



## Full wwPDB EM Validation Report ⓘ

Jun 3, 2024 – 09:03 PM JST

PDB ID : 7V2N  
EMDB ID : EMD-31657  
Title : T.thermophilus 30S ribosome with KsgA, class K2  
Authors : Raina, R.; Singh, J.; Anand, R.; Vinothkumar, K.R.  
Deposited on : 2021-08-09  
Resolution : 3.60 Å (reported)  
Based on initial model : 4B3R

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

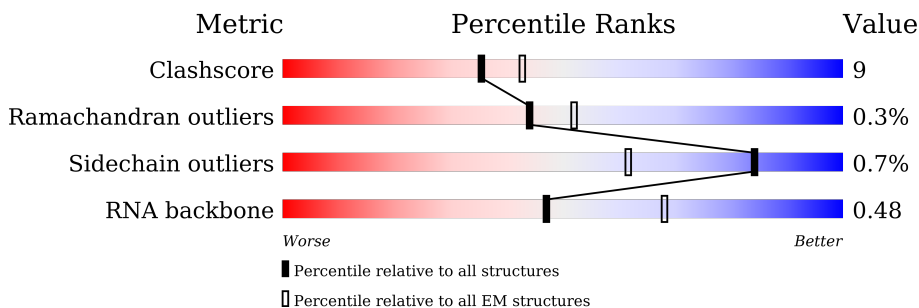
EMDB validation analysis : 0.0.1.dev92  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.60 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



| Metric                | Whole archive (#Entries) | EM structures (#Entries) |
|-----------------------|--------------------------|--------------------------|
| Clashscore            | 158937                   | 4297                     |
| Ramachandran outliers | 154571                   | 4023                     |
| Sidechain outliers    | 154315                   | 3826                     |
| RNA backbone          | 4643                     | 859                      |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1   | A     | 1522   |                  |
| 2   | B     | 256    |                  |
| 3   | C     | 239    |                  |
| 4   | D     | 209    |                  |
| 5   | E     | 162    |                  |
| 6   | F     | 101    |                  |
| 7   | G     | 156    |                  |

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| Mol | Chain | Length | Quality of chain   |
|-----|-------|--------|--|
| 8   | H     | 138    |    |
| 9   | I     | 128    |    |
| 10  | J     | 105    |    |
| 11  | K     | 129    |    |
| 12  | L     | 132    |    |
| 13  | M     | 126    |    |
| 14  | N     | 61     |    |
| 15  | O     | 89     |    |
| 16  | P     | 88     |    |
| 17  | Q     | 105    |    |
| 18  | R     | 88     |    |
| 19  | S     | 93     |    |
| 20  | T     | 106    |   |
| 21  | U     | 298    |  |
| 22  | V     | 27     |  |

## 2 Entry composition [i](#)

There are 23 unique types of molecules in this entry. The entry contains 51020 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called 16s ribosomal RNA.

| Mol | Chain | Residues | Atoms |       |      |      |      | AltConf | Trace |
|-----|-------|----------|-------|-------|------|------|------|---------|-------|
|     |       |          | Total | C     | N    | O    | P    |         |       |
| 1   | A     | 1394     | 29962 | 13336 | 5547 | 9685 | 1394 | 0       | 0     |

- Molecule 2 is a protein called 30S ribosomal protein S2.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 2   | B     | 220      | 1802  | 1150 | 326 | 321 | 5 | 0       | 0     |

- Molecule 3 is a protein called 30S ribosomal protein S3.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 3   | C     | 206      | 1612  | 1016 | 314 | 281 | 1 | 0       | 0     |

- Molecule 4 is a protein called 30S ribosomal protein S4.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 4   | D     | 208      | 1703  | 1066 | 339 | 291 | 7 | 0       | 0     |

- Molecule 5 is a protein called 30S ribosomal protein S5.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 5   | E     | 150      | 1146  | 724 | 217 | 201 | 4 | 0       | 0     |

- Molecule 6 is a protein called 30S ribosomal protein S6.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 6   | F     | 101      | 843   | 531 | 155 | 154 | 3 | 0       | 0     |

- Molecule 7 is a protein called 30S ribosomal protein S7.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 7   | G     | 155      | 1257  | 781 | 252 | 218 | 6 | 0       | 0     |

- Molecule 8 is a protein called 30S ribosomal protein S8.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 8   | H     | 138      | 1116  | 705 | 215 | 193 | 3 | 0       | 0     |

- Molecule 9 is a protein called 30S ribosomal protein S9.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
|     |       |          | Total | C   | N   | O   |         |       |
| 9   | I     | 127      | 1010  | 639 | 197 | 174 | 0       | 0     |

- Molecule 10 is a protein called 30S ribosomal protein S10.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 10  | J     | 98       | 794   | 499 | 156 | 138 | 1 | 0       | 0     |

- Molecule 11 is a protein called 30S ribosomal protein S11.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 11  | K     | 119      | 885   | 549 | 168 | 165 | 3 | 0       | 0     |

- Molecule 12 is a protein called 30S ribosomal protein S12.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 12  | L     | 124      | 970   | 611 | 195 | 163 | 1 | 0       | 0     |

- Molecule 13 is a protein called 30S ribosomal protein S13.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 13  | M     | 113      | 905   | 559 | 187 | 157 | 2 | 0       | 0     |

- Molecule 14 is a protein called 30S ribosomal protein S14 type Z.

| Mol | Chain | Residues | Atoms |     |     |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---|---------|-------|
| 14  | N     | 60       | Total | C   | N   | O  | S | 0       | 0     |
|     |       |          | 492   | 312 | 104 | 72 | 4 |         |       |

- Molecule 15 is a protein called 30S ribosomal protein S15.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 15  | O     | 88       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 734   | 459 | 147 | 126 | 2 |         |       |

- Molecule 16 is a protein called 30S ribosomal protein S16.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 16  | P     | 81       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 682   | 433 | 136 | 112 | 1 |         |       |

- Molecule 17 is a protein called 30S ribosomal protein S17.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 17  | Q     | 100      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 834   | 534 | 155 | 143 | 2 |         |       |

- Molecule 18 is a protein called 30S ribosomal protein S18.

| Mol | Chain | Residues | Atoms |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---------|-------|
| 18  | R     | 69       | Total | C   | N   | O  | 0       | 0     |
|     |       |          | 565   | 361 | 110 | 94 |         |       |

- Molecule 19 is a protein called 30S ribosomal protein S19.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 19  | S     | 80       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 647   | 414 | 119 | 112 | 2 |         |       |

- Molecule 20 is a protein called 30S ribosomal protein S20.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 20  | T     | 99       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 763   | 470 | 162 | 129 | 2 |         |       |

- Molecule 21 is a protein called Ribosomal RNA small subunit methyltransferase A.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
|     |       |          | Total | C    | N   | O   | S |         |       |
| 21  | U     | 266      | 2088  | 1336 | 347 | 399 | 6 | 0       | 0     |

There are 6 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment        | Reference  |
|-------|---------|----------|--------|----------------|------------|
| U     | -5      | HIS      | -      | expression tag | UNP P37468 |
| U     | -4      | HIS      | -      | expression tag | UNP P37468 |
| U     | -3      | HIS      | -      | expression tag | UNP P37468 |
| U     | -2      | HIS      | -      | expression tag | UNP P37468 |
| U     | -1      | HIS      | -      | expression tag | UNP P37468 |
| U     | 0       | HIS      | -      | expression tag | UNP P37468 |

- Molecule 22 is a protein called 30S ribosomal protein Thx.

| Mol | Chain | Residues | Atoms |     |    |    | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---------|-------|
|     |       |          | Total | C   | N  | O  |         |       |
| 22  | V     | 24       | 208   | 128 | 50 | 30 | 0       | 0     |

- Molecule 23 is ZINC ION (three-letter code: ZN) (formula: Zn).

| Mol | Chain | Residues | Atoms |    | AltConf |
|-----|-------|----------|-------|----|---------|
|     |       |          | Total | Zn |         |
| 23  | D     | 1        | 1     | 1  | 0       |
| 23  | N     | 1        | 1     | 1  | 0       |

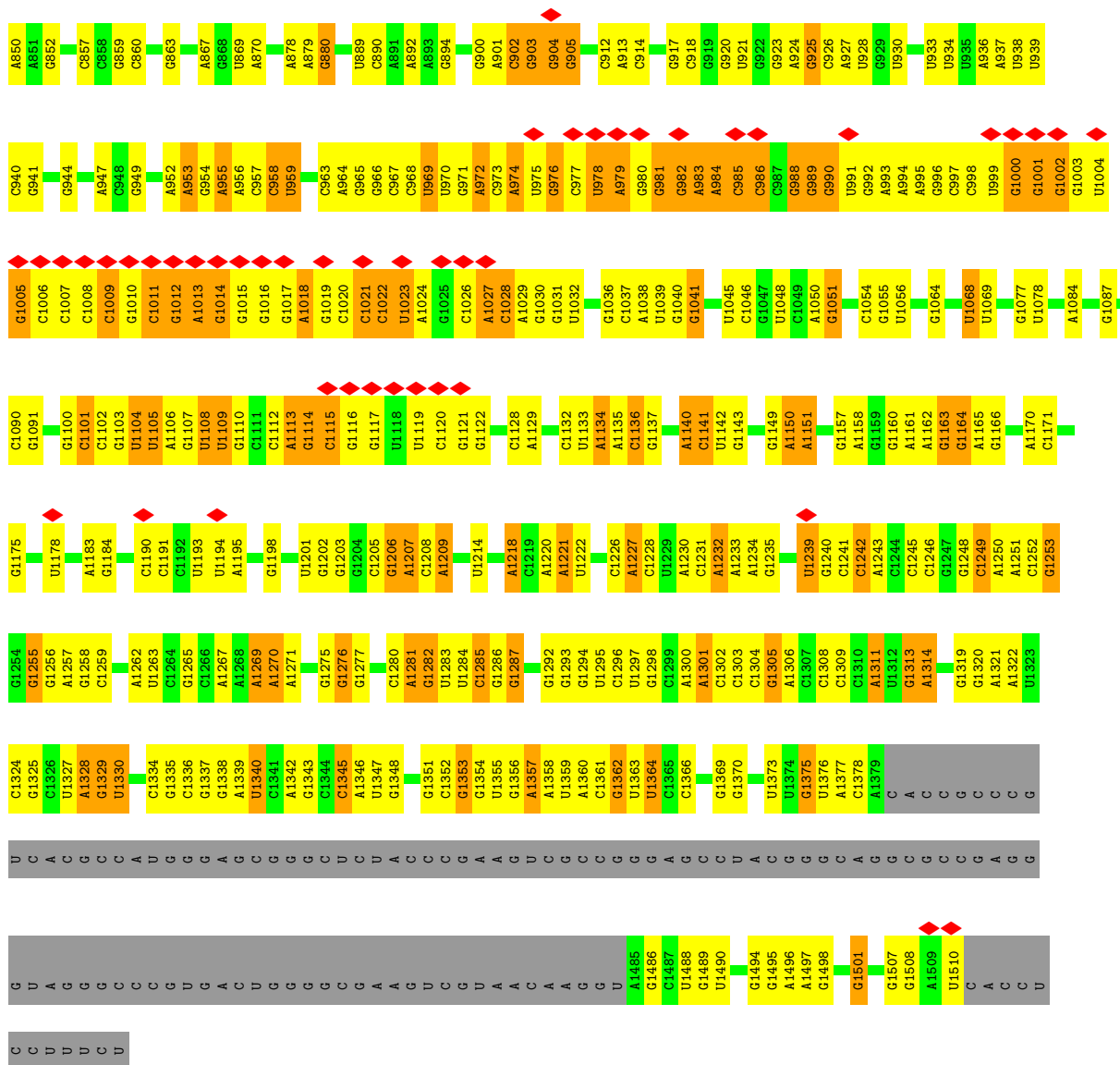
### 3 Residue-property plots i

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

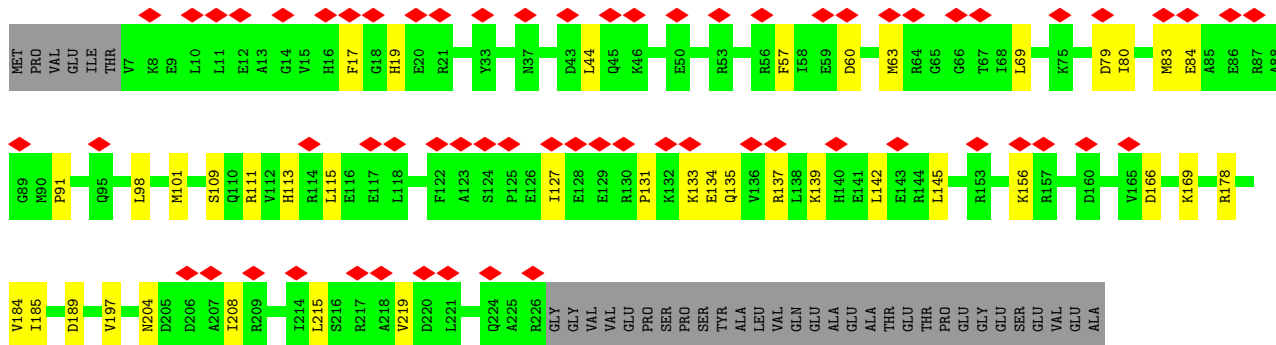
- Molecule 1: 16s ribosomal RNA



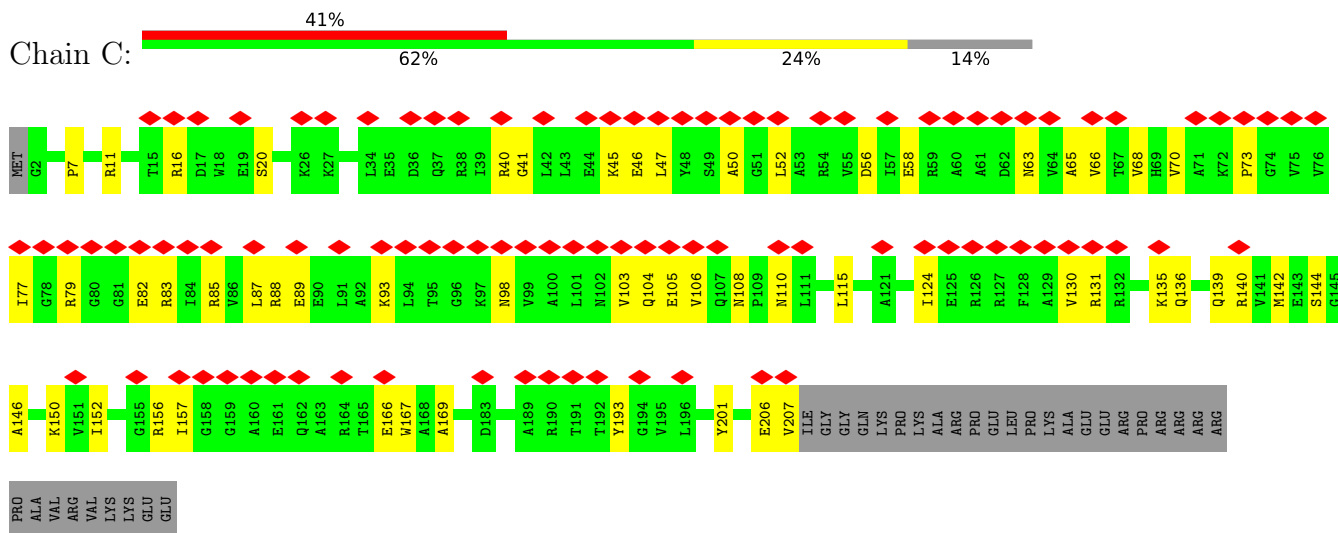




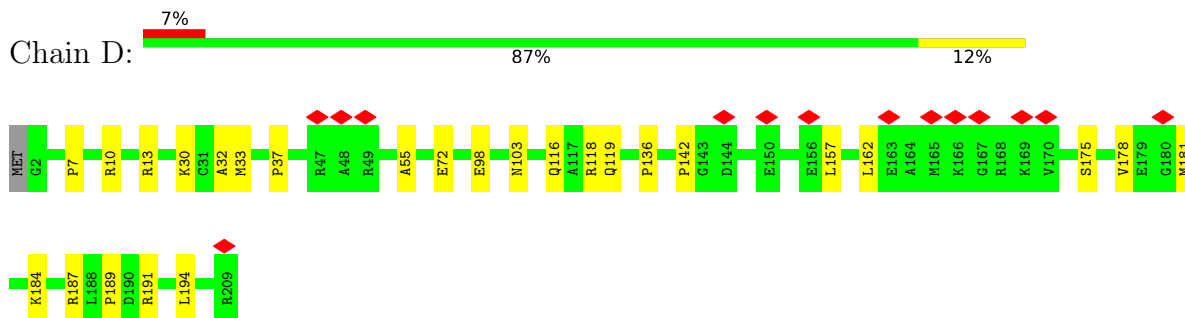
• Molecule 2: 30S ribosomal protein S2



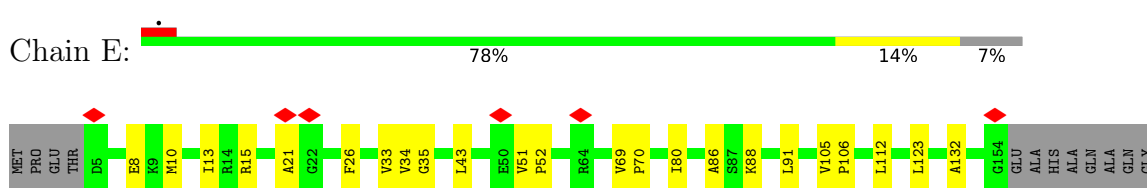
• Molecule 3: 30S ribosomal protein S3



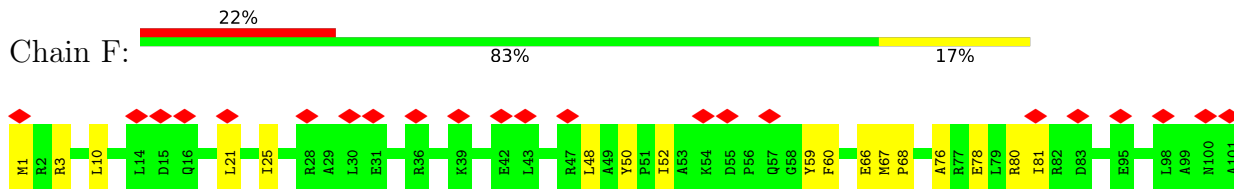
• Molecule 4: 30S ribosomal protein S4



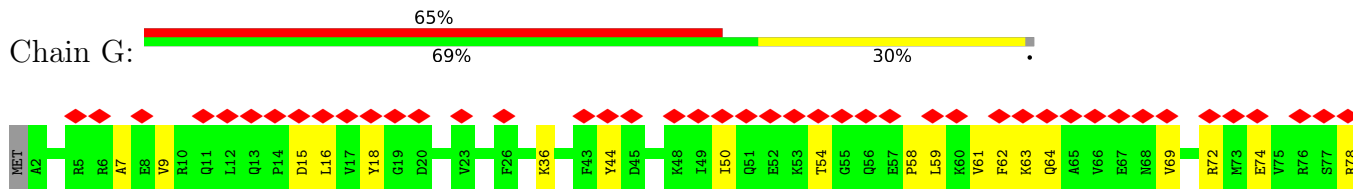
• Molecule 5: 30S ribosomal protein S5

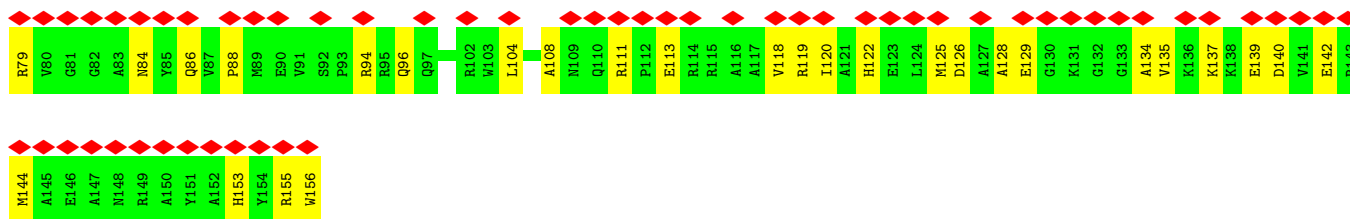


• Molecule 6: 30S ribosomal protein S6

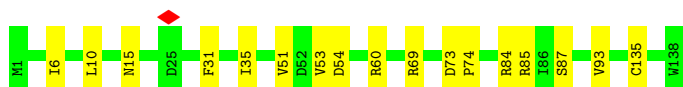
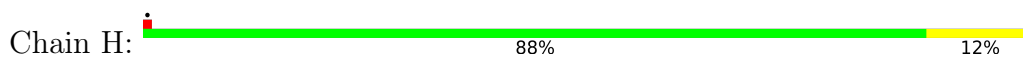


• Molecule 7: 30S ribosomal protein S7





- Molecule 8: 30S ribosomal protein S8



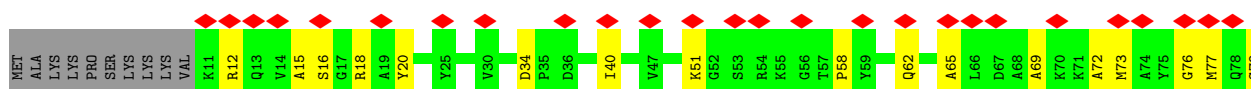
- Molecule 9: 30S ribosomal protein S9



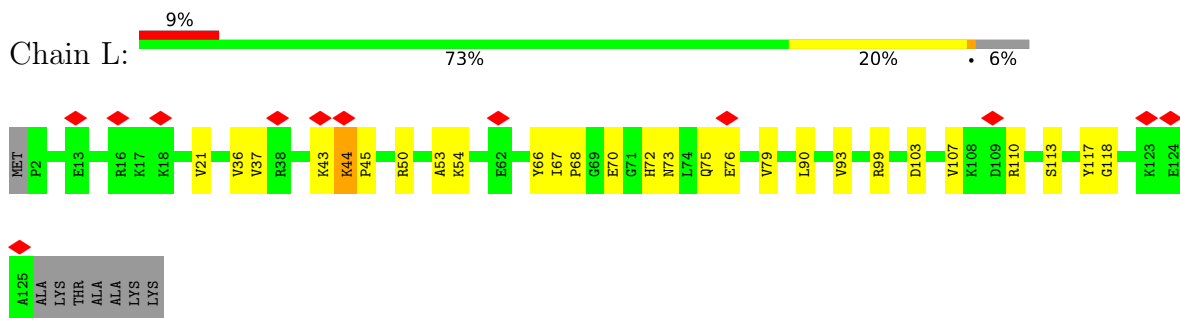
- Molecule 10: 30S ribosomal protein S10



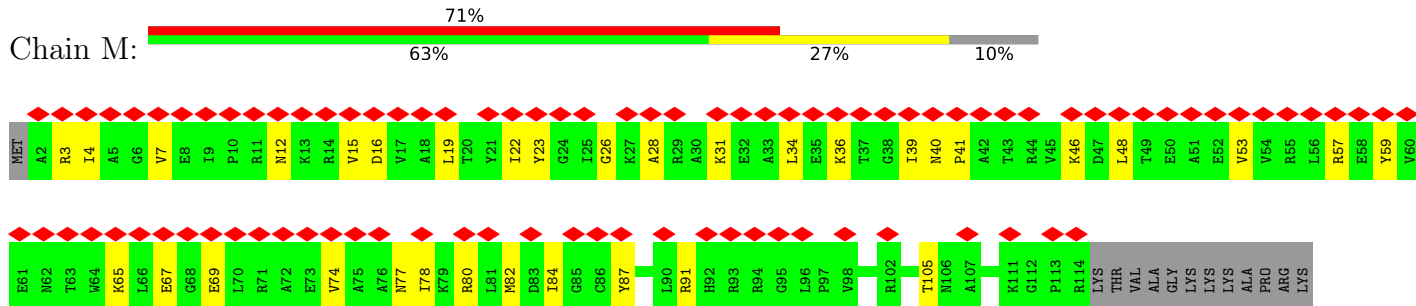
- Molecule 11: 30S ribosomal protein S11



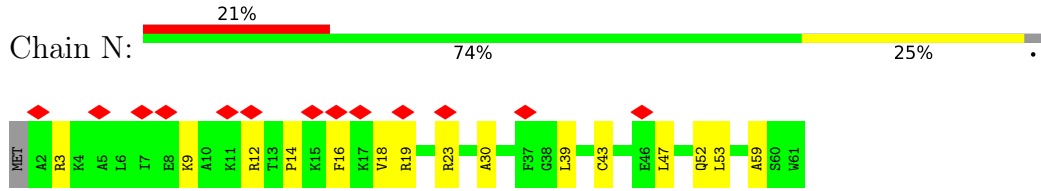
- Molecule 12: 30S ribosomal protein S12



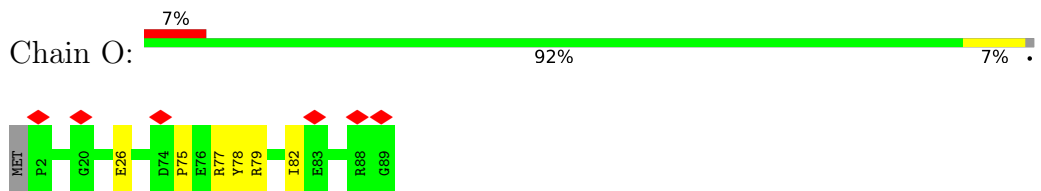
• Molecule 13: 30S ribosomal protein S13



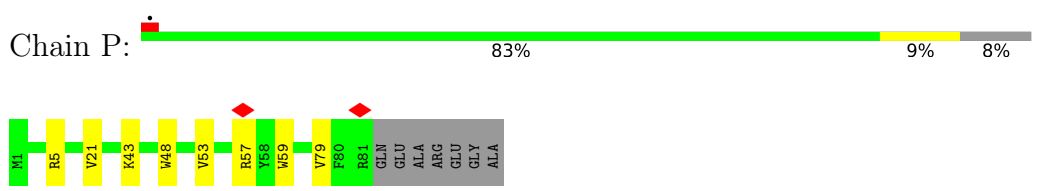
• Molecule 14: 30S ribosomal protein S14 type Z



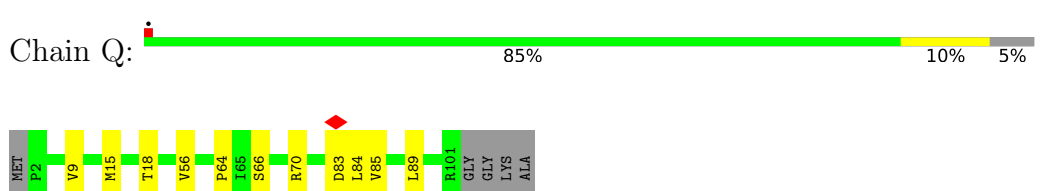
• Molecule 15: 30S ribosomal protein S15



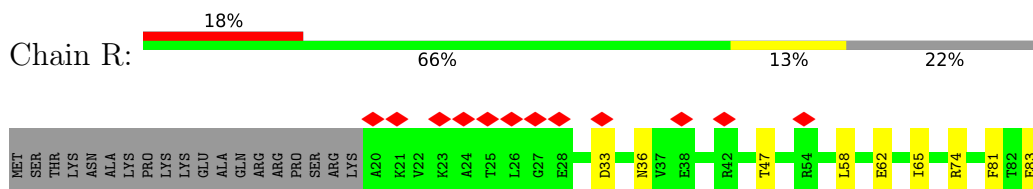
• Molecule 16: 30S ribosomal protein S16



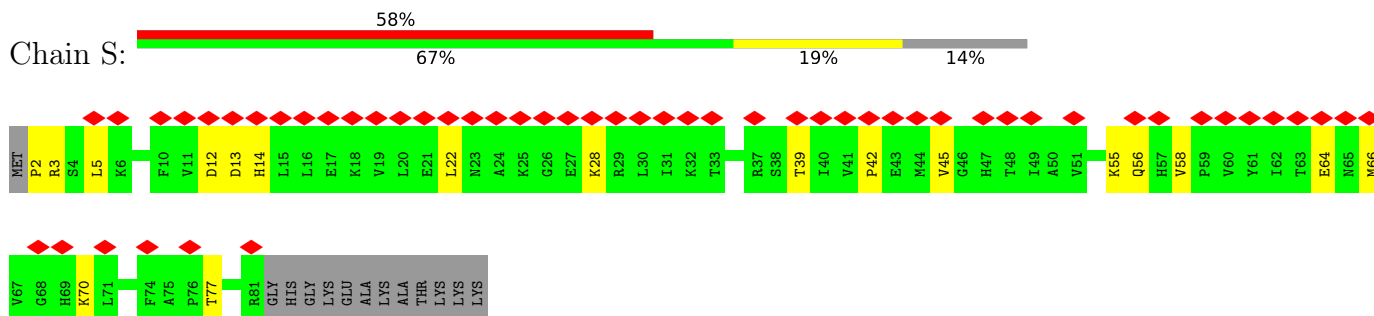
• Molecule 17: 30S ribosomal protein S17



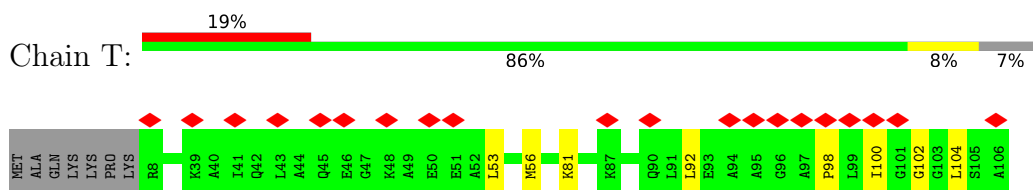
- Molecule 18: 30S ribosomal protein S18



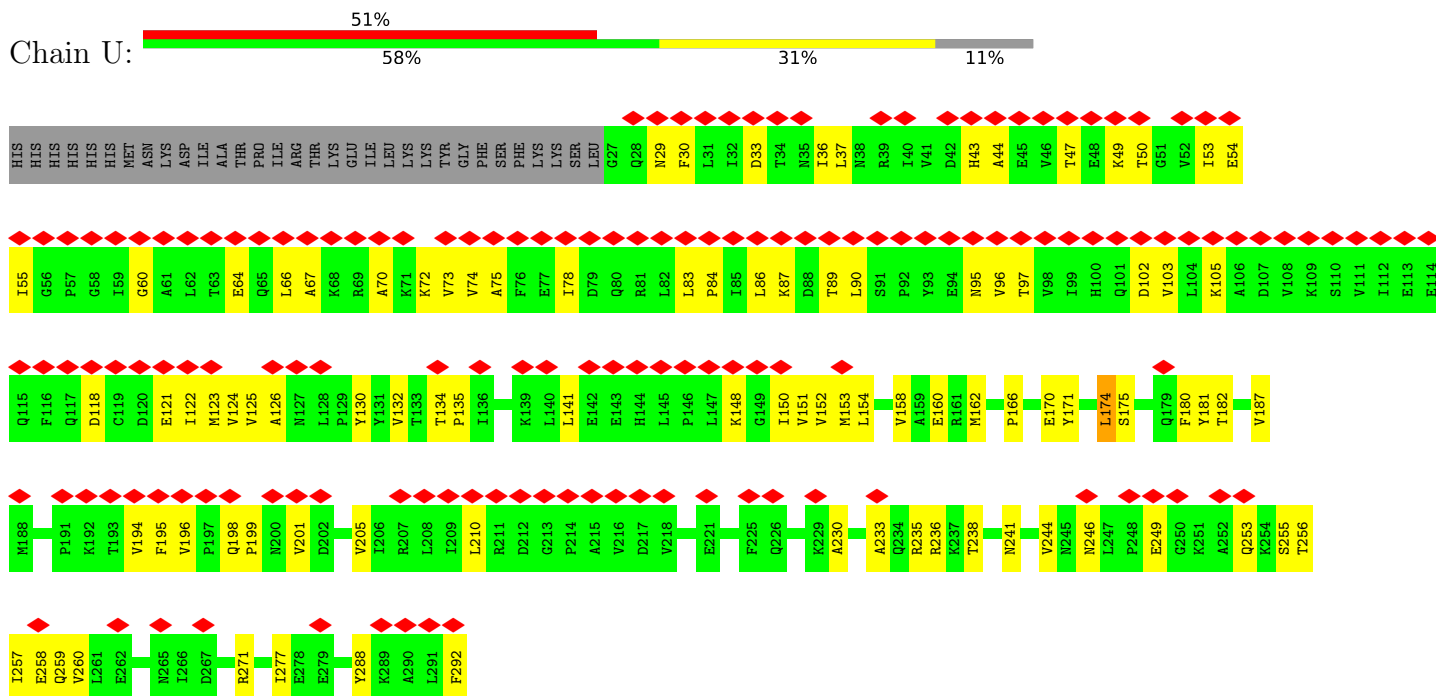
- Molecule 19: 30S ribosomal protein S19



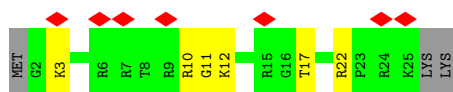
- Molecule 20: 30S ribosomal protein S20



- Molecule 21: Ribosomal RNA small subunit methyltransferase A



- Molecule 22: 30S ribosomal protein Thx



## 4 Experimental information

| Property                             | Value                                   | Source    |
|--------------------------------------|---|-----------|
| EM reconstruction method             | SINGLE PARTICLE                         | Depositor |
| Imposed symmetry                     | POINT, C1                               | Depositor |
| Number of particles used             | 50201                                   | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF                       | Depositor |
| CTF correction method                | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope                           | FEI TITAN KRIOS                         | Depositor |
| Voltage (kV)                         | 300                                     | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 43.0                                    | Depositor |
| Minimum defocus (nm)                 | 1800                                    | Depositor |
| Maximum defocus (nm)                 | 3500                                    | Depositor |
| Magnification                        | 101449                                  | Depositor |
| Image detector                       | FEI FALCON III (4k x 4k)                | Depositor |
| Maximum map value                    | 0.359                                   | Depositor |
| Minimum map value                    | -0.089                                  | Depositor |
| Average map value                    | -0.000                                  | Depositor |
| Map value standard deviation         | 0.013                                   | Depositor |
| Recommended contour level            | 0.075                                   | Depositor |
| Map size (Å)                         | 441.6, 441.6, 441.6                     | wwPDB     |
| Map dimensions                       | 320, 320, 320                           | wwPDB     |
| Map angles (°)                       | 90.0, 90.0, 90.0                        | wwPDB     |
| Pixel spacing (Å)                    | 1.38, 1.38, 1.38                        | Depositor |

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section:  
ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths |         | Bond angles |                |
|-----|-------|--------------|---------|-------------|----------------|
|     |       | RMSZ         | # Z  >5 | RMSZ        | # Z  >5        |
| 1   | A     | 0.57         | 0/33537 | 0.81        | 2/52338 (0.0%) |
| 2   | B     | 0.25         | 0/1834  | 0.59        | 0/2469         |
| 3   | C     | 0.27         | 0/1636  | 0.62        | 0/2205         |
| 4   | D     | 0.27         | 0/1733  | 0.58        | 0/2318         |
| 5   | E     | 0.27         | 0/1162  | 0.60        | 0/1564         |
| 6   | F     | 0.25         | 0/856   | 0.61        | 0/1154         |
| 7   | G     | 0.26         | 0/1276  | 0.65        | 0/1709         |
| 8   | H     | 0.26         | 0/1136  | 0.60        | 0/1527         |
| 9   | I     | 0.27         | 0/1029  | 0.66        | 0/1379         |
| 10  | J     | 0.27         | 0/807   | 0.64        | 0/1085         |
| 11  | K     | 0.28         | 0/900   | 0.64        | 0/1213         |
| 12  | L     | 0.26         | 0/986   | 0.63        | 0/1320         |
| 13  | M     | 0.26         | 0/915   | 0.67        | 0/1227         |
| 14  | N     | 0.26         | 0/501   | 0.58        | 0/664          |
| 15  | O     | 0.25         | 0/745   | 0.58        | 0/992          |
| 16  | P     | 0.25         | 0/698   | 0.59        | 0/939          |
| 17  | Q     | 0.24         | 0/847   | 0.58        | 0/1131         |
| 18  | R     | 0.25         | 0/570   | 0.60        | 0/757          |
| 19  | S     | 0.26         | 0/661   | 0.60        | 0/890          |
| 20  | T     | 0.26         | 0/765   | 0.63        | 0/1007         |
| 21  | U     | 0.26         | 0/2119  | 0.63        | 0/2871         |
| 22  | V     | 0.31         | 0/212   | 0.66        | 0/277          |
| All | All   | 0.48         | 0/54925 | 0.75        | 2/81036 (0.0%) |

There are no bond length outliers.

All (2) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms       | Z    | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|------|-------------|----------|
| 1   | A     | 82  | U    | C2'-C3'-O3' | 5.86 | 123.08      | 113.70   |
| 1   | A     | 156 | A    | C2'-C3'-O3' | 5.33 | 122.22      | 113.70   |



There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1   | A     | 29962 | 0        | 15122    | 394     | 0            |
| 2   | B     | 1802  | 0        | 1855     | 28      | 0            |
| 3   | C     | 1612  | 0        | 1677     | 40      | 0            |
| 4   | D     | 1703  | 0        | 1763     | 18      | 0            |
| 5   | E     | 1146  | 0        | 1207     | 12      | 0            |
| 6   | F     | 843   | 0        | 857      | 9       | 0            |
| 7   | G     | 1257  | 0        | 1296     | 32      | 0            |
| 8   | H     | 1116  | 0        | 1177     | 11      | 0            |
| 9   | I     | 1010  | 0        | 1037     | 35      | 0            |
| 10  | J     | 794   | 0        | 840      | 17      | 0            |
| 11  | K     | 885   | 0        | 904      | 26      | 0            |
| 12  | L     | 970   | 0        | 1057     | 17      | 0            |
| 13  | M     | 905   | 0        | 958      | 26      | 0            |
| 14  | N     | 492   | 0        | 529      | 11      | 0            |
| 15  | O     | 734   | 0        | 771      | 4       | 0            |
| 16  | P     | 682   | 0        | 706      | 5       | 0            |
| 17  | Q     | 834   | 0        | 904      | 6       | 0            |
| 18  | R     | 565   | 0        | 631      | 7       | 0            |
| 19  | S     | 647   | 0        | 673      | 12      | 0            |
| 20  | T     | 763   | 0        | 861      | 4       | 0            |
| 21  | U     | 2088  | 0        | 2154     | 61      | 0            |
| 22  | V     | 208   | 0        | 221      | 5       | 0            |
| 23  | D     | 1     | 0        | 0        | 0       | 0            |
| 23  | N     | 1     | 0        | 0        | 0       | 0            |
| All | All   | 51020 | 0        | 37200    | 744     | 0            |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

All (744) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 1:A:1339:A:H61    | 1:A:1348:G:H1     | 1.15                     | 0.93              |
| 1:A:495:C:H5      | 1:A:524:G:H1      | 1.19                     | 0.90              |
| 1:A:1243:A:H62    | 1:A:1256:G:H21    | 1.20                     | 0.86              |
| 1:A:180:A:N6      | 1:A:199:U:H3      | 1.72                     | 0.85              |
| 1:A:933:U:H1'     | 1:A:1209:A:H61    | 1.41                     | 0.84              |
| 1:A:180:A:H62     | 1:A:199:U:H3      | 1.26                     | 0.82              |
| 1:A:36:G:H1       | 1:A:533:C:H5      | 1.31                     | 0.79              |
| 10:J:8:LEU:HB2    | 10:J:70:ARG:HB2   | 1.63                     | 0.78              |
| 9:I:86:VAL:HG21   | 9:I:102:LEU:HD11  | 1.66                     | 0.76              |
| 11:K:82:VAL:HB    | 11:K:108:ILE:HG22 | 1.68                     | 0.76              |
| 10:J:90:LEU:HD21  | 10:J:96:ILE:HG12  | 1.67                     | 0.75              |
| 21:U:182:THR:HG22 | 21:U:210:LEU:HA   | 1.68                     | 0.75              |
| 13:M:12:ASN:HA    | 13:M:46:LYS:HZ2   | 1.51                     | 0.75              |
| 1:A:153:G:H3'     | 1:A:154:G:H21     | 1.51                     | 0.74              |
| 21:U:162:MET:HG2  | 21:U:170:GLU:HG2  | 1.69                     | 0.74              |
| 13:M:4:ILE:HD12   | 13:M:57:ARG:HB2   | 1.70                     | 0.72              |
| 21:U:130:TYR:HD1  | 21:U:154:LEU:HA   | 1.54                     | 0.72              |
| 1:A:42:G:H1       | 1:A:397:C:H5      | 1.37                     | 0.72              |
| 18:R:58:LEU:HB3   | 18:R:62:GLU:HG3   | 1.70                     | 0.72              |
| 1:A:1243:A:H62    | 1:A:1256:G:N2     | 1.88                     | 0.72              |
| 1:A:1022:C:H4'    | 1:A:1023:U:C5     | 2.25                     | 0.71              |
| 1:A:488:C:H5      | 1:A:525:G:H1      | 1.40                     | 0.70              |
| 21:U:29:ASN:OD1   | 21:U:29:ASN:O     | 2.09                     | 0.70              |
| 1:A:1339:A:N6     | 1:A:1348:G:H1     | 1.89                     | 0.70              |
| 17:Q:9:VAL:HG12   | 17:Q:56:VAL:HG22  | 1.72                     | 0.70              |
| 1:A:485:C:H2'     | 1:A:486:G:H8      | 1.57                     | 0.70              |
| 13:M:7:VAL:HG21   | 13:M:22:ILE:HG12  | 1.73                     | 0.70              |
| 5:E:43:LEU:HD11   | 5:E:132:ALA:HB1   | 1.74                     | 0.69              |
| 21:U:90:LEU:HB3   | 21:U:96:VAL:HG21  | 1.74                     | 0.69              |
| 19:S:45:VAL:HG11  | 19:S:64:GLU:HG2   | 1.74                     | 0.69              |
| 1:A:529:C:H5''    | 4:D:72:GLU:HG2    | 1.75                     | 0.68              |
| 8:H:87:SER:HB2    | 8:H:93:VAL:H      | 1.58                     | 0.68              |
| 11:K:58:PRO:HB3   | 11:K:93:GLN:HG2   | 1.75                     | 0.68              |
| 21:U:29:ASN:ND2   | 21:U:130:TYR:OH   | 2.25                     | 0.68              |
| 21:U:84:PRO:O     | 21:U:87:LYS:HB2   | 1.93                     | 0.68              |
| 21:U:78:ILE:HG22  | 21:U:102:ASP:HA   | 1.76                     | 0.68              |
| 1:A:905:G:H1      | 1:A:1373:U:H3     | 1.41                     | 0.67              |
| 11:K:65:ALA:HB1   | 11:K:98:LEU:HG    | 1.76                     | 0.67              |
| 1:A:523:A:H2'     | 1:A:524:G:C8      | 2.29                     | 0.67              |
| 14:N:16:PHE:HB2   | 14:N:19:ARG:HG3   | 1.75                     | 0.67              |
| 21:U:55:ILE:HG23  | 21:U:103:VAL:HG11 | 1.76                     | 0.67              |
| 22:V:3:LYS:HG3    | 22:V:10:ARG:HH11  | 1.58                     | 0.67              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 11:K:79:SER:HB2  | 11:K:104:GLN:HB2  | 1.76                     | 0.67              |
| 1:A:208:C:O2'    | 1:A:209:U:O4'     | 2.12                     | 0.67              |
| 9:I:15:ALA:HB1   | 9:I:77:ILE:HD13   | 1.76                     | 0.67              |
| 1:A:657:G:H2'    | 1:A:658:G:C8      | 2.31                     | 0.66              |
| 1:A:1313:G:O2'   | 1:A:1314:A:H8     | 1.77                     | 0.66              |
| 1:A:45:G:HO2'    | 1:A:46:U:H6       | 1.43                     | 0.66              |
| 4:D:191:ARG:O    | 4:D:191:ARG:NH1   | 2.29                     | 0.66              |
| 1:A:132:C:H5     | 1:A:222:G:H1      | 1.44                     | 0.66              |
| 1:A:1359:U:H2'   | 1:A:1360:A:H8     | 1.59                     | 0.65              |
| 9:I:104:ARG:NH1  | 9:I:105:ASP:O     | 2.28                     | 0.65              |
| 2:B:111:ARG:HD2  | 2:B:145:LEU:HD21  | 1.78                     | 0.65              |
| 1:A:981:G:N2     | 1:A:1023:U:O4     | 2.29                     | 0.65              |
| 11:K:18:ARG:HG2  | 11:K:81:ASP:HB2   | 1.77                     | 0.64              |
| 1:A:75:C:H2'     | 1:A:76:G:H4'      | 1.79                     | 0.64              |
| 1:A:508:G:H2'    | 1:A:509:C:C6      | 2.33                     | 0.64              |
| 1:A:956:A:OP2    | 1:A:1345:C:N4     | 2.29                     | 0.64              |
| 1:A:965:G:H21    | 1:A:993:A:H2      | 1.43                     | 0.64              |
| 3:C:139:GLN:HE22 | 3:C:140:ARG:HE    | 1.44                     | 0.64              |
| 4:D:98:GLU:HA    | 4:D:103:ASN:HD22  | 1.63                     | 0.64              |
| 1:A:1269:A:H2'   | 1:A:1270:A:C8     | 2.33                     | 0.63              |
| 9:I:10:ARG:HG2   | 9:I:75:ASP:HB2    | 1.78                     | 0.63              |
| 3:C:46:GLU:HG3   | 3:C:83:ARG:HH22   | 1.64                     | 0.62              |
| 3:C:150:LYS:HB3  | 3:C:201:TYR:HB2   | 1.80                     | 0.62              |
| 7:G:58:PRO:HB2   | 7:G:62:PHE:CE2    | 2.33                     | 0.62              |
| 1:A:485:C:H2'    | 1:A:486:G:C8      | 2.34                     | 0.62              |
| 2:B:19:HIS:NE2   | 2:B:189:ASP:OD2   | 2.32                     | 0.62              |
| 1:A:590:G:H8     | 1:A:616:A:H62     | 1.47                     | 0.62              |
| 4:D:162:LEU:HG   | 4:D:178:VAL:HG23  | 1.80                     | 0.62              |
| 7:G:153:HIS:HA   | 7:G:155:ARG:HE    | 1.64                     | 0.62              |
| 9:I:92:TYR:HD1   | 9:I:95:LYS:HZ1    | 1.48                     | 0.62              |
| 13:M:4:ILE:HD11  | 13:M:53:VAL:HG22  | 1.81                     | 0.62              |
| 1:A:924:A:H2'    | 1:A:925:G:C8      | 2.35                     | 0.62              |
| 2:B:98:LEU:H     | 2:B:101:MET:HE3   | 1.64                     | 0.62              |
| 13:M:34:LEU:HG   | 13:M:39:ILE:HG23  | 1.82                     | 0.62              |
| 7:G:78:ARG:NH1   | 7:G:79:ARG:O      | 2.33                     | 0.62              |
| 7:G:111:ARG:NH2  | 7:G:126:ASP:OD2   | 2.32                     | 0.62              |
| 1:A:439:C:H2'    | 1:A:440:G:H5''    | 1.82                     | 0.61              |
| 1:A:463:A:H2'    | 1:A:464:C:C2      | 2.36                     | 0.61              |
| 1:A:646:G:H2'    | 1:A:647:A:C8      | 2.35                     | 0.61              |
| 7:G:58:PRO:HB2   | 7:G:62:PHE:HE2    | 1.64                     | 0.61              |
| 21:U:249:GLU:HB3 | 21:U:253:GLN:HE22 | 1.66                     | 0.61              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:590:G:H5'    | 1:A:591:A:H5'     | 1.81                     | 0.61              |
| 1:A:925:G:H4'    | 1:A:1314:A:H2     | 1.65                     | 0.61              |
| 1:A:1308:C:H5''  | 22:V:12:LYS:NZ    | 2.15                     | 0.61              |
| 3:C:56:ASP:O     | 3:C:66:VAL:HA     | 2.00                     | 0.61              |
| 13:M:78:ILE:O    | 13:M:82:MET:HG3   | 2.00                     | 0.61              |
| 1:A:691:C:H2'    | 1:A:692:C:C6      | 2.36                     | 0.61              |
| 1:A:1241:C:O2'   | 1:A:1265:G:N3     | 2.34                     | 0.61              |
| 6:F:3:ARG:HH21   | 6:F:66:GLU:HG3    | 1.66                     | 0.61              |
| 9:I:46:ALA:HB2   | 9:I:74:ILE:HG23   | 1.83                     | 0.61              |
| 1:A:924:A:H2'    | 1:A:925:G:H8      | 1.67                     | 0.60              |
| 3:C:47:LEU:HD11  | 3:C:87:LEU:HD21   | 1.83                     | 0.60              |
| 11:K:12:ARG:NH2  | 11:K:34:ASP:OD2   | 2.35                     | 0.60              |
| 3:C:156:ARG:NH1  | 3:C:193:TYR:O     | 2.35                     | 0.60              |
| 11:K:120:ARG:HE  | 11:K:126:ARG:NH1  | 2.00                     | 0.60              |
| 1:A:78:G:H2'     | 1:A:79:G:C8       | 2.37                     | 0.60              |
| 1:A:1243:A:N6    | 1:A:1256:G:H21    | 1.97                     | 0.60              |
| 1:A:1338:G:H2'   | 1:A:1339:A:C8     | 2.37                     | 0.60              |
| 7:G:64:GLN:HE22  | 7:G:128:ALA:HB1   | 1.66                     | 0.60              |
| 2:B:133:LYS:HG3  | 2:B:137:ARG:HH22  | 1.66                     | 0.60              |
| 5:E:35:GLY:HA3   | 5:E:112:LEU:HB3   | 1.82                     | 0.60              |
| 19:S:22:LEU:HD11 | 19:S:28:LYS:HB2   | 1.82                     | 0.60              |
| 1:A:445:G:H1     | 1:A:468:C:H5      | 1.49                     | 0.60              |
| 1:A:1027:A:H3'   | 1:A:1028:C:H4'    | 1.81                     | 0.60              |
| 9:I:65:VAL:HG23  | 9:I:77:ILE:HD11   | 1.84                     | 0.60              |
| 10:J:3:LYS:HE3   | 10:J:76:ASN:H     | 1.67                     | 0.60              |
| 1:A:404:A:N1     | 1:A:430:U:H5      | 2.00                     | 0.59              |
| 1:A:1040:G:H3'   | 1:A:1041:G:H8     | 1.67                     | 0.59              |
| 1:A:499:G:H2'    | 1:A:500:U:H6      | 1.66                     | 0.59              |
| 1:A:989:G:H22    | 1:A:999:U:H1'     | 1.66                     | 0.59              |
| 1:A:367:G:H1'    | 1:A:467:A:H1'     | 1.85                     | 0.59              |
| 21:U:30:PHE:HB2  | 21:U:196:VAL:HB   | 1.84                     | 0.59              |
| 1:A:124:G:N2     | 1:A:191:G:OP2     | 2.34                     | 0.59              |
| 6:F:10:LEU:HD21  | 6:F:59:TYR:HD2    | 1.68                     | 0.59              |
| 8:H:69:ARG:NH1   | 8:H:73:ASP:O      | 2.36                     | 0.59              |
| 21:U:238:THR:HA  | 21:U:271:ARG:HD3  | 1.85                     | 0.59              |
| 21:U:43:HIS:HB3  | 21:U:187:VAL:HG21 | 1.84                     | 0.59              |
| 21:U:141:LEU:HB3 | 21:U:181:TYR:HD2  | 1.67                     | 0.59              |
| 1:A:1297:U:O4    | 1:A:1301:A:N7     | 2.36                     | 0.59              |
| 1:A:74:G:H1      | 1:A:88:C:H42      | 1.52                     | 0.58              |
| 1:A:703:C:OP2    | 1:A:704:C:N4      | 2.35                     | 0.58              |
| 2:B:115:LEU:HD13 | 2:B:145:LEU:HB3   | 1.85                     | 0.58              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:151:G:H2'    | 1:A:152:G:H5''    | 1.84                     | 0.58              |
| 21:U:84:PRO:HA   | 21:U:87:LYS:HD3   | 1.85                     | 0.58              |
| 1:A:1045:U:H2'   | 1:A:1046:C:C6     | 2.39                     | 0.58              |
| 9:I:10:ARG:NH1   | 9:I:75:ASP:OD2    | 2.36                     | 0.58              |
| 1:A:1308:C:H5''  | 22:V:12:LYS:HZ1   | 1.68                     | 0.58              |
| 1:A:674:G:H2'    | 1:A:675:G:C8      | 2.39                     | 0.57              |
| 10:J:79:ARG:HH21 | 10:J:82:ILE:HD13  | 1.69                     | 0.57              |
| 1:A:1103:G:H2'   | 1:A:1104:U:C6     | 2.39                     | 0.57              |
| 5:E:33:VAL:HG12  | 5:E:112:LEU:HD12  | 1.86                     | 0.57              |
| 1:A:698:G:H2'    | 1:A:699:A:C8      | 2.39                     | 0.57              |
| 2:B:84:GLU:HG3   | 2:B:215:LEU:HB3   | 1.85                     | 0.57              |
| 1:A:1359:U:H2'   | 1:A:1360:A:C8     | 2.39                     | 0.57              |
| 1:A:1005:G:H21   | 1:A:1006:C:H42    | 1.53                     | 0.57              |
| 1:A:1257:A:H3'   | 1:A:1258:G:H8     | 1.68                     | 0.57              |
| 9:I:32:ASP:HB3   | 9:I:35:GLU:HG2    | 1.87                     | 0.57              |
| 1:A:74:G:H21     | 1:A:91:G:H1       | 1.52                     | 0.57              |
| 14:N:9:LYS:HA    | 14:N:12:ARG:HH21  | 1.69                     | 0.56              |
| 1:A:1160:G:N2    | 1:A:1162:A:H3'    | 2.20                     | 0.56              |
| 13:M:28:ALA:HA   | 13:M:31:LYS:NZ    | 2.18                     | 0.56              |
| 1:A:901:A:HO2'   | 1:A:902:C:H6      | 1.51                     | 0.56              |
| 9:I:48:GLU:N     | 9:I:49:PRO:HD2    | 2.20                     | 0.56              |
| 1:A:955:A:N6     | 1:A:1206:G:OP1    | 2.38                     | 0.56              |
| 1:A:963:C:H2'    | 1:A:964:A:C8      | 2.40                     | 0.56              |
| 1:A:423:U:OP1    | 4:D:13:ARG:NH2    | 2.39                     | 0.56              |
| 1:A:567:A:N6     | 1:A:742:G:O2'     | 2.39                     | 0.56              |
| 1:A:923:G:C2     | 1:A:924:A:C8      | 2.93                     | 0.56              |
| 1:A:952:A:H5''   | 1:A:953:A:H3'     | 1.86                     | 0.56              |
| 12:L:68:PRO:HB2  | 12:L:117:TYR:HE1  | 1.70                     | 0.56              |
| 1:A:1040:G:H3'   | 1:A:1041:G:C8     | 2.41                     | 0.56              |
| 1:A:495:C:H5     | 1:A:524:G:N1      | 1.98                     | 0.56              |
| 1:A:658:G:H2'    | 1:A:659:A:H8      | 1.71                     | 0.56              |
| 2:B:80:ILE:HD11  | 2:B:208:ILE:HG23  | 1.87                     | 0.56              |
| 7:G:139:GLU:HA   | 7:G:142:GLU:HB2   | 1.86                     | 0.56              |
| 1:A:523:A:H2'    | 1:A:524:G:H8      | 1.71                     | 0.56              |
| 5:E:105:VAL:HB   | 5:E:106:PRO:HD3   | 1.88                     | 0.56              |
| 21:U:124:VAL:HB  | 21:U:150:ILE:HG12 | 1.87                     | 0.56              |
| 1:A:681:U:H4'    | 1:A:770:G:H4'     | 1.87                     | 0.55              |
| 1:A:936:A:H2'    | 1:A:937:A:C4      | 2.41                     | 0.55              |
| 1:A:796:C:OP1    | 1:A:880:G:N2      | 2.36                     | 0.55              |
| 1:A:1249:C:H41   | 1:A:1309:C:H1'    | 1.71                     | 0.55              |
| 14:N:23:ARG:HG2  | 14:N:30:ALA:HB2   | 1.88                     | 0.55              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 21:U:154:LEU:HD12 | 21:U:158:VAL:HG13 | 1.87                     | 0.55              |
| 1:A:967:C:H4'     | 1:A:995:A:C6      | 2.42                     | 0.55              |
| 1:A:403:G:H2'     | 1:A:404:A:H8      | 1.71                     | 0.55              |
| 1:A:506:C:H1'     | 1:A:520:C:H5''    | 1.87                     | 0.55              |
| 11:K:120:ARG:HE   | 11:K:126:ARG:HH11 | 1.53                     | 0.55              |
| 1:A:1338:G:H2'    | 1:A:1339:A:H8     | 1.71                     | 0.55              |
| 2:B:127:ILE:O     | 2:B:135:GLN:NE2   | 2.40                     | 0.55              |
| 7:G:69:VAL:HG21   | 7:G:104:LEU:HD21  | 1.89                     | 0.55              |
| 10:J:57:LYS:HE2   | 10:J:60:ARG:NH2   | 2.22                     | 0.55              |
| 21:U:126:ALA:HB3  | 21:U:152:VAL:HG12 | 1.89                     | 0.55              |
| 1:A:380:G:H2'     | 1:A:381:C:C6      | 2.42                     | 0.55              |
| 10:J:44:VAL:HG22  | 10:J:66:ARG:HB3   | 1.89                     | 0.55              |
| 21:U:67:ALA:O     | 21:U:95:ASN:ND2   | 2.40                     | 0.55              |
| 1:A:404:A:N1      | 1:A:430:U:C5      | 2.75                     | 0.55              |
| 1:A:1005:G:H21    | 1:A:1006:C:N4     | 2.04                     | 0.55              |
| 2:B:109:SER:O     | 2:B:113:HIS:ND1   | 2.39                     | 0.54              |
| 21:U:241:ASN:HA   | 21:U:244:VAL:HG12 | 1.89                     | 0.54              |
| 1:A:1114:G:H3'    | 1:A:1115:C:H5''   | 1.87                     | 0.54              |
| 2:B:133:LYS:HB2   | 2:B:137:ARG:HH12  | 1.73                     | 0.54              |
| 9:I:28:VAL:HA     | 9:I:63:ILE:O      | 2.08                     | 0.54              |
| 1:A:45:G:O2'      | 1:A:46:U:H6       | 1.91                     | 0.54              |
| 1:A:252:U:H2'     | 1:A:253:G:C8      | 2.43                     | 0.54              |
| 1:A:1205:C:H5'    | 1:A:1206:G:H5''   | 1.90                     | 0.54              |
| 3:C:52:LEU:HA     | 3:C:70:VAL:HG22   | 1.90                     | 0.54              |
| 12:L:70:GLU:H     | 12:L:107:VAL:HG11 | 1.72                     | 0.54              |
| 1:A:1143:G:H1     | 1:A:1164:G:H1     | 1.53                     | 0.54              |
| 2:B:127:ILE:HB    | 2:B:135:GLN:HE22  | 1.73                     | 0.54              |
| 21:U:66:LEU:HB3   | 21:U:73:VAL:HG21  | 1.90                     | 0.54              |
| 21:U:141:LEU:HB3  | 21:U:181:TYR:CD2  | 2.43                     | 0.54              |
| 1:A:76:G:H2'      | 1:A:77:G:C8       | 2.42                     | 0.54              |
| 3:C:50:ALA:HB1    | 3:C:70:VAL:HG11   | 1.90                     | 0.54              |
| 3:C:124:ILE:HD12  | 3:C:130:VAL:HG12  | 1.89                     | 0.54              |
| 3:C:150:LYS:CD    | 3:C:169:ALA:HB2   | 2.38                     | 0.54              |
| 1:A:1134:A:HO2'   | 1:A:1135:A:H8     | 1.57                     | 0.53              |
| 1:A:1001:G:N2     | 1:A:1002:G:N7     | 2.55                     | 0.53              |
| 3:C:46:GLU:HB3    | 3:C:47:LEU:HD12   | 1.89                     | 0.53              |
| 3:C:135:LYS:HZ1   | 3:C:139:GLN:HB3   | 1.73                     | 0.53              |
| 1:A:97:C:H2'      | 1:A:98:G:H5'      | 1.90                     | 0.53              |
| 4:D:189:PRO:HB2   | 4:D:194:LEU:HD11  | 1.90                     | 0.53              |
| 5:E:10:MET:SD     | 5:E:13:ILE:HG13   | 2.49                     | 0.53              |
| 7:G:59:LEU:HA     | 7:G:62:PHE:HD2    | 1.74                     | 0.53              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:1031:G:H5''  | 14:N:3:ARG:HG2    | 1.89                     | 0.53              |
| 16:P:53:VAL:HG13 | 16:P:79:VAL:HG22  | 1.90                     | 0.53              |
| 1:A:437:C:H2'    | 1:A:438:C:H6      | 1.72                     | 0.53              |
| 3:C:58:GLU:HB2   | 3:C:65:ALA:HB3    | 1.90                     | 0.53              |
| 1:A:1201:U:H2'   | 1:A:1202:G:H8     | 1.74                     | 0.53              |
| 1:A:1205:C:H5''  | 1:A:1206:G:H8     | 1.72                     | 0.53              |
| 1:A:1375:G:N2    | 1:A:1376:U:O4     | 2.36                     | 0.53              |
| 1:A:74:G:N2      | 1:A:91:G:H1       | 2.07                     | 0.53              |
| 1:A:1305:G:H2'   | 1:A:1306:A:H8     | 1.74                     | 0.53              |
| 1:A:1329:G:H5''  | 9:I:107:ARG:HB2   | 1.89                     | 0.53              |
| 18:R:47:THR:HA   | 18:R:83:GLU:HB2   | 1.90                     | 0.53              |
| 1:A:1296:C:H2'   | 1:A:1297:U:C6     | 2.42                     | 0.53              |
| 12:L:44:LYS:HB3  | 12:L:45:PRO:HD3   | 1.91                     | 0.53              |
| 1:A:20:C:H5      | 1:A:894:G:H1      | 1.57                     | 0.53              |
| 2:B:17:PHE:O     | 2:B:204:ASN:ND2   | 2.42                     | 0.53              |
| 21:U:171:TYR:O   | 21:U:235:ARG:NH2  | 2.41                     | 0.53              |
| 1:A:833:G:OP2    | 1:A:849:U:N3      | 2.35                     | 0.52              |
| 1:A:1328:A:H61   | 1:A:1357:A:H3'    | 1.74                     | 0.52              |
| 1:A:1233:A:H2'   | 1:A:1234:A:O4'    | 2.09                     | 0.52              |
| 1:A:1354:G:O3'   | 9:I:69:GLY:HA3    | 2.09                     | 0.52              |
| 3:C:130:VAL:HG21 | 3:C:157:ILE:HD12  | 1.91                     | 0.52              |
| 7:G:50:ILE:HD11  | 7:G:61:VAL:HG11   | 1.91                     | 0.52              |
| 7:G:126:ASP:O    | 7:G:129:GLU:HG2   | 2.08                     | 0.52              |
| 2:B:166:ASP:HB3  | 2:B:169:LYS:HB3   | 1.91                     | 0.52              |
| 3:C:20:SER:HG    | 3:C:40:ARG:HH12   | 1.53                     | 0.52              |
| 3:C:89:GLU:O     | 3:C:93:LYS:HG2    | 2.09                     | 0.52              |
| 1:A:7:G:H4'      | 1:A:294:A:H4'     | 1.89                     | 0.52              |
| 1:A:1305:G:H2'   | 1:A:1306:A:C8     | 2.45                     | 0.52              |
| 3:C:11:ARG:O     | 3:C:16:ARG:HB2    | 2.10                     | 0.52              |
| 3:C:68:VAL:HG12  | 3:C:70:VAL:HG23   | 1.92                     | 0.52              |
| 14:N:47:LEU:HD11 | 14:N:52:GLN:HB2   | 1.92                     | 0.52              |
| 1:A:741:U:H2'    | 1:A:742:G:O4'     | 2.09                     | 0.52              |
| 1:A:1101:C:H2'   | 1:A:1102:C:H6     | 1.74                     | 0.52              |
| 13:M:87:TYR:CE1  | 13:M:91:ARG:HD3   | 2.45                     | 0.52              |
| 4:D:116:GLN:HE21 | 4:D:157:LEU:HD21  | 1.75                     | 0.52              |
| 7:G:69:VAL:HG12  | 7:G:69:VAL:O      | 2.09                     | 0.52              |
| 21:U:153:MET:HB3 | 21:U:205:VAL:HG22 | 1.92                     | 0.52              |
| 1:A:989:G:N2     | 1:A:999:U:H1'     | 2.24                     | 0.52              |
| 1:A:1140:A:N3    | 1:A:1163:G:C2     | 2.77                     | 0.52              |
| 22:V:3:LYS:HA    | 22:V:11:GLY:HA2   | 1.92                     | 0.52              |
| 14:N:39:LEU:HD23 | 14:N:43:CYS:HB3   | 1.91                     | 0.52              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:1132:C:H2'   | 1:A:1133:U:C6    | 2.45                     | 0.51              |
| 1:A:1134:A:H5''  | 10:J:42:THR:HG23 | 1.92                     | 0.51              |
| 7:G:69:VAL:HG22  | 7:G:135:VAL:HG22 | 1.91                     | 0.51              |
| 11:K:72:ALA:HB1  | 11:K:77:MET:HG3  | 1.92                     | 0.51              |
| 1:A:963:C:H2'    | 1:A:964:A:H8     | 1.74                     | 0.51              |
| 16:P:43:LYS:HG3  | 16:P:48:TRP:CD2  | 2.45                     | 0.51              |
| 1:A:878:A:H2'    | 1:A:879:A:C8     | 2.45                     | 0.51              |
| 7:G:78:ARG:HD3   | 7:G:156:TRP:HE3  | 1.76                     | 0.51              |
| 12:L:99:ARG:HB2  | 12:L:117:TYR:HA  | 1.92                     | 0.51              |
| 1:A:414:C:H2'    | 1:A:415:C:C6     | 2.46                     | 0.51              |
| 1:A:729:C:H2'    | 1:A:730:A:H8     | 1.75                     | 0.51              |
| 1:A:966:G:H1'    | 1:A:993:A:N1     | 2.25                     | 0.51              |
| 2:B:178:ARG:HH22 | 8:H:74:PRO:HB3   | 1.75                     | 0.51              |
| 9:I:9:ARG:H      | 9:I:79:LEU:HD23  | 1.75                     | 0.51              |
| 11:K:12:ARG:HG3  | 11:K:40:ILE:HD12 | 1.93                     | 0.51              |
| 19:S:39:THR:HG22 | 19:S:70:LYS:HD2  | 1.93                     | 0.51              |
| 1:A:1248:G:N2    | 1:A:1251:A:OP2   | 2.37                     | 0.51              |
| 2:B:57:PHE:HE2   | 2:B:185:ILE:HD11 | 1.76                     | 0.51              |
| 3:C:136:GLN:O    | 3:C:139:GLN:NE2  | 2.43                     | 0.51              |
| 1:A:1055:G:H2'   | 1:A:1056:U:C6    | 2.46                     | 0.51              |
| 1:A:1135:A:H2'   | 1:A:1136:C:C6    | 2.46                     | 0.51              |
| 1:A:184:G:H1     | 1:A:195:U:H3     | 1.59                     | 0.51              |
| 1:A:839:G:HO2'   | 1:A:852:G:HO2'   | 1.55                     | 0.51              |
| 1:A:1369:G:H2'   | 1:A:1370:G:H8    | 1.74                     | 0.51              |
| 8:H:6:ILE:HB     | 8:H:85:ARG:NH1   | 2.26                     | 0.51              |
| 21:U:199:PRO:C   | 21:U:201:VAL:H   | 2.12                     | 0.51              |
| 1:A:72:C:H2'     | 1:A:73:C:C6      | 2.45                     | 0.50              |
| 1:A:1285:C:H2'   | 1:A:1286:G:O4'   | 2.12                     | 0.50              |
| 5:E:15:ARG:HD3   | 5:E:26:PHE:CD1   | 2.46                     | 0.50              |
| 1:A:204:A:H4'    | 1:A:205:G:H5'    | 1.93                     | 0.50              |
| 3:C:73:PRO:HB3   | 3:C:103:VAL:HG11 | 1.93                     | 0.50              |
| 3:C:85:ARG:HH21  | 3:C:88:ARG:HD3   | 1.76                     | 0.50              |
| 21:U:86:LEU:HA   | 21:U:89:THR:OG1  | 2.11                     | 0.50              |
| 7:G:59:LEU:HB3   | 7:G:63:LYS:NZ    | 2.26                     | 0.50              |
| 1:A:1245:C:H2'   | 1:A:1246:C:H6    | 1.76                     | 0.50              |
| 11:K:20:TYR:HD1  | 11:K:83:ILE:HB   | 1.77                     | 0.50              |
| 12:L:50:ARG:HB2  | 12:L:90:LEU:HD21 | 1.92                     | 0.50              |
| 13:M:48:LEU:H    | 13:M:48:LEU:HD23 | 1.76                     | 0.50              |
| 15:O:75:PRO:HB2  | 15:O:79:ARG:HH22 | 1.77                     | 0.50              |
| 1:A:1012:G:O5'   | 1:A:1013:A:N6    | 2.45                     | 0.50              |
| 2:B:184:VAL:HG12 | 2:B:197:VAL:HG13 | 1.93                     | 0.50              |

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| Atom-1            | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|------------------|--------------------------|-------------------|
| 1:A:293:G:N2      | 1:A:296:A:OP2    | 2.42                     | 0.50              |
| 1:A:500:U:O4      | 1:A:516:A:H2     | 1.94                     | 0.50              |
| 1:A:326:C:O2      | 1:A:326:C:O4'    | 2.29                     | 0.50              |
| 1:A:359:A:H2'     | 1:A:360:A:C8     | 2.46                     | 0.50              |
| 8:H:84:ARG:O      | 8:H:135:CYS:HB2  | 2.12                     | 0.50              |
| 1:A:403:G:H2'     | 1:A:404:A:C8     | 2.47                     | 0.50              |
| 1:A:493:A:H5''    | 4:D:55:ALA:HB2   | 1.94                     | 0.50              |
| 13:M:3:ARG:NH1    | 13:M:7:VAL:O     | 2.43                     | 0.50              |
| 1:A:295:G:H2'     | 1:A:296:A:C8     | 2.47                     | 0.49              |
| 1:A:369:A:N6      | 1:A:387:G:C8     | 2.80                     | 0.49              |
| 1:A:995:A:N3      | 1:A:995:A:H2'    | 2.27                     | 0.49              |
| 1:A:1205:C:H5''   | 1:A:1206:G:C8    | 2.46                     | 0.49              |
| 11:K:69:ALA:O     | 11:K:73:MET:HG2  | 2.11                     | 0.49              |
| 1:A:437:C:H2'     | 1:A:438:C:C6     | 2.46                     | 0.49              |
| 1:A:1221:A:H62    | 1:A:1281:A:H62   | 1.60                     | 0.49              |
| 6:F:78:GLU:O      | 6:F:81:ILE:HG12  | 2.11                     | 0.49              |
| 11:K:62:GLN:HB2   | 11:K:93:GLN:OE1  | 2.12                     | 0.49              |
| 13:M:23:TYR:HD2   | 13:M:67:GLU:HG3  | 1.77                     | 0.49              |
| 1:A:973:C:H2'     | 1:A:974:A:H4'    | 1.95                     | 0.49              |
| 9:I:24:GLY:HA2    | 9:I:59:PHE:O     | 2.12                     | 0.49              |
| 21:U:36:ILE:HG13  | 21:U:37:LEU:HD12 | 1.94                     | 0.49              |
| 1:A:721:A:H2'     | 1:A:722:C:C6     | 2.47                     | 0.49              |
| 1:A:989:G:H2'     | 1:A:990:G:O4'    | 2.13                     | 0.49              |
| 10:J:80:LYS:HA    | 10:J:83:GLU:HG2  | 1.94                     | 0.49              |
| 13:M:12:ASN:HA    | 13:M:46:LYS:NZ   | 2.23                     | 0.49              |
| 16:P:43:LYS:HG3   | 16:P:48:TRP:CE2  | 2.48                     | 0.49              |
| 1:A:1239:U:H4'    | 1:A:1240:G:C8    | 2.47                     | 0.49              |
| 11:K:109:VAL:HG12 | 18:R:86:VAL:HA   | 1.94                     | 0.49              |
| 7:G:113:GLU:HB2   | 7:G:119:ARG:HG2  | 1.95                     | 0.49              |
| 1:A:395:G:H2'     | 1:A:396:C:C6     | 2.48                     | 0.49              |
| 1:A:499:G:OP2     | 1:A:516:A:N6     | 2.46                     | 0.49              |
| 1:A:978:U:O2      | 1:A:980:G:N2     | 2.46                     | 0.49              |
| 1:A:1249:C:O2     | 1:A:1249:C:O4'   | 2.31                     | 0.49              |
| 3:C:206:GLU:HG2   | 3:C:207:VAL:HG23 | 1.94                     | 0.49              |
| 9:I:73:GLN:O      | 9:I:77:ILE:HG12  | 2.13                     | 0.49              |
| 21:U:70:ALA:O     | 21:U:95:ASN:ND2  | 2.45                     | 0.49              |
| 1:A:35:C:H2'      | 1:A:36:G:H8      | 1.77                     | 0.48              |
| 1:A:355:U:H2'     | 1:A:356:A:C8     | 2.47                     | 0.48              |
| 1:A:1255:G:H3'    | 1:A:1256:G:H8    | 1.78                     | 0.48              |
| 7:G:72:ARG:HG2    | 7:G:96:GLN:OE1   | 2.13                     | 0.48              |
| 3:C:142:MET:HA    | 3:C:146:ALA:HB3  | 1.95                     | 0.48              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 10:J:30:SER:O    | 10:J:81:THR:OG1  | 2.31                     | 0.48              |
| 21:U:122:ILE:O   | 21:U:148:LYS:N   | 2.38                     | 0.48              |
| 1:A:1201:U:H2'   | 1:A:1202:G:C8    | 2.48                     | 0.48              |
| 10:J:32:ALA:N    | 10:J:78:ASN:OD1  | 2.45                     | 0.48              |
| 11:K:121:PRO:HB2 | 11:K:125:PHE:HB2 | 1.95                     | 0.48              |
| 1:A:1113:A:H2'   | 1:A:1114:G:O4'   | 2.14                     | 0.48              |
| 9:I:50:LEU:HG    | 9:I:55:ALA:HB3   | 1.94                     | 0.48              |
| 1:A:1276:G:H2'   | 1:A:1277:G:C8    | 2.48                     | 0.48              |
| 1:A:1308:C:H2'   | 1:A:1309:C:C6    | 2.49                     | 0.48              |
| 4:D:118:ARG:HG3  | 4:D:136:PRO:HB3  | 1.95                     | 0.48              |
| 1:A:130:C:H2'    | 1:A:130:C:O2     | 2.12                     | 0.48              |
| 3:C:63:ASN:ND2   | 3:C:98:ASN:HD21  | 2.10                     | 0.48              |
| 21:U:72:LYS:HZ1  | 21:U:118:ASP:HB2 | 1.78                     | 0.48              |
| 1:A:66:U:O2      | 1:A:66:U:O4'     | 2.30                     | 0.48              |
| 1:A:526:G:OP1    | 4:D:10:ARG:NH2   | 2.47                     | 0.48              |
| 1:A:692:C:H2'    | 1:A:693:G:H8     | 1.78                     | 0.48              |
| 1:A:968:C:H2'    | 1:A:969:U:C6     | 2.48                     | 0.48              |
| 7:G:15:ASP:OD1   | 7:G:16:LEU:N     | 2.45                     | 0.48              |
| 21:U:73:VAL:O    | 21:U:96:VAL:HA   | 2.13                     | 0.48              |
| 1:A:1245:C:H2'   | 1:A:1246:C:C6    | 2.49                     | 0.48              |
| 1:A:1352:C:H2'   | 1:A:1353:G:O4'   | 2.14                     | 0.48              |
| 3:C:131:ARG:NH1  | 3:C:166:GLU:OE2  | 2.46                     | 0.48              |
| 15:O:26:GLU:OE1  | 15:O:77:ARG:HD2  | 2.13                     | 0.48              |
| 1:A:1270:A:N3    | 1:A:1334:C:O2'   | 2.36                     | 0.48              |
| 1:A:1283:U:H2'   | 1:A:1285:C:C5    | 2.49                     | 0.48              |
| 2:B:69:LEU:HD13  | 2:B:91:PRO:HB2   | 1.95                     | 0.48              |
| 3:C:150:LYS:HD2  | 3:C:169:ALA:HB2  | 1.96                     | 0.48              |
| 4:D:98:GLU:HA    | 4:D:103:ASN:ND2  | 2.29                     | 0.48              |
| 11:K:15:ALA:HA   | 11:K:76:GLY:O    | 2.14                     | 0.48              |
| 21:U:134:THR:OG1 | 21:U:135:PRO:HD3 | 2.13                     | 0.48              |
| 1:A:121:G:H2'    | 1:A:122:G:H5'    | 1.95                     | 0.47              |
| 1:A:22:G:H2'     | 1:A:23:G:C8      | 2.50                     | 0.47              |
| 1:A:1009:C:H5''  | 1:A:1014:G:OP2   | 2.14                     | 0.47              |
| 1:A:98:G:O2'     | 1:A:99:G:H5''    | 2.14                     | 0.47              |
| 1:A:984:A:H2'    | 1:A:985:C:C2     | 2.49                     | 0.47              |
| 11:K:84:VAL:HG21 | 11:K:91:ARG:HG3  | 1.96                     | 0.47              |
| 19:S:56:GLN:HE22 | 19:S:58:VAL:HB   | 1.79                     | 0.47              |
| 1:A:443:A:P      | 1:A:470:G:H22    | 2.36                     | 0.47              |
| 1:A:1226:C:H2'   | 1:A:1227:A:C8    | 2.48                     | 0.47              |
| 1:A:1296:C:H2'   | 1:A:1297:U:H6    | 1.78                     | 0.47              |
| 12:L:36:VAL:HA   | 12:L:76:GLU:OE2  | 2.14                     | 0.47              |

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| Atom-1          | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-------------------|--------------------------|-------------------|
| 1:A:252:U:H2'   | 1:A:253:G:H8      | 1.78                     | 0.47              |
| 1:A:414:C:H2'   | 1:A:415:C:H6      | 1.80                     | 0.47              |
| 7:G:18:TYR:HE2  | 7:G:44:TYR:HE1    | 1.61                     | 0.47              |
| 15:O:75:PRO:HB2 | 15:O:79:ARG:HH12  | 1.78                     | 0.47              |
| 21:U:60:GLY:O   | 21:U:64:GLU:N     | 2.47                     | 0.47              |
| 1:A:50:U:C5     | 1:A:358:G:HI1'    | 2.49                     | 0.47              |
| 1:A:155:A:H2'   | 1:A:156:A:O4'     | 2.14                     | 0.47              |
| 1:A:927:A:H2'   | 1:A:928:U:C6      | 2.49                     | 0.47              |
| 1:A:940:C:H2'   | 1:A:941:G:H8      | 1.79                     | 0.47              |
| 1:A:1328:A:N6   | 1:A:1357:A:H3'    | 2.28                     | 0.47              |
| 5:E:51:VAL:HB   | 5:E:52:PRO:HD3    | 1.97                     | 0.47              |
| 1:A:318:C:H2'   | 1:A:319:U:C6      | 2.50                     | 0.47              |
| 1:A:691:C:H4'   | 11:K:20:TYR:CD2   | 2.49                     | 0.47              |
| 1:A:1300:A:H5'  | 19:S:3:ARG:HH12   | 1.80                     | 0.47              |
| 1:A:1340:U:H3   | 1:A:1346:A:H62    | 1.63                     | 0.47              |
| 17:Q:85:VAL:O   | 17:Q:89:LEU:HG    | 2.15                     | 0.47              |
| 21:U:54:GLU:HA  | 21:U:125:VAL:O    | 2.14                     | 0.47              |
| 1:A:29:G:O2'    | 1:A:292:U:OP1     | 2.33                     | 0.47              |
| 1:A:889:U:H2'   | 1:A:890:C:C6      | 2.49                     | 0.47              |
| 1:A:1226:C:H2'  | 1:A:1227:A:H8     | 1.80                     | 0.47              |
| 13:M:4:ILE:HD11 | 13:M:53:VAL:CG2   | 2.45                     | 0.47              |
| 21:U:257:ILE:O  | 21:U:260:VAL:HG22 | 2.15                     | 0.47              |
| 1:A:795:C:O2'   | 1:A:879:A:N1      | 2.44                     | 0.47              |
| 1:A:958:C:C5    | 1:A:959:U:C2      | 3.03                     | 0.47              |
| 1:A:1023:U:H2'  | 1:A:1024:A:O4'    | 2.15                     | 0.47              |
| 1:A:1068:U:H5'' | 1:A:1069:U:H5     | 1.79                     | 0.47              |
| 1:A:1141:C:H5   | 1:A:1164:G:H22    | 1.63                     | 0.47              |
| 1:A:103:A:H5'   | 1:A:104:C:H5      | 1.80                     | 0.46              |
| 1:A:498:C:H3'   | 1:A:516:A:N6      | 2.30                     | 0.46              |
| 1:A:686:A:H5''  | 1:A:687:G:C8      | 2.50                     | 0.46              |
| 1:A:966:G:H21   | 1:A:994:A:H2      | 1.61                     | 0.46              |
| 1:A:1103:G:O2'  | 1:A:1104:U:H5'    | 2.14                     | 0.46              |
| 1:A:1255:G:H3'  | 1:A:1256:G:C8     | 2.50                     | 0.46              |
| 15:O:78:TYR:O   | 15:O:82:ILE:HG12  | 2.14                     | 0.46              |
| 1:A:521:G:H2'   | 1:A:522:G:H8      | 1.80                     | 0.46              |
| 7:G:108:ALA:HB1 | 7:G:120:ILE:HG22  | 1.96                     | 0.46              |
| 9:I:55:ALA:O    | 9:I:56:LEU:HB3    | 2.15                     | 0.46              |
| 14:N:14:PRO:HG2 | 14:N:19:ARG:HB2   | 1.98                     | 0.46              |
| 1:A:78:G:H1     | 1:A:86:U:H3       | 1.62                     | 0.46              |
| 1:A:432:C:H2'   | 1:A:433:U:C6      | 2.50                     | 0.46              |
| 1:A:1218:A:HO2' | 1:A:1286:G:HO2'   | 1.64                     | 0.46              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 17:Q:66:SER:O    | 17:Q:70:ARG:NH1   | 2.48                     | 0.46              |
| 21:U:180:PHE:HB2 | 21:U:277:ILE:HD11 | 1.98                     | 0.46              |
| 1:A:402:G:H21    | 4:D:119:GLN:HE22  | 1.61                     | 0.46              |
| 1:A:1339:A:H5''  | 1:A:1340:U:OP2    | 2.15                     | 0.46              |
| 8:H:53:VAL:HG12  | 8:H:54:ASP:OD1    | 2.14                     | 0.46              |
| 9:I:63:ILE:CG2   | 9:I:77:ILE:HD12   | 2.45                     | 0.46              |
| 1:A:429:C:H2'    | 1:A:430:U:O2      | 2.16                     | 0.46              |
| 1:A:453:C:H2'    | 1:A:454:G:O4'     | 2.15                     | 0.46              |
| 1:A:689:U:C2     | 1:A:690:A:C8      | 3.04                     | 0.46              |
| 9:I:63:ILE:HD11  | 9:I:81:ILE:HD11   | 1.98                     | 0.46              |
| 18:R:33:ASP:OD2  | 18:R:36:ASN:HB2   | 2.15                     | 0.46              |
| 1:A:1286:G:C6    | 1:A:1287:G:N1     | 2.84                     | 0.46              |
| 1:A:1203:G:OP1   | 1:A:1303:C:N4     | 2.46                     | 0.46              |
| 4:D:7:PRO:HG2    | 4:D:10:ARG:HD2    | 1.98                     | 0.46              |
| 7:G:84:ASN:HB3   | 7:G:86:GLN:NE2    | 2.31                     | 0.46              |
| 21:U:230:ALA:O   | 21:U:246:ASN:ND2  | 2.49                     | 0.46              |
| 1:A:644:G:H2'    | 1:A:645:G:O4'     | 2.15                     | 0.46              |
| 1:A:1252:C:HO2'  | 1:A:1295:U:HO2'   | 1.59                     | 0.46              |
| 9:I:53:VAL:HG12  | 9:I:95:LYS:HE2    | 1.97                     | 0.46              |
| 1:A:462:G:H2'    | 1:A:463:A:C8      | 2.51                     | 0.46              |
| 2:B:115:LEU:HB2  | 2:B:145:LEU:HD13  | 1.97                     | 0.46              |
| 4:D:175:SER:OG   | 4:D:184:LYS:HB3   | 2.16                     | 0.46              |
| 13:M:15:VAL:O    | 13:M:19:LEU:HG    | 2.16                     | 0.46              |
| 20:T:92:LEU:HD13 | 20:T:98:PRO:HG3   | 1.97                     | 0.46              |
| 21:U:29:ASN:HB2  | 21:U:195:PHE:HB3  | 1.96                     | 0.46              |
| 10:J:86:MET:O    | 10:J:86:MET:HG2   | 2.15                     | 0.46              |
| 11:K:20:TYR:CD1  | 11:K:83:ILE:HB    | 2.51                     | 0.46              |
| 14:N:47:LEU:HG   | 14:N:53:LEU:HG    | 1.97                     | 0.46              |
| 1:A:457:G:H2'    | 1:A:458:A:H8      | 1.81                     | 0.45              |
| 1:A:1358:A:H2'   | 1:A:1359:U:O4'    | 2.15                     | 0.45              |
| 14:N:47:LEU:CD1  | 14:N:52:GLN:HB2   | 2.46                     | 0.45              |
| 1:A:702:G:H5'    | 11:K:117:ASN:HB2  | 1.97                     | 0.45              |
| 1:A:1324:C:H2'   | 1:A:1325:G:C8     | 2.51                     | 0.45              |
| 18:R:74:ARG:HB3  | 18:R:81:PHE:CE1   | 2.51                     | 0.45              |
| 1:A:112:U:H3'    | 1:A:284:A:H61     | 1.80                     | 0.45              |
| 1:A:691:C:H2'    | 1:A:692:C:H6      | 1.81                     | 0.45              |
| 3:C:89:GLU:HG2   | 3:C:93:LYS:HE3    | 1.99                     | 0.45              |
| 9:I:63:ILE:HG23  | 9:I:77:ILE:HD12   | 1.99                     | 0.45              |
| 21:U:54:GLU:O    | 21:U:75:ALA:HA    | 2.17                     | 0.45              |
| 1:A:96:G:O2'     | 1:A:146:A:H8      | 1.98                     | 0.45              |
| 1:A:457:G:H2'    | 1:A:458:A:C8      | 2.52                     | 0.45              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:722:C:H2'    | 1:A:723:C:C6     | 2.51                     | 0.45              |
| 1:A:674:G:C6     | 1:A:675:G:C6     | 3.05                     | 0.45              |
| 1:A:979:A:O2'    | 1:A:981:G:O5'    | 2.35                     | 0.45              |
| 1:A:1251:A:H1'   | 1:A:1308:C:H1'   | 1.98                     | 0.45              |
| 19:S:45:VAL:HG21 | 19:S:64:GLU:OE2  | 2.17                     | 0.45              |
| 1:A:505:G:N7     | 12:L:50:ARG:NH1  | 2.63                     | 0.45              |
| 9:I:16:ARG:O     | 9:I:63:ILE:HA    | 2.16                     | 0.45              |
| 21:U:33:ASP:OD2  | 21:U:194:VAL:HA  | 2.17                     | 0.45              |
| 1:A:42:G:N1      | 1:A:397:C:H5     | 2.11                     | 0.45              |
| 1:A:56:A:H2'     | 1:A:56:A:N3      | 2.32                     | 0.45              |
| 1:A:77:G:H2'     | 1:A:78:G:O4'     | 2.17                     | 0.45              |
| 1:A:319:U:H2'    | 1:A:320:G:O4'    | 2.16                     | 0.45              |
| 1:A:432:C:H2'    | 1:A:433:U:H6     | 1.82                     | 0.45              |
| 1:A:658:G:H2'    | 1:A:659:A:C8     | 2.50                     | 0.45              |
| 7:G:134:ALA:HA   | 7:G:137:LYS:HE3  | 1.99                     | 0.45              |
| 1:A:173:C:C2     | 1:A:174:A:C8     | 3.05                     | 0.45              |
| 1:A:1232:A:H2'   | 1:A:1233:A:C8    | 2.51                     | 0.45              |
| 7:G:16:LEU:HD11  | 9:I:45:ALA:HA    | 1.98                     | 0.45              |
| 8:H:31:PHE:O     | 8:H:35:ILE:HG12  | 2.17                     | 0.45              |
| 9:I:29:ASN:OD1   | 9:I:64:THR:HA    | 2.16                     | 0.45              |
| 11:K:16:SER:HA   | 11:K:79:SER:O    | 2.16                     | 0.45              |
| 12:L:68:PRO:O    | 12:L:99:ARG:NH1  | 2.40                     | 0.45              |
| 1:A:1054:C:H2'   | 1:A:1055:G:H8    | 1.82                     | 0.45              |
| 7:G:74:GLU:O     | 7:G:88:PRO:HA    | 2.17                     | 0.45              |
| 9:I:26:VAL:HG23  | 9:I:63:ILE:HG13  | 1.99                     | 0.45              |
| 11:K:81:ASP:OD1  | 11:K:106:LYS:HE3 | 2.17                     | 0.45              |
| 12:L:50:ARG:HB3  | 12:L:66:TYR:HE1  | 1.82                     | 0.45              |
| 1:A:266:A:H2'    | 1:A:267:C:C6     | 2.52                     | 0.45              |
| 1:A:468:C:O4'    | 1:A:468:C:O2     | 2.35                     | 0.45              |
| 1:A:752:A:N3     | 1:A:1490:U:O2'   | 2.50                     | 0.45              |
| 1:A:983:A:H1'    | 1:A:1021:C:H1'   | 1.99                     | 0.45              |
| 1:A:1252:C:O2'   | 1:A:1253:G:H5'   | 2.17                     | 0.45              |
| 3:C:104:GLN:NE2  | 3:C:105:GLU:O    | 2.50                     | 0.45              |
| 4:D:162:LEU:HD23 | 4:D:181:MET:HG2  | 1.99                     | 0.45              |
| 13:M:65:LYS:HG3  | 13:M:69:GLU:CD   | 2.38                     | 0.45              |
| 1:A:132:C:O4'    | 1:A:132:C:O2     | 2.32                     | 0.44              |
| 10:J:19:SER:O    | 10:J:23:ILE:HG12 | 2.17                     | 0.44              |
| 13:M:80:ARG:O    | 13:M:84:ILE:HG12 | 2.17                     | 0.44              |
| 1:A:180:A:N6     | 1:A:199:U:N3     | 2.52                     | 0.44              |
| 1:A:1328:A:N1    | 1:A:1357:A:H5'   | 2.32                     | 0.44              |
| 9:I:86:VAL:HG13  | 9:I:93:ARG:HB2   | 1.99                     | 0.44              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:495:C:H2'    | 1:A:495:C:O2     | 2.18                     | 0.44              |
| 1:A:712:A:H2'    | 1:A:713:A:H8     | 1.82                     | 0.44              |
| 5:E:80:ILE:HG22  | 5:E:91:LEU:HB2   | 1.98                     | 0.44              |
| 6:F:21:LEU:O     | 6:F:25:ILE:HG12  | 2.17                     | 0.44              |
| 10:J:64:GLU:HB2  | 14:N:59:ALA:HB2  | 2.00                     | 0.44              |
| 13:M:87:TYR:O    | 13:M:91:ARG:HG2  | 2.18                     | 0.44              |
| 17:Q:64:PRO:HB3  | 17:Q:70:ARG:NH1  | 2.32                     | 0.44              |
| 1:A:321:A:H2'    | 1:A:322:G:O4'    | 2.17                     | 0.44              |
| 1:A:498:C:H3'    | 1:A:516:A:H62    | 1.83                     | 0.44              |
| 1:A:1207:A:H2'   | 1:A:1207:A:N3    | 2.32                     | 0.44              |
| 1:A:1305:G:C2    | 1:A:1306:A:C5    | 3.05                     | 0.44              |
| 1:A:1488:U:H2'   | 1:A:1489:G:C8    | 2.52                     | 0.44              |
| 12:L:73:ASN:O    | 12:L:75:GLN:NE2  | 2.49                     | 0.44              |
| 1:A:417:U:H3'    | 1:A:418:C:C6     | 2.52                     | 0.44              |
| 1:A:988:G:N7     | 1:A:1000:G:H8    | 2.16                     | 0.44              |
| 1:A:1104:U:H2'   | 1:A:1105:U:C6    | 2.53                     | 0.44              |
| 2:B:145:LEU:HD23 | 2:B:145:LEU:HA   | 1.85                     | 0.44              |
| 10:J:37:PRO:HA   | 10:J:71:LEU:O    | 2.18                     | 0.44              |
| 19:S:12:ASP:OD2  | 19:S:14:HIS:NE2  | 2.50                     | 0.44              |
| 1:A:1298:G:N2    | 1:A:1301:A:OP2   | 2.42                     | 0.44              |
| 12:L:53:ALA:HB2  | 12:L:67:ILE:HD11 | 2.00                     | 0.44              |
| 21:U:83:LEU:O    | 21:U:86:LEU:HG   | 2.18                     | 0.44              |
| 18:R:62:GLU:HA   | 18:R:65:ILE:HG22 | 1.98                     | 0.44              |
| 1:A:1011:C:N4    | 1:A:1014:G:N7    | 2.65                     | 0.44              |
| 1:A:1369:G:H2'   | 1:A:1370:G:C8    | 2.53                     | 0.44              |
| 13:M:40:ASN:OD1  | 13:M:41:PRO:HD2  | 2.17                     | 0.44              |
| 1:A:434:G:H8     | 1:A:481:A:H62    | 1.62                     | 0.43              |
| 1:A:685:C:H4'    | 1:A:687:G:C8     | 2.53                     | 0.43              |
| 7:G:9:VAL:HG11   | 7:G:94:ARG:HE    | 1.83                     | 0.43              |
| 21:U:233:ALA:HB3 | 21:U:246:ASN:ND2 | 2.33                     | 0.43              |
| 1:A:129:A:H1'    | 1:A:321:A:C5     | 2.53                     | 0.43              |
| 1:A:184:G:H2'    | 1:A:185:C:H6     | 1.83                     | 0.43              |
| 1:A:209:U:H2'    | 1:A:209:U:O2     | 2.16                     | 0.43              |
| 1:A:446:A:N6     | 1:A:465:U:H2'    | 2.33                     | 0.43              |
| 2:B:139:LYS:O    | 2:B:142:LEU:N    | 2.51                     | 0.43              |
| 21:U:288:TYR:O   | 21:U:292:PHE:HB3 | 2.17                     | 0.43              |
| 1:A:292:U:O2'    | 1:A:540:C:O2     | 2.36                     | 0.43              |
| 1:A:480:A:H4'    | 1:A:481:A:H5'    | 2.00                     | 0.43              |
| 1:A:537:A:H2'    | 1:A:538:C:C6     | 2.52                     | 0.43              |
| 2:B:131:PRO:O    | 2:B:134:GLU:N    | 2.49                     | 0.43              |
| 12:L:37:VAL:HG11 | 12:L:72:HIS:HE1  | 1.84                     | 0.43              |

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| Atom-1            | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|------------------|--------------------------|-------------------|
| 21:U:160:GLU:OE2  | 21:U:175:SER:HA  | 2.18                     | 0.43              |
| 1:A:1150:A:H2'    | 1:A:1151:A:C8    | 2.53                     | 0.43              |
| 7:G:50:ILE:O      | 7:G:54:THR:OG1   | 2.27                     | 0.43              |
| 21:U:158:VAL:O    | 21:U:160:GLU:N   | 2.52                     | 0.43              |
| 21:U:166:PRO:HA   | 21:U:171:TYR:CE2 | 2.53                     | 0.43              |
| 1:A:564:U:H2'     | 1:A:565:G:O4'    | 2.18                     | 0.43              |
| 1:A:903:G:N2      | 1:A:904:G:O6     | 2.52                     | 0.43              |
| 7:G:118:VAL:HG13  | 7:G:122:HIS:CE1  | 2.53                     | 0.43              |
| 7:G:125:MET:O     | 7:G:128:ALA:HB3  | 2.18                     | 0.43              |
| 1:A:33:A:H2'      | 1:A:34:A:C8      | 2.53                     | 0.43              |
| 1:A:242:A:C2      | 1:A:278:A:C5     | 3.06                     | 0.43              |
| 1:A:925:G:H4'     | 1:A:1314:A:C2    | 2.51                     | 0.43              |
| 1:A:988:G:N3      | 1:A:988:G:H2'    | 2.34                     | 0.43              |
| 3:C:150:LYS:HZ1   | 3:C:152:ILE:HG12 | 1.84                     | 0.43              |
| 13:M:36:LYS:HD3   | 13:M:59:TYR:OH   | 2.18                     | 0.43              |
| 16:P:21:VAL:HG21  | 16:P:59:TRP:CD1  | 2.54                     | 0.43              |
| 21:U:130:TYR:CD1  | 21:U:154:LEU:HA  | 2.44                     | 0.43              |
| 21:U:174:LEU:HD23 | 21:U:174:LEU:HA  | 1.79                     | 0.43              |
| 1:A:38:U:O2'      | 1:A:484:G:O2'    | 2.30                     | 0.43              |
| 1:A:537:A:H5''    | 12:L:21:VAL:HG21 | 2.01                     | 0.43              |
| 1:A:1297:U:H3'    | 1:A:1298:G:C8    | 2.53                     | 0.43              |
| 1:A:1298:G:H4'    | 14:N:18:VAL:HG11 | 2.00                     | 0.43              |
| 2:B:79:ASP:O      | 2:B:83:MET:HG2   | 2.18                     | 0.43              |
| 1:A:47:G:H2'      | 1:A:362:C:C5     | 2.54                     | 0.43              |
| 1:A:180:A:H8      | 20:T:81:LYS:NZ   | 2.16                     | 0.43              |
| 1:A:1100:G:O3'    | 9:I:104:ARG:NE   | 2.49                     | 0.43              |
| 6:F:1:MET:HG3     | 6:F:67:MET:C     | 2.39                     | 0.43              |
| 8:H:6:ILE:O       | 8:H:10:LEU:HG    | 2.19                     | 0.43              |
| 13:M:4:ILE:CD1    | 13:M:57:ARG:HB2  | 2.46                     | 0.43              |
| 19:S:2:PRO:HB2    | 19:S:3:ARG:H     | 1.71                     | 0.43              |
| 21:U:123:MET:HB2  | 21:U:148:LYS:HB3 | 1.99                     | 0.43              |
| 1:A:582:U:H2'     | 1:A:583:C:C6     | 2.54                     | 0.43              |
| 1:A:859:G:H2'     | 1:A:860:C:O4'    | 2.19                     | 0.43              |
| 1:A:972:A:H8      | 1:A:1198:G:HO2'  | 1.66                     | 0.43              |
| 1:A:1002:G:H2'    | 1:A:1002:G:N3    | 2.33                     | 0.43              |
| 1:A:1090:C:C4     | 1:A:1091:G:C8    | 3.06                     | 0.43              |
| 1:A:582:U:H2'     | 1:A:583:C:H6     | 1.83                     | 0.43              |
| 1:A:1114:G:H3'    | 1:A:1115:C:H6    | 1.84                     | 0.43              |
| 1:A:1242:C:H1'    | 1:A:1257:A:N6    | 2.34                     | 0.43              |
| 1:A:1330:U:H4'    | 9:I:120:ARG:HG3  | 2.00                     | 0.43              |
| 6:F:48:LEU:HD21   | 6:F:60:PHE:CE1   | 2.53                     | 0.43              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 8:H:51:VAL:HG11  | 8:H:60:ARG:HH11   | 1.84                     | 0.43              |
| 21:U:132:VAL:O   | 21:U:135:PRO:HD2  | 2.19                     | 0.43              |
| 1:A:360:A:H4'    | 1:A:361:U:OP1     | 2.18                     | 0.42              |
| 1:A:673:C:H2'    | 1:A:674:G:C8      | 2.54                     | 0.42              |
| 1:A:1231:C:H41   | 1:A:1269:A:H3'    | 1.84                     | 0.42              |
| 3:C:7:PRO:O      | 3:C:11:ARG:NH1    | 2.52                     | 0.42              |
| 3:C:7:PRO:HG3    | 3:C:201:TYR:CE1   | 2.54                     | 0.42              |
| 3:C:7:PRO:HG3    | 3:C:201:TYR:HE1   | 1.84                     | 0.42              |
| 13:M:16:ASP:HB2  | 13:M:34:LEU:HD13  | 2.01                     | 0.42              |
| 1:A:74:G:H2'     | 1:A:75:C:C6       | 2.54                     | 0.42              |
| 1:A:449:C:H5''   | 1:A:450:C:H5      | 1.84                     | 0.42              |
| 1:A:594:G:C5     | 1:A:595:A:C2      | 3.07                     | 0.42              |
| 1:A:698:G:H2'    | 1:A:699:A:H8      | 1.82                     | 0.42              |
| 1:A:982:G:N2     | 1:A:983:A:O4'     | 2.52                     | 0.42              |
| 1:A:1190:C:H2'   | 1:A:1191:C:O4'    | 2.19                     | 0.42              |
| 1:A:1231:C:H2'   | 1:A:1232:A:H5''   | 2.01                     | 0.42              |
| 1:A:1248:G:N2    | 1:A:1250:A:H3'    | 2.33                     | 0.42              |
| 11:K:91:ARG:O    | 11:K:95:ILE:HG12  | 2.19                     | 0.42              |
| 12:L:36:VAL:HB   | 12:L:54:LYS:HB3   | 2.00                     | 0.42              |
| 21:U:44:ALA:HB2  | 21:U:151:VAL:HG21 | 2.00                     | 0.42              |
| 1:A:369:A:N6     | 1:A:387:G:H8      | 2.17                     | 0.42              |
| 1:A:430:U:O2     | 1:A:430:U:O4'     | 2.37                     | 0.42              |
| 1:A:754:C:H5'    | 21:U:236:ARG:HB3  | 2.02                     | 0.42              |
| 12:L:110:ARG:NH2 | 12:L:113:SER:HB2  | 2.34                     | 0.42              |
| 1:A:986:C:O2     | 1:A:1001:G:N2     | 2.52                     | 0.42              |
| 1:A:1297:U:H3    | 1:A:1301:A:H62    | 1.65                     | 0.42              |
| 17:Q:15:MET:HB2  | 17:Q:18:THR:HB    | 2.01                     | 0.42              |
| 1:A:812:A:H2'    | 1:A:813:G:O4'     | 2.20                     | 0.42              |
| 2:B:156:LYS:HA   | 2:B:156:LYS:HD3   | 1.95                     | 0.42              |
| 1:A:158:C:H2'    | 1:A:159:U:C6      | 2.55                     | 0.42              |
| 1:A:1282:G:N2    | 1:A:1283:U:O4     | 2.53                     | 0.42              |
| 1:A:1356:G:H5'   | 7:G:36:LYS:HD2    | 2.02                     | 0.42              |
| 5:E:8:GLU:HG2    | 5:E:34:VAL:HG22   | 2.01                     | 0.42              |
| 13:M:84:ILE:HD12 | 19:S:66:MET:HB3   | 2.01                     | 0.42              |
| 1:A:38:U:HO2'    | 1:A:484:G:HO2'    | 1.59                     | 0.42              |
| 1:A:687:G:OP2    | 1:A:687:G:H8      | 2.03                     | 0.42              |
| 1:A:702:G:C4     | 1:A:703:C:C5      | 3.08                     | 0.42              |
| 4:D:30:LYS:C     | 4:D:32:ALA:H      | 2.23                     | 0.42              |
| 6:F:50:TYR:O     | 6:F:52:ILE:HD12   | 2.19                     | 0.42              |
| 9:I:61:ALA:HB1   | 9:I:63:ILE:HD11   | 2.01                     | 0.42              |
| 1:A:20:C:H5''    | 5:E:86:ALA:HB3    | 2.01                     | 0.42              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:C:70:VAL:O     | 3:C:105:GLU:HA   | 2.20                     | 0.42              |
| 7:G:78:ARG:HD3   | 7:G:156:TRP:CE3  | 2.53                     | 0.42              |
| 9:I:8:GLY:HA2    | 9:I:79:LEU:HD23  | 2.02                     | 0.42              |
| 12:L:90:LEU:HB2  | 12:L:93:VAL:HG12 | 2.02                     | 0.42              |
| 21:U:102:ASP:HB3 | 21:U:105:LYS:HB2 | 2.02                     | 0.42              |
| 1:A:180:A:H8     | 20:T:81:LYS:HZ1  | 1.67                     | 0.42              |
| 1:A:691:C:C2     | 1:A:692:C:C5     | 3.07                     | 0.42              |
| 1:A:869:U:H2'    | 1:A:870:A:C8     | 2.55                     | 0.42              |
| 2:B:60:ASP:O     | 2:B:63:MET:HG3   | 2.19                     | 0.42              |
| 9:I:116:LYS:NZ   | 9:I:120:ARG:O    | 2.53                     | 0.42              |
| 11:K:51:LYS:HD3  | 11:K:51:LYS:HA   | 1.91                     | 0.42              |
| 1:A:412:G:H2'    | 1:A:413:C:C6     | 2.55                     | 0.42              |
| 1:A:741:U:O2'    | 1:A:857:C:O2     | 2.35                     | 0.42              |
| 1:A:1362:G:H21   | 1:A:1364:U:H5    | 1.66                     | 0.42              |
| 4:D:142:PRO:HB3  | 4:D:187:ARG:HA   | 2.02                     | 0.42              |
| 13:M:34:LEU:HD11 | 13:M:41:PRO:HA   | 2.01                     | 0.42              |
| 1:A:260:U:H2'    | 1:A:261:G:O4'    | 2.20                     | 0.41              |
| 1:A:595:A:C5     | 1:A:596:C:C5     | 3.08                     | 0.41              |
| 1:A:646:G:H2'    | 1:A:647:A:H8     | 1.83                     | 0.41              |
| 1:A:1157:G:H2'   | 1:A:1158:A:H8    | 1.85                     | 0.41              |
| 1:A:1311:A:H5'   | 13:M:26:GLY:HA3  | 2.02                     | 0.41              |
| 2:B:178:ARG:NH2  | 8:H:74:PRO:HB3   | 2.35                     | 0.41              |
| 11:K:98:LEU:HD23 | 11:K:98:LEU:HA   | 1.81                     | 0.41              |
| 17:Q:83:ASP:OD1  | 17:Q:84:LEU:N    | 2.53                     | 0.41              |
| 21:U:256:THR:O   | 21:U:259:GLN:HB3 | 2.19                     | 0.41              |
| 1:A:20:C:O2      | 1:A:20:C:O4'     | 2.37                     | 0.41              |
| 1:A:671:A:C2     | 1:A:688:A:C5     | 3.08                     | 0.41              |
| 1:A:957:C:H6     | 1:A:957:C:O5'    | 2.03                     | 0.41              |
| 1:A:1252:C:O2'   | 1:A:1295:U:O2'   | 2.30                     | 0.41              |
| 2:B:84:GLU:HB3   | 2:B:219:VAL:HG21 | 2.02                     | 0.41              |
| 2:B:133:LYS:HG3  | 2:B:137:ARG:NH2  | 2.34                     | 0.41              |
| 3:C:41:GLY:C     | 3:C:45:LYS:HZ2   | 2.23                     | 0.41              |
| 3:C:108:ASN:O    | 3:C:110:ASN:N    | 2.53                     | 0.41              |
| 12:L:79:VAL:N    | 12:L:103:ASP:OD2 | 2.53                     | 0.41              |
| 1:A:317:A:H2'    | 1:A:318:C:C6     | 2.56                     | 0.41              |
| 1:A:1101:C:H1'   | 1:A:1161:A:C5    | 2.55                     | 0.41              |
| 1:A:1163:G:O2'   | 1:A:1164:G:C8    | 2.71                     | 0.41              |
| 1:A:1276:G:H2'   | 1:A:1277:G:H8    | 1.84                     | 0.41              |
| 1:A:451:C:C2     | 1:A:462:G:C2     | 3.09                     | 0.41              |
| 1:A:673:C:H2'    | 1:A:674:G:H8     | 1.85                     | 0.41              |
| 1:A:1297:U:O2'   | 1:A:1342:A:N3    | 2.38                     | 0.41              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:A:1336:C:H2'   | 1:A:1337:G:H8     | 1.85                     | 0.41              |
| 2:B:44:LEU:HD23  | 2:B:44:LEU:HA     | 1.92                     | 0.41              |
| 3:C:135:LYS:NZ   | 3:C:139:GLN:HB3   | 2.35                     | 0.41              |
| 21:U:47:THR:HG23 | 21:U:49:LYS:H     | 1.84                     | 0.41              |
| 21:U:53:ILE:HG23 | 21:U:74:VAL:HG23  | 2.02                     | 0.41              |
| 1:A:214:C:H2'    | 1:A:215:C:C6      | 2.56                     | 0.41              |
| 1:A:256:G:H2'    | 1:A:257:U:C6      | 2.55                     | 0.41              |
| 1:A:957:C:N4     | 1:A:1300:A:H61    | 2.18                     | 0.41              |
| 5:E:88:LYS:HB2   | 5:E:123:LEU:HB2   | 2.02                     | 0.41              |
| 1:A:218:U:H2'    | 1:A:219:U:C6      | 2.55                     | 0.41              |
| 1:A:395:G:H2'    | 1:A:396:C:H6      | 1.85                     | 0.41              |
| 1:A:656:U:O2'    | 1:A:657:G:H5''    | 2.20                     | 0.41              |
| 1:A:1108:U:O2'   | 1:A:1109:U:H5''   | 2.20                     | 0.41              |
| 1:A:1113:A:H5''  | 9:I:62:TYR:CE2    | 2.56                     | 0.41              |
| 13:M:74:VAL:HA   | 13:M:77:ASN:HD22  | 1.85                     | 0.41              |
| 19:S:13:ASP:OD1  | 19:S:14:HIS:N     | 2.54                     | 0.41              |
| 1:A:752:A:H4'    | 1:A:1501:G:N2     | 2.35                     | 0.41              |
| 1:A:923:G:C6     | 1:A:1319:G:C6     | 3.08                     | 0.41              |
| 1:A:983:A:H2'    | 1:A:1018:A:H2     | 1.86                     | 0.41              |
| 1:A:1050:A:H4'   | 1:A:1051:G:OP1    | 2.21                     | 0.41              |
| 1:A:1163:G:O2'   | 1:A:1164:G:O5'    | 2.37                     | 0.41              |
| 18:R:85:LEU:H    | 18:R:85:LEU:HD23  | 1.86                     | 0.41              |
| 1:A:1327:U:H4'   | 1:A:1328:A:H5''   | 2.03                     | 0.41              |
| 3:C:79:ARG:H     | 3:C:82:GLU:HG2    | 1.85                     | 0.41              |
| 7:G:140:ASP:O    | 7:G:144:MET:HG2   | 2.20                     | 0.41              |
| 1:A:21:U:H2'     | 1:A:22:G:O4'      | 2.20                     | 0.41              |
| 1:A:251:G:H2'    | 1:A:252:U:C6      | 2.56                     | 0.41              |
| 1:A:317:A:H2'    | 1:A:318:C:H6      | 1.85                     | 0.41              |
| 1:A:378:A:H2'    | 1:A:379:A:O4'     | 2.21                     | 0.41              |
| 1:A:729:C:H2'    | 1:A:730:A:C8      | 2.56                     | 0.41              |
| 1:A:926:C:H2'    | 1:A:927:A:H8      | 1.85                     | 0.41              |
| 1:A:1113:A:H5''  | 9:I:62:TYR:HE2    | 1.86                     | 0.41              |
| 1:A:1252:C:H2'   | 1:A:1253:G:C8     | 2.56                     | 0.41              |
| 1:A:1257:A:H3'   | 1:A:1258:G:C8     | 2.53                     | 0.41              |
| 3:C:73:PRO:O     | 3:C:77:ILE:HG12   | 2.21                     | 0.41              |
| 3:C:106:VAL:HG21 | 3:C:115:LEU:HD11  | 2.03                     | 0.41              |
| 4:D:33:MET:O     | 4:D:37:PRO:HB3    | 2.20                     | 0.41              |
| 5:E:69:VAL:HA    | 5:E:70:PRO:HD3    | 1.89                     | 0.41              |
| 11:K:120:ARG:NE  | 11:K:126:ARG:HH11 | 2.19                     | 0.41              |
| 21:U:50:THR:HG23 | 21:U:121:GLU:HB2  | 2.03                     | 0.41              |
| 21:U:74:VAL:HG12 | 21:U:97:THR:HB    | 2.03                     | 0.41              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 21:U:255:SER:O   | 21:U:258:GLU:HG2  | 2.21                     | 0.41              |
| 1:A:706:A:O3'    | 1:A:707:U:H6      | 2.04                     | 0.41              |
| 21:U:83:LEU:HB3  | 21:U:87:LYS:NZ    | 2.36                     | 0.41              |
| 1:A:537:A:H2'    | 1:A:538:C:H6      | 1.85                     | 0.40              |
| 1:A:686:A:H2'    | 1:A:686:A:N3      | 2.35                     | 0.40              |
| 1:A:926:C:H2'    | 1:A:927:A:C8      | 2.56                     | 0.40              |
| 1:A:953:A:C2     | 1:A:1339:A:H1'    | 2.57                     | 0.40              |
| 1:A:1193:U:H1'   | 1:A:1195:A:C2     | 2.57                     | 0.40              |
| 1:A:1251:A:H1'   | 1:A:1308:C:C1'    | 2.51                     | 0.40              |
| 6:F:1:MET:HA     | 6:F:68:PRO:HA     | 2.03                     | 0.40              |
| 20:T:53:LEU:HA   | 20:T:56:MET:HG3   | 2.03                     | 0.40              |
| 1:A:171:C:H2'    | 1:A:172:C:H6      | 1.87                     | 0.40              |
| 1:A:181:C:H2'    | 1:A:182:C:C6      | 2.56                     | 0.40              |
| 1:A:188:C:H2'    | 1:A:189:U:O4'     | 2.22                     | 0.40              |
| 1:A:408:A:H4'    | 1:A:409:G:O5'     | 2.21                     | 0.40              |
| 1:A:433:U:H3'    | 1:A:434:G:N2      | 2.36                     | 0.40              |
| 1:A:721:A:H2'    | 1:A:722:C:H6      | 1.86                     | 0.40              |
| 1:A:958:C:H5''   | 1:A:959:U:C5      | 2.56                     | 0.40              |
| 1:A:976:G:N2     | 1:A:1027:A:C4     | 2.89                     | 0.40              |
| 6:F:76:ALA:HB1   | 6:F:80:ARG:NH2    | 2.36                     | 0.40              |
| 21:U:253:GLN:O   | 21:U:257:ILE:HG13 | 2.21                     | 0.40              |
| 1:A:103:A:H2     | 1:A:320:G:H21     | 1.68                     | 0.40              |
| 1:A:901:A:O2'    | 1:A:902:C:H6      | 2.02                     | 0.40              |
| 1:A:1103:G:H2'   | 1:A:1104:U:H6     | 1.84                     | 0.40              |
| 1:A:1170:A:H2'   | 1:A:1171:C:O4'    | 2.21                     | 0.40              |
| 1:A:1269:A:C6    | 1:A:1270:A:N6     | 2.89                     | 0.40              |
| 7:G:84:ASN:HB3   | 7:G:86:GLN:HE22   | 1.87                     | 0.40              |
| 9:I:2:GLU:O      | 9:I:20:ARG:HA     | 2.21                     | 0.40              |
| 16:P:57:ARG:NH1  | 16:P:79:VAL:O     | 2.54                     | 0.40              |
| 1:A:61:A:H4'     | 1:A:62:G:OP1      | 2.22                     | 0.40              |
| 1:A:397:C:O2     | 1:A:397:C:O4'     | 2.37                     | 0.40              |
| 1:A:406:G:H2'    | 1:A:425:U:C4      | 2.57                     | 0.40              |
| 1:A:521:G:C2     | 1:A:522:G:C5      | 3.09                     | 0.40              |
| 1:A:964:A:H1'    | 19:S:55:LYS:HA    | 2.03                     | 0.40              |
| 1:A:1353:G:C2    | 1:A:1354:G:C8     | 3.09                     | 0.40              |
| 3:C:108:ASN:HD21 | 3:C:144:SER:HB3   | 1.86                     | 0.40              |
| 10:J:18:ALA:O    | 10:J:22:LYS:HG2   | 2.21                     | 0.40              |
| 10:J:85:LEU:O    | 10:J:86:MET:HB3   | 2.21                     | 0.40              |
| 22:V:17:THR:O    | 22:V:22:ARG:NH2   | 2.54                     | 0.40              |
| 1:A:46:U:H2'     | 1:A:47:G:C8       | 2.56                     | 0.40              |
| 1:A:163:G:H2'    | 1:A:164:C:C6      | 2.57                     | 0.40              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:A:810:C:O2    | 8:H:15:ASN:ND2  | 2.55                     | 0.40              |
| 1:A:917:G:H2'   | 1:A:918:C:C6    | 2.57                     | 0.40              |
| 1:A:936:A:N6    | 19:S:77:THR:O   | 2.55                     | 0.40              |
| 10:J:40:LEU:HB2 | 10:J:69:ASN:HB2 | 2.04                     | 0.40              |
| 13:M:4:ILE:HG23 | 13:M:57:ARG:HA  | 2.03                     | 0.40              |

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed      | Favoured  | Allowed  | Outliers | Percentiles |     |
|-----|-------|---------------|-----------|----------|----------|-------------|-----|
| 2   | B     | 218/256 (85%) | 198 (91%) | 20 (9%)  | 0        | 100         | 100 |
| 3   | C     | 204/239 (85%) | 187 (92%) | 16 (8%)  | 1 (0%)   | 29          | 68  |
| 4   | D     | 206/209 (99%) | 197 (96%) | 9 (4%)   | 0        | 100         | 100 |
| 5   | E     | 148/162 (91%) | 141 (95%) | 6 (4%)   | 1 (1%)   | 22          | 61  |
| 6   | F     | 99/101 (98%)  | 93 (94%)  | 6 (6%)   | 0        | 100         | 100 |
| 7   | G     | 153/156 (98%) | 147 (96%) | 5 (3%)   | 1 (1%)   | 22          | 61  |
| 8   | H     | 136/138 (99%) | 131 (96%) | 5 (4%)   | 0        | 100         | 100 |
| 9   | I     | 125/128 (98%) | 111 (89%) | 14 (11%) | 0        | 100         | 100 |
| 10  | J     | 96/105 (91%)  | 82 (85%)  | 14 (15%) | 0        | 100         | 100 |
| 11  | K     | 117/129 (91%) | 107 (92%) | 10 (8%)  | 0        | 100         | 100 |
| 12  | L     | 122/132 (92%) | 106 (87%) | 14 (12%) | 2 (2%)   | 9           | 46  |
| 13  | M     | 111/126 (88%) | 101 (91%) | 10 (9%)  | 0        | 100         | 100 |
| 14  | N     | 58/61 (95%)   | 53 (91%)  | 5 (9%)   | 0        | 100         | 100 |
| 15  | O     | 86/89 (97%)   | 85 (99%)  | 1 (1%)   | 0        | 100         | 100 |
| 16  | P     | 79/88 (90%)   | 76 (96%)  | 3 (4%)   | 0        | 100         | 100 |
| 17  | Q     | 98/105 (93%)  | 96 (98%)  | 2 (2%)   | 0        | 100         | 100 |

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| Mol | Chain | Analysed        | Favoured   | Allowed  | Outliers | Percentiles |     |
|-----|-------|-----------------|------------|----------|----------|-------------|-----|
| 18  | R     | 67/88 (76%)     | 60 (90%)   | 7 (10%)  | 0        | 100         | 100 |
| 19  | S     | 78/93 (84%)     | 75 (96%)   | 2 (3%)   | 1 (1%)   | 12          | 50  |
| 20  | T     | 97/106 (92%)    | 89 (92%)   | 7 (7%)   | 1 (1%)   | 15          | 55  |
| 21  | U     | 264/298 (89%)   | 238 (90%)  | 26 (10%) | 0        | 100         | 100 |
| 22  | V     | 22/27 (82%)     | 22 (100%)  | 0        | 0        | 100         | 100 |
| All | All   | 2584/2836 (91%) | 2395 (93%) | 182 (7%) | 7 (0%)   | 44          | 75  |

All (7) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 12  | L     | 44  | LYS  |
| 5   | E     | 21  | ALA  |
| 7   | G     | 7   | ALA  |
| 3   | C     | 167 | TRP  |
| 12  | L     | 118 | GLY  |
| 19  | S     | 42  | PRO  |
| 20  | T     | 102 | GLY  |

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed       | Rotameric  | Outliers | Percentiles |     |
|-----|-------|----------------|------------|----------|-------------|-----|
| 2   | B     | 191/220 (87%)  | 191 (100%) | 0        | 100         | 100 |
| 3   | C     | 160/188 (85%)  | 160 (100%) | 0        | 100         | 100 |
| 4   | D     | 180/181 (99%)  | 180 (100%) | 0        | 100         | 100 |
| 5   | E     | 115/123 (94%)  | 115 (100%) | 0        | 100         | 100 |
| 6   | F     | 90/90 (100%)   | 90 (100%)  | 0        | 100         | 100 |
| 7   | G     | 126/127 (99%)  | 126 (100%) | 0        | 100         | 100 |
| 8   | H     | 119/119 (100%) | 119 (100%) | 0        | 100         | 100 |
| 9   | I     | 98/99 (99%)    | 95 (97%)   | 3 (3%)   | 40          | 71  |
| 10  | J     | 88/92 (96%)    | 84 (96%)   | 4 (4%)   | 27          | 62  |

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| Mol | Chain | Analysed        | Rotameric  | Outliers | Percentiles |     |
|-----|-------|-----------------|------------|----------|-------------|-----|
| 11  | K     | 90/99 (91%)     | 90 (100%)  | 0        | 100         | 100 |
| 12  | L     | 104/109 (95%)   | 103 (99%)  | 1 (1%)   | 76          | 88  |
| 13  | M     | 91/101 (90%)    | 90 (99%)   | 1 (1%)   | 73          | 88  |
| 14  | N     | 49/50 (98%)     | 49 (100%)  | 0        | 100         | 100 |
| 15  | O     | 79/80 (99%)     | 79 (100%)  | 0        | 100         | 100 |
| 16  | P     | 70/74 (95%)     | 69 (99%)   | 1 (1%)   | 67          | 85  |
| 17  | Q     | 95/97 (98%)     | 95 (100%)  | 0        | 100         | 100 |
| 18  | R     | 60/77 (78%)     | 60 (100%)  | 0        | 100         | 100 |
| 19  | S     | 71/80 (89%)     | 70 (99%)   | 1 (1%)   | 67          | 85  |
| 20  | T     | 76/82 (93%)     | 74 (97%)   | 2 (3%)   | 46          | 74  |
| 21  | U     | 234/264 (89%)   | 232 (99%)  | 2 (1%)   | 78          | 90  |
| 22  | V     | 19/22 (86%)     | 19 (100%)  | 0        | 100         | 100 |
| All | All   | 2205/2374 (93%) | 2190 (99%) | 15 (1%)  | 84          | 93  |

All (15) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 9   | I     | 17  | VAL  |
| 9   | I     | 65  | VAL  |
| 9   | I     | 104 | ARG  |
| 10  | J     | 4   | ILE  |
| 10  | J     | 5   | ARG  |
| 10  | J     | 9   | ARG  |
| 10  | J     | 38  | ILE  |
| 12  | L     | 43  | LYS  |
| 13  | M     | 105 | THR  |
| 16  | P     | 5   | ARG  |
| 19  | S     | 5   | LEU  |
| 20  | T     | 100 | ILE  |
| 20  | T     | 104 | LEU  |
| 21  | U     | 174 | LEU  |
| 21  | U     | 198 | GLN  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2   | B     | 135 | GLN  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 3   | C     | 63  | ASN  |
| 3   | C     | 139 | GLN  |
| 7   | G     | 64  | GLN  |
| 12  | L     | 72  | HIS  |
| 19  | S     | 56  | GLN  |
| 21  | U     | 29  | ASN  |

### 5.3.3 RNA [i](#)

| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| 1   | A     | 1391/1522 (91%) | 410 (29%)         | 30 (2%)         |

All (410) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 8   | G    |
| 1   | A     | 10  | G    |
| 1   | A     | 18  | U    |
| 1   | A     | 23  | G    |
| 1   | A     | 33  | A    |
| 1   | A     | 40  | G    |
| 1   | A     | 46  | U    |
| 1   | A     | 48  | C    |
| 1   | A     | 49  | C    |
| 1   | A     | 51  | A    |
| 1   | A     | 52  | A    |
| 1   | A     | 53  | G    |
| 1   | A     | 54  | A    |
| 1   | A     | 55  | C    |
| 1   | A     | 57  | U    |
| 1   | A     | 58  | G    |
| 1   | A     | 59  | C    |
| 1   | A     | 62  | G    |
| 1   | A     | 65  | G    |
| 1   | A     | 66  | U    |
| 1   | A     | 69  | G    |
| 1   | A     | 70  | G    |
| 1   | A     | 74  | G    |
| 1   | A     | 75  | C    |
| 1   | A     | 76  | G    |
| 1   | A     | 77  | G    |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 78         | G           |
| 1          | A            | 79         | G           |
| 1          | A            | 80         | U           |
| 1          | A            | 81         | U           |
| 1          | A            | 82         | U           |
| 1          | A            | 83         | U           |
| 1          | A            | 84         | A           |
| 1          | A            | 87         | C           |
| 1          | A            | 88         | C           |
| 1          | A            | 89         | G           |
| 1          | A            | 90         | U           |
| 1          | A            | 91         | G           |
| 1          | A            | 92         | G           |
| 1          | A            | 94         | C           |
| 1          | A            | 95         | A           |
| 1          | A            | 96         | G           |
| 1          | A            | 98         | G           |
| 1          | A            | 115        | C           |
| 1          | A            | 122        | G           |
| 1          | A            | 123        | U           |
| 1          | A            | 126        | C           |
| 1          | A            | 129        | A           |
| 1          | A            | 133        | G           |
| 1          | A            | 139        | G           |
| 1          | A            | 145        | C           |
| 1          | A            | 148        | C           |
| 1          | A            | 151        | G           |
| 1          | A            | 152        | G           |
| 1          | A            | 156        | A           |
| 1          | A            | 157        | A           |
| 1          | A            | 169        | C           |
| 1          | A            | 179        | G           |
| 1          | A            | 180        | A           |
| 1          | A            | 189        | U           |
| 1          | A            | 202        | A           |
| 1          | A            | 204        | A           |
| 1          | A            | 205        | G           |
| 1          | A            | 208        | C           |
| 1          | A            | 209        | U           |
| 1          | A            | 210        | U           |
| 1          | A            | 211        | U           |
| 1          | A            | 212        | G           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 222        | G           |
| 1          | A            | 223        | G           |
| 1          | A            | 224        | A           |
| 1          | A            | 242        | A           |
| 1          | A            | 243        | G           |
| 1          | A            | 247        | G           |
| 1          | A            | 258        | A           |
| 1          | A            | 262        | G           |
| 1          | A            | 263        | C           |
| 1          | A            | 270        | A           |
| 1          | A            | 271        | G           |
| 1          | A            | 284        | A           |
| 1          | A            | 285        | G           |
| 1          | A            | 317        | A           |
| 1          | A            | 324        | C           |
| 1          | A            | 325        | A           |
| 1          | A            | 326        | C           |
| 1          | A            | 328        | G           |
| 1          | A            | 341        | C           |
| 1          | A            | 347        | G           |
| 1          | A            | 348        | C           |
| 1          | A            | 350        | G           |
| 1          | A            | 355        | U           |
| 1          | A            | 356        | A           |
| 1          | A            | 359        | A           |
| 1          | A            | 360        | A           |
| 1          | A            | 361        | U           |
| 1          | A            | 363        | U           |
| 1          | A            | 364        | U           |
| 1          | A            | 365        | C           |
| 1          | A            | 367        | G           |
| 1          | A            | 368        | C           |
| 1          | A            | 369        | A           |
| 1          | A            | 380        | G           |
| 1          | A            | 383        | U           |
| 1          | A            | 386        | C           |
| 1          | A            | 387        | G           |
| 1          | A            | 393        | A           |
| 1          | A            | 394        | C           |
| 1          | A            | 402        | G           |
| 1          | A            | 408        | A           |
| 1          | A            | 409        | G           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 410        | A           |
| 1          | A            | 413        | C           |
| 1          | A            | 418        | C           |
| 1          | A            | 419        | G           |
| 1          | A            | 420        | G           |
| 1          | A            | 425        | U           |
| 1          | A            | 431        | C           |
| 1          | A            | 435        | A           |
| 1          | A            | 440        | G           |
| 1          | A            | 441        | G           |
| 1          | A            | 447        | A           |
| 1          | A            | 448        | A           |
| 1          | A            | 449        | C           |
| 1          | A            | 452        | C           |
| 1          | A            | 455        | A           |
| 1          | A            | 456        | C           |
| 1          | A            | 457        | G           |
| 1          | A            | 466        | G           |
| 1          | A            | 467        | A           |
| 1          | A            | 469        | G           |
| 1          | A            | 470        | G           |
| 1          | A            | 476        | G           |
| 1          | A            | 481        | A           |
| 1          | A            | 482        | U           |
| 1          | A            | 493        | A           |
| 1          | A            | 495        | C           |
| 1          | A            | 498        | C           |
| 1          | A            | 499        | G           |
| 1          | A            | 502        | C           |
| 1          | A            | 505        | G           |
| 1          | A            | 508        | G           |
| 1          | A            | 511        | G           |
| 1          | A            | 513        | G           |
| 1          | A            | 514        | G           |
| 1          | A            | 515        | U           |
| 1          | A            | 517        | A           |
| 1          | A            | 520        | C           |
| 1          | A            | 522        | G           |
| 1          | A            | 531        | A           |
| 1          | A            | 532        | G           |
| 1          | A            | 543        | A           |
| 1          | A            | 548        | C           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 552        | G           |
| 1          | A            | 556        | A           |
| 1          | A            | 557        | A           |
| 1          | A            | 558        | A           |
| 1          | A            | 560        | G           |
| 1          | A            | 561        | G           |
| 1          | A            | 572        | G           |
| 1          | A            | 580        | C           |
| 1          | A            | 590        | G           |
| 1          | A            | 602        | C           |
| 1          | A            | 613        | G           |
| 1          | A            | 626        | A           |
| 1          | A            | 630        | U           |
| 1          | A            | 631        | C           |
| 1          | A            | 637        | A           |
| 1          | A            | 645        | G           |
| 1          | A            | 649        | A           |
| 1          | A            | 657        | G           |
| 1          | A            | 666        | G           |
| 1          | A            | 667        | G           |
| 1          | A            | 670        | U           |
| 1          | A            | 671        | A           |
| 1          | A            | 672        | G           |
| 1          | A            | 674        | G           |
| 1          | A            | 678        | A           |
| 1          | A            | 679        | A           |
| 1          | A            | 687        | G           |
| 1          | A            | 697        | G           |
| 1          | A            | 698        | G           |
| 1          | A            | 699        | A           |
| 1          | A            | 705        | G           |
| 1          | A            | 707        | U           |
| 1          | A            | 712        | A           |
| 1          | A            | 715        | G           |
| 1          | A            | 718        | G           |
| 1          | A            | 739        | G           |
| 1          | A            | 743        | A           |
| 1          | A            | 761        | A           |
| 1          | A            | 764        | A           |
| 1          | A            | 765        | A           |
| 1          | A            | 771        | A           |
| 1          | A            | 796        | C           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 799        | A           |
| 1          | A            | 800        | A           |
| 1          | A            | 801        | C           |
| 1          | A            | 803        | A           |
| 1          | A            | 812        | A           |
| 1          | A            | 824        | C           |
| 1          | A            | 825        | U           |
| 1          | A            | 826        | C           |
| 1          | A            | 829        | G           |
| 1          | A            | 836        | G           |
| 1          | A            | 837        | A           |
| 1          | A            | 850        | A           |
| 1          | A            | 863        | G           |
| 1          | A            | 867        | A           |
| 1          | A            | 880        | G           |
| 1          | A            | 892        | A           |
| 1          | A            | 900        | G           |
| 1          | A            | 902        | C           |
| 1          | A            | 903        | G           |
| 1          | A            | 904        | G           |
| 1          | A            | 905        | G           |
| 1          | A            | 912        | C           |
| 1          | A            | 913        | A           |
| 1          | A            | 914        | C           |
| 1          | A            | 920        | G           |
| 1          | A            | 921        | U           |
| 1          | A            | 925        | G           |
| 1          | A            | 930        | U           |
| 1          | A            | 934        | U           |
| 1          | A            | 938        | U           |
| 1          | A            | 939        | U           |
| 1          | A            | 944        | G           |
| 1          | A            | 947        | A           |
| 1          | A            | 949        | G           |
| 1          | A            | 953        | A           |
| 1          | A            | 954        | G           |
| 1          | A            | 955        | A           |
| 1          | A            | 958        | C           |
| 1          | A            | 959        | U           |
| 1          | A            | 969        | U           |
| 1          | A            | 970        | U           |
| 1          | A            | 971        | G           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 972        | A           |
| 1          | A            | 974        | A           |
| 1          | A            | 975        | U           |
| 1          | A            | 976        | G           |
| 1          | A            | 977        | C           |
| 1          | A            | 978        | U           |
| 1          | A            | 979        | A           |
| 1          | A            | 981        | G           |
| 1          | A            | 982        | G           |
| 1          | A            | 983        | A           |
| 1          | A            | 984        | A           |
| 1          | A            | 985        | C           |
| 1          | A            | 986        | C           |
| 1          | A            | 988        | G           |
| 1          | A            | 989        | G           |
| 1          | A            | 990        | G           |
| 1          | A            | 991        | U           |
| 1          | A            | 992        | G           |
| 1          | A            | 996        | G           |
| 1          | A            | 997        | C           |
| 1          | A            | 998        | C           |
| 1          | A            | 1000       | G           |
| 1          | A            | 1001       | G           |
| 1          | A            | 1002       | G           |
| 1          | A            | 1003       | G           |
| 1          | A            | 1004       | U           |
| 1          | A            | 1005       | G           |
| 1          | A            | 1007       | C           |
| 1          | A            | 1008       | C           |
| 1          | A            | 1009       | C           |
| 1          | A            | 1010       | G           |
| 1          | A            | 1011       | C           |
| 1          | A            | 1012       | G           |
| 1          | A            | 1013       | A           |
| 1          | A            | 1014       | G           |
| 1          | A            | 1015       | G           |
| 1          | A            | 1016       | G           |
| 1          | A            | 1017       | G           |
| 1          | A            | 1018       | A           |
| 1          | A            | 1019       | G           |
| 1          | A            | 1020       | C           |
| 1          | A            | 1021       | C           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 1022       | C           |
| 1          | A            | 1023       | U           |
| 1          | A            | 1026       | C           |
| 1          | A            | 1027       | A           |
| 1          | A            | 1028       | C           |
| 1          | A            | 1029       | A           |
| 1          | A            | 1030       | G           |
| 1          | A            | 1032       | U           |
| 1          | A            | 1036       | G           |
| 1          | A            | 1037       | C           |
| 1          | A            | 1038       | A           |
| 1          | A            | 1039       | U           |
| 1          | A            | 1041       | G           |
| 1          | A            | 1048       | U           |
| 1          | A            | 1051       | G           |
| 1          | A            | 1064       | G           |
| 1          | A            | 1068       | U           |
| 1          | A            | 1077       | G           |
| 1          | A            | 1078       | U           |
| 1          | A            | 1084       | A           |
| 1          | A            | 1087       | G           |
| 1          | A            | 1101       | C           |
| 1          | A            | 1104       | U           |
| 1          | A            | 1105       | U           |
| 1          | A            | 1106       | A           |
| 1          | A            | 1107       | G           |
| 1          | A            | 1108       | U           |
| 1          | A            | 1109       | U           |
| 1          | A            | 1110       | G           |
| 1          | A            | 1112       | C           |
| 1          | A            | 1113       | A           |
| 1          | A            | 1114       | G           |
| 1          | A            | 1115       | C           |
| 1          | A            | 1116       | G           |
| 1          | A            | 1117       | G           |
| 1          | A            | 1119       | U           |
| 1          | A            | 1120       | C           |
| 1          | A            | 1121       | G           |
| 1          | A            | 1122       | G           |
| 1          | A            | 1128       | C           |
| 1          | A            | 1129       | A           |
| 1          | A            | 1134       | A           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 1136       | C           |
| 1          | A            | 1137       | G           |
| 1          | A            | 1140       | A           |
| 1          | A            | 1141       | C           |
| 1          | A            | 1142       | U           |
| 1          | A            | 1149       | G           |
| 1          | A            | 1150       | A           |
| 1          | A            | 1151       | A           |
| 1          | A            | 1164       | G           |
| 1          | A            | 1165       | A           |
| 1          | A            | 1166       | G           |
| 1          | A            | 1175       | G           |
| 1          | A            | 1178       | U           |
| 1          | A            | 1184       | G           |
| 1          | A            | 1194       | U           |
| 1          | A            | 1206       | G           |
| 1          | A            | 1207       | A           |
| 1          | A            | 1209       | A           |
| 1          | A            | 1214       | U           |
| 1          | A            | 1218       | A           |
| 1          | A            | 1220       | A           |
| 1          | A            | 1221       | A           |
| 1          | A            | 1222       | U           |
| 1          | A            | 1227       | A           |
| 1          | A            | 1228       | C           |
| 1          | A            | 1230       | A           |
| 1          | A            | 1232       | A           |
| 1          | A            | 1235       | G           |
| 1          | A            | 1239       | U           |
| 1          | A            | 1242       | C           |
| 1          | A            | 1249       | C           |
| 1          | A            | 1253       | G           |
| 1          | A            | 1255       | G           |
| 1          | A            | 1259       | C           |
| 1          | A            | 1262       | A           |
| 1          | A            | 1263       | U           |
| 1          | A            | 1267       | A           |
| 1          | A            | 1269       | A           |
| 1          | A            | 1270       | A           |
| 1          | A            | 1271       | A           |
| 1          | A            | 1275       | G           |
| 1          | A            | 1276       | G           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | A            | 1280       | C           |
| 1          | A            | 1281       | A           |
| 1          | A            | 1282       | G           |
| 1          | A            | 1284       | U           |
| 1          | A            | 1285       | C           |
| 1          | A            | 1287       | G           |
| 1          | A            | 1292       | G           |
| 1          | A            | 1293       | G           |
| 1          | A            | 1294       | G           |
| 1          | A            | 1301       | A           |
| 1          | A            | 1302       | C           |
| 1          | A            | 1304       | C           |
| 1          | A            | 1305       | G           |
| 1          | A            | 1311       | A           |
| 1          | A            | 1314       | A           |
| 1          | A            | 1320       | G           |
| 1          | A            | 1321       | A           |
| 1          | A            | 1322       | A           |
| 1          | A            | 1328       | A           |
| 1          | A            | 1329       | G           |
| 1          | A            | 1330       | U           |
| 1          | A            | 1335       | G           |
| 1          | A            | 1340       | U           |
| 1          | A            | 1343       | G           |
| 1          | A            | 1345       | C           |
| 1          | A            | 1347       | U           |
| 1          | A            | 1351       | G           |
| 1          | A            | 1353       | G           |
| 1          | A            | 1355       | U           |
| 1          | A            | 1357       | A           |
| 1          | A            | 1361       | C           |
| 1          | A            | 1362       | G           |
| 1          | A            | 1363       | U           |
| 1          | A            | 1364       | U           |
| 1          | A            | 1366       | C           |
| 1          | A            | 1375       | G           |
| 1          | A            | 1377       | A           |
| 1          | A            | 1378       | C           |
| 1          | A            | 1486       | G           |
| 1          | A            | 1494       | G           |
| 1          | A            | 1495       | G           |
| 1          | A            | 1496       | A           |

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| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 1   | A     | 1497 | A    |
| 1   | A     | 1498 | G    |
| 1   | A     | 1501 | G    |
| 1   | A     | 1507 | G    |
| 1   | A     | 1508 | G    |
| 1   | A     | 1510 | U    |

All (30) RNA pucker outliers are listed below:

| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 1   | A     | 61   | A    |
| 1   | A     | 79   | G    |
| 1   | A     | 80   | U    |
| 1   | A     | 81   | U    |
| 1   | A     | 82   | U    |
| 1   | A     | 88   | C    |
| 1   | A     | 156  | A    |
| 1   | A     | 359  | A    |
| 1   | A     | 360  | A    |
| 1   | A     | 516  | A    |
| 1   | A     | 557  | A    |
| 1   | A     | 717  | A    |
| 1   | A     | 902  | C    |
| 1   | A     | 953  | A    |
| 1   | A     | 985  | C    |
| 1   | A     | 988  | G    |
| 1   | A     | 996  | G    |
| 1   | A     | 1001 | G    |
| 1   | A     | 1005 | G    |
| 1   | A     | 1014 | G    |
| 1   | A     | 1015 | G    |
| 1   | A     | 1036 | G    |
| 1   | A     | 1112 | C    |
| 1   | A     | 1128 | C    |
| 1   | A     | 1163 | G    |
| 1   | A     | 1165 | A    |
| 1   | A     | 1183 | A    |
| 1   | A     | 1208 | C    |
| 1   | A     | 1269 | A    |
| 1   | A     | 1313 | G    |

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

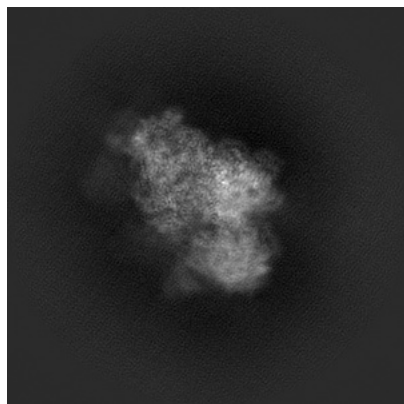
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-31657. These allow visual inspection of the internal detail of the map and identification of artifacts.

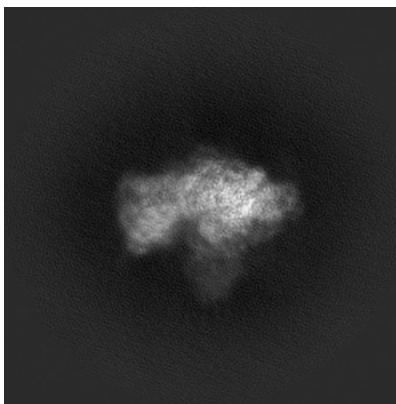
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

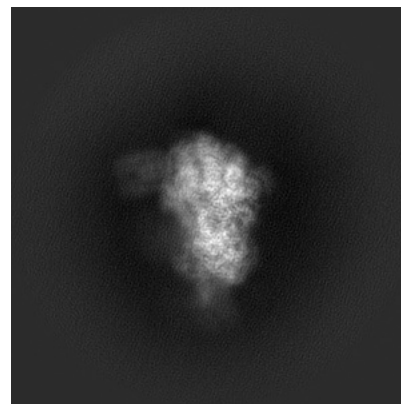
#### 6.1.1 Primary map



X

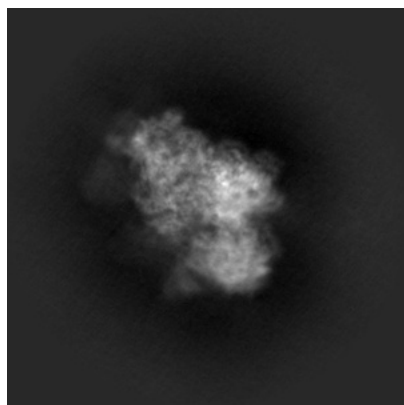


Y

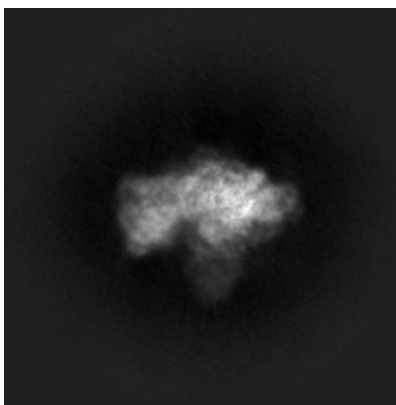


Z

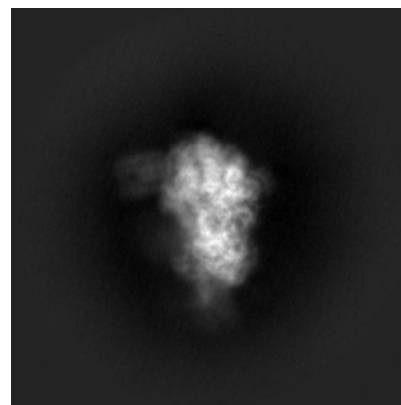
#### 6.1.2 Raw map



X



Y

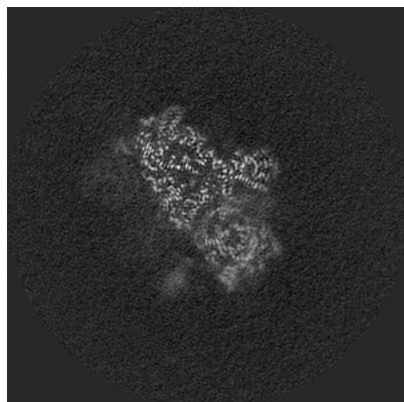


Z

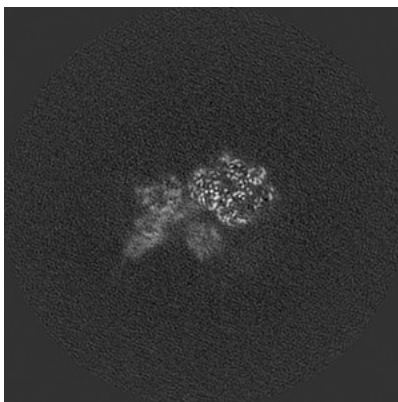
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

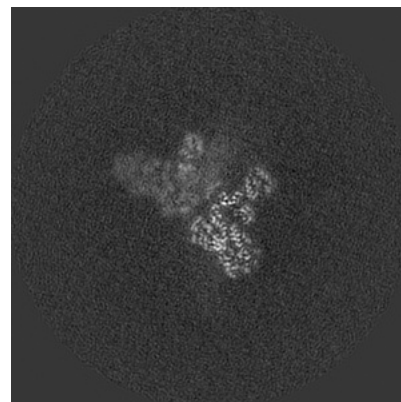
### 6.2.1 Primary map



X Index: 160

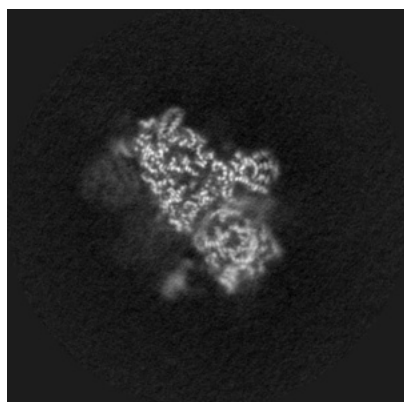


Y Index: 160

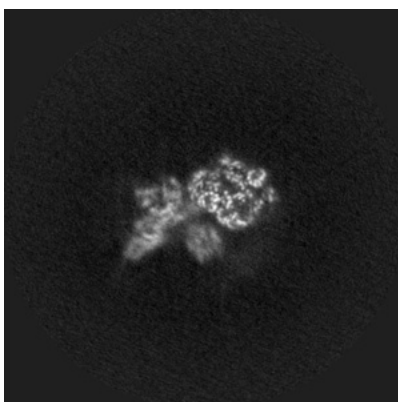


Z Index: 160

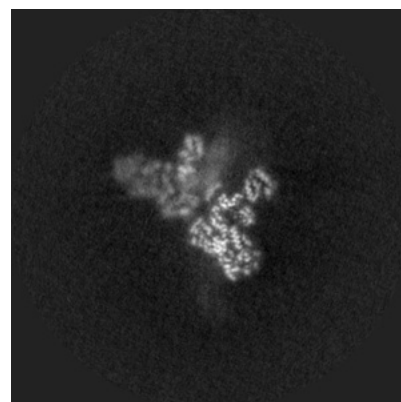
### 6.2.2 Raw map



X Index: 160



Y Index: 160

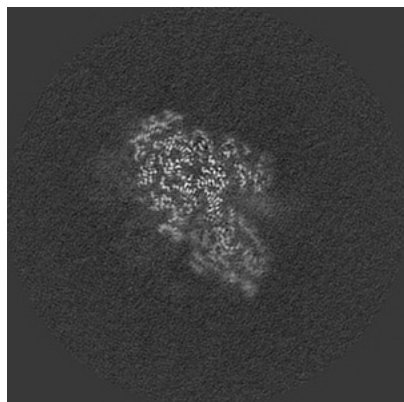


Z Index: 160

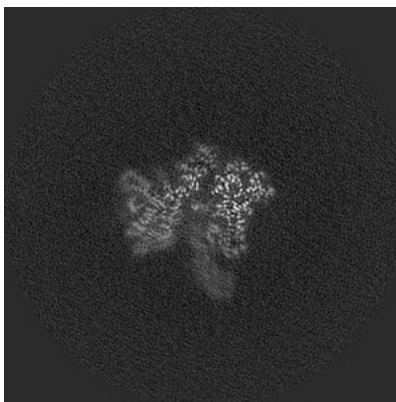
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

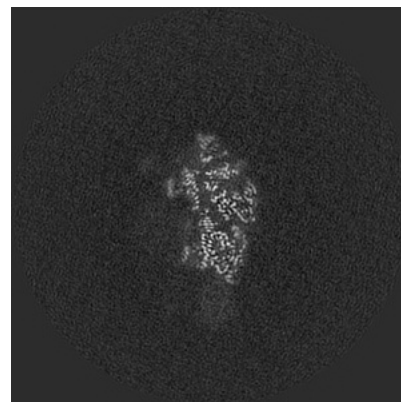
### 6.3.1 Primary map



X Index: 168

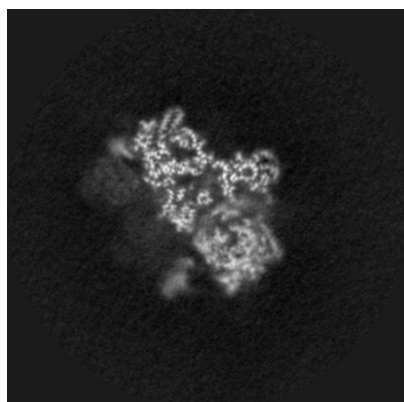


Y Index: 173

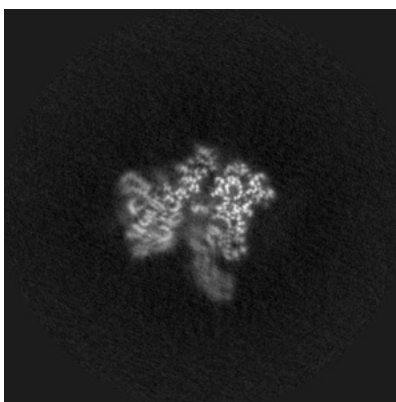


Z Index: 191

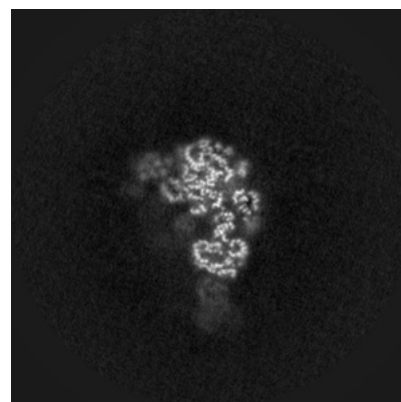
### 6.3.2 Raw map



X Index: 158



Y Index: 173

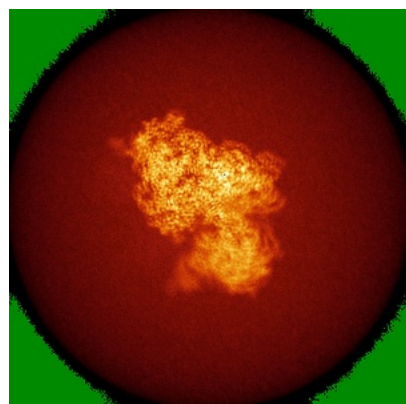


Z Index: 183

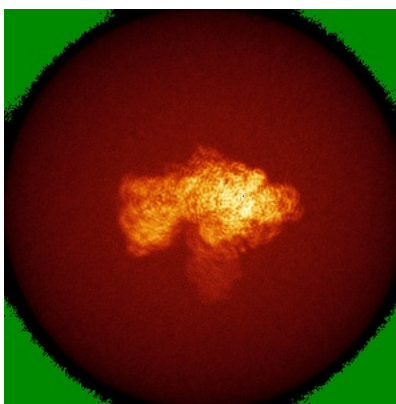
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

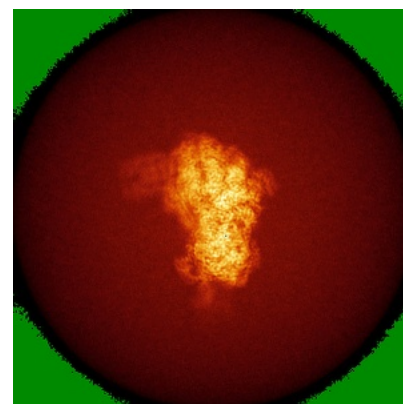
### 6.4.1 Primary map



X

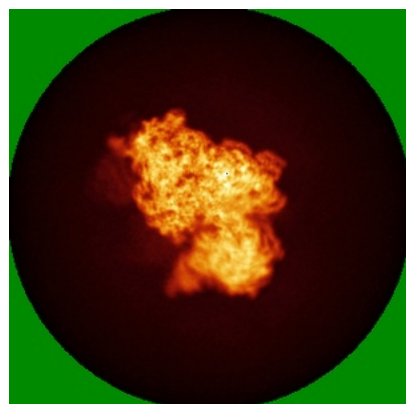


Y

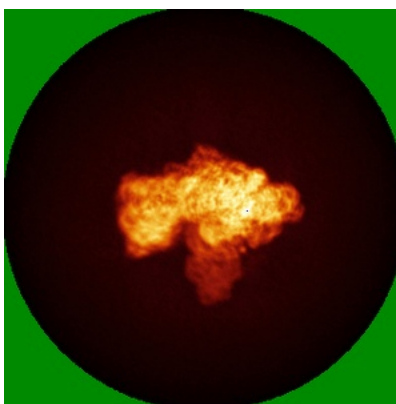


Z

### 6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

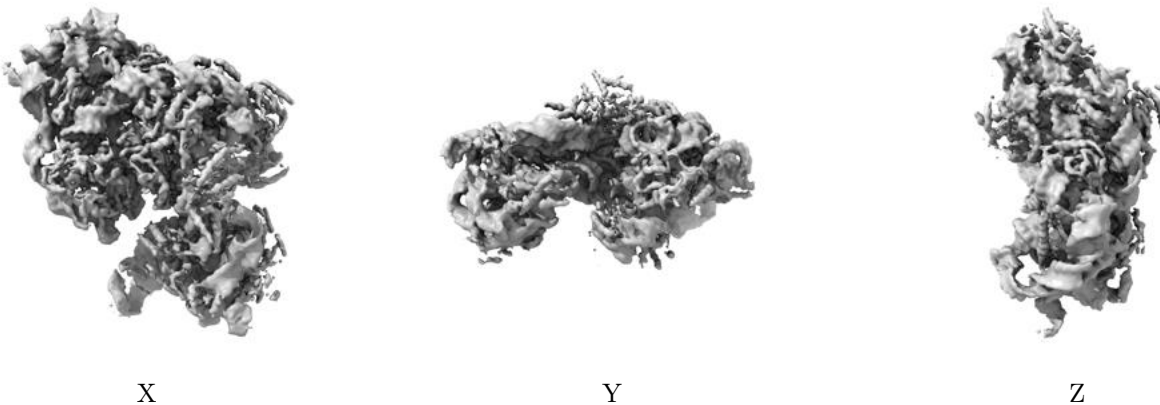
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.075. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

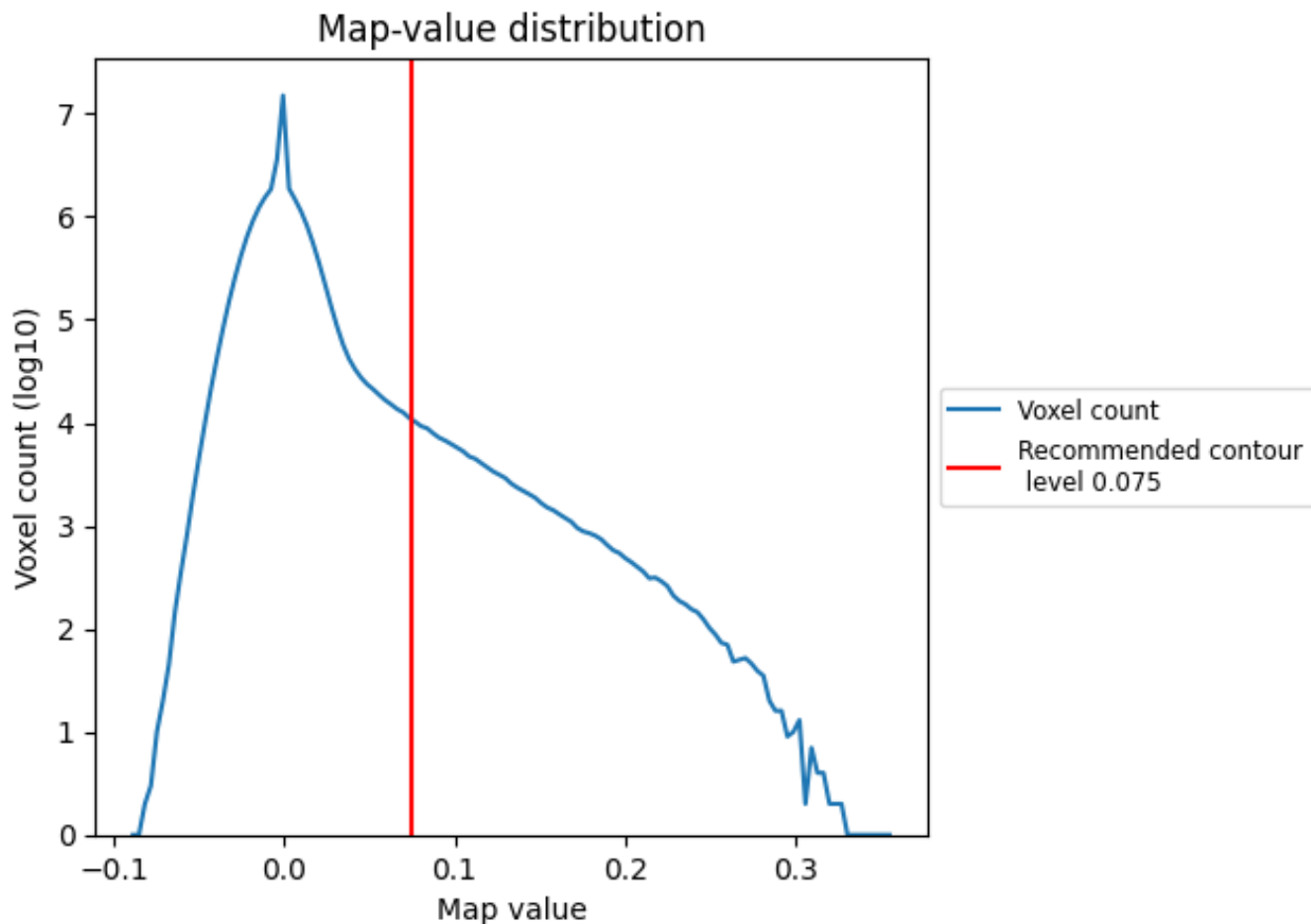
## 6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

## 7 Map analysis [i](#)

This section contains the results of statistical analysis of the map.

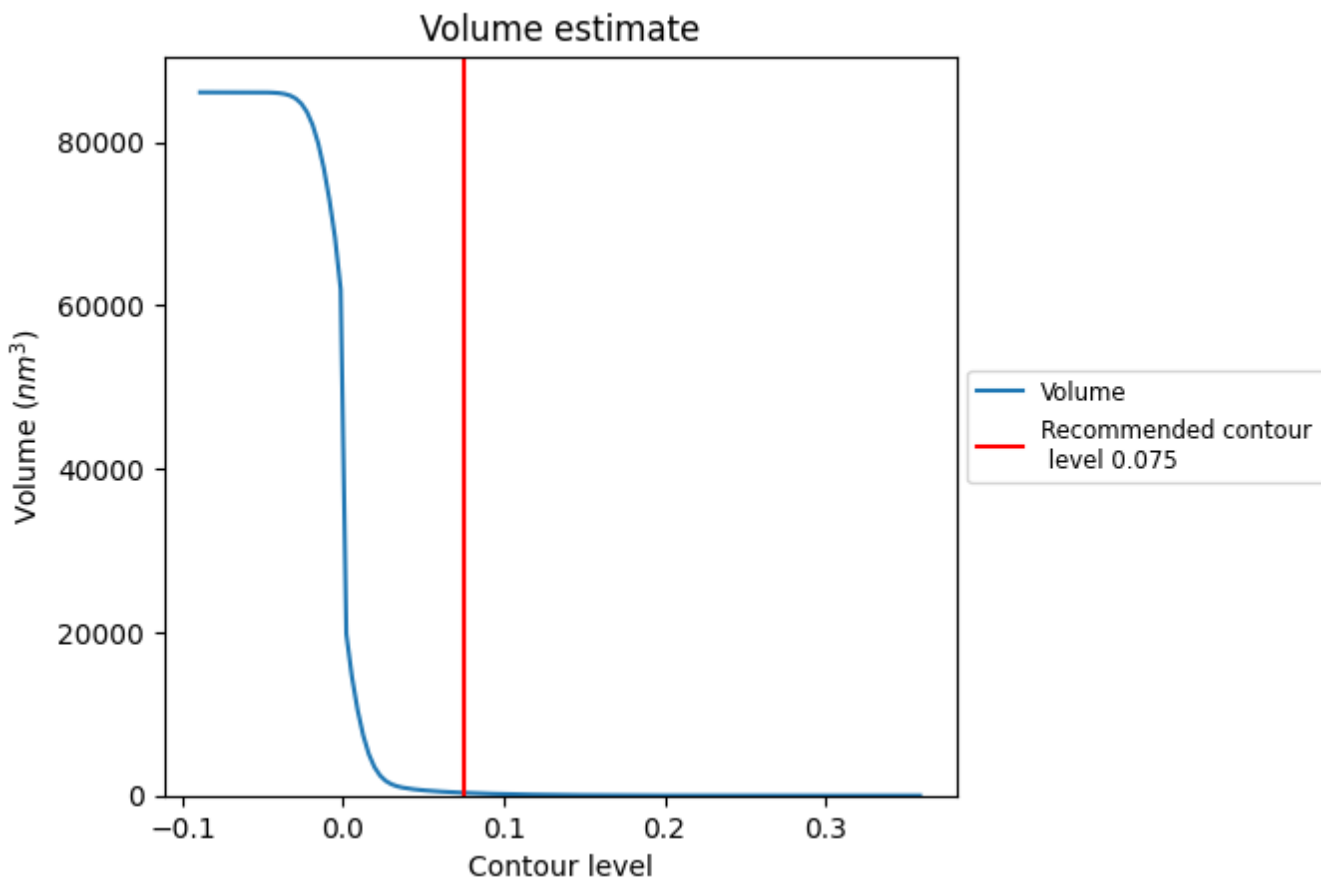
### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.



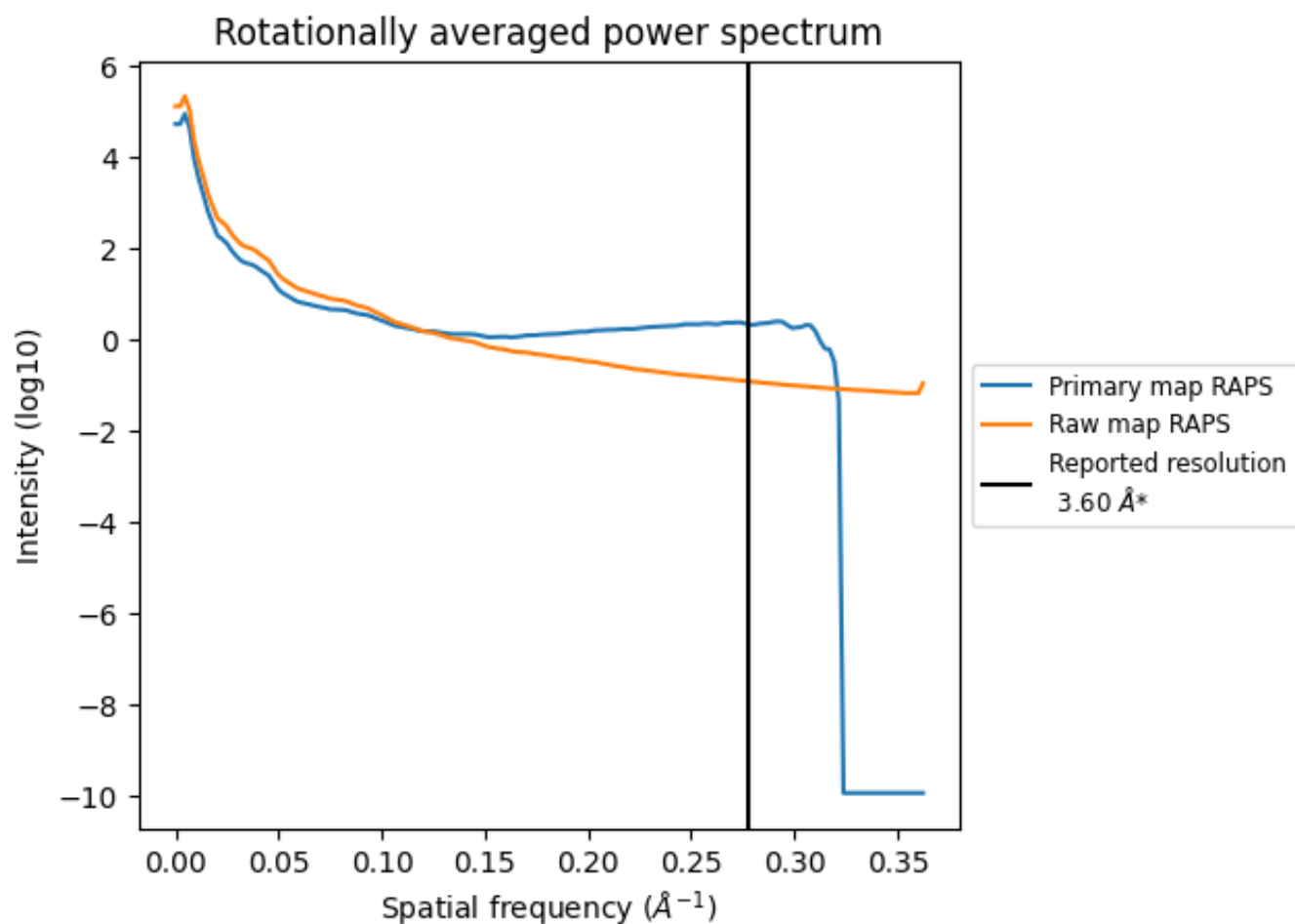
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 339  $\text{nm}^3$ ; this corresponds to an approximate mass of 306 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum i

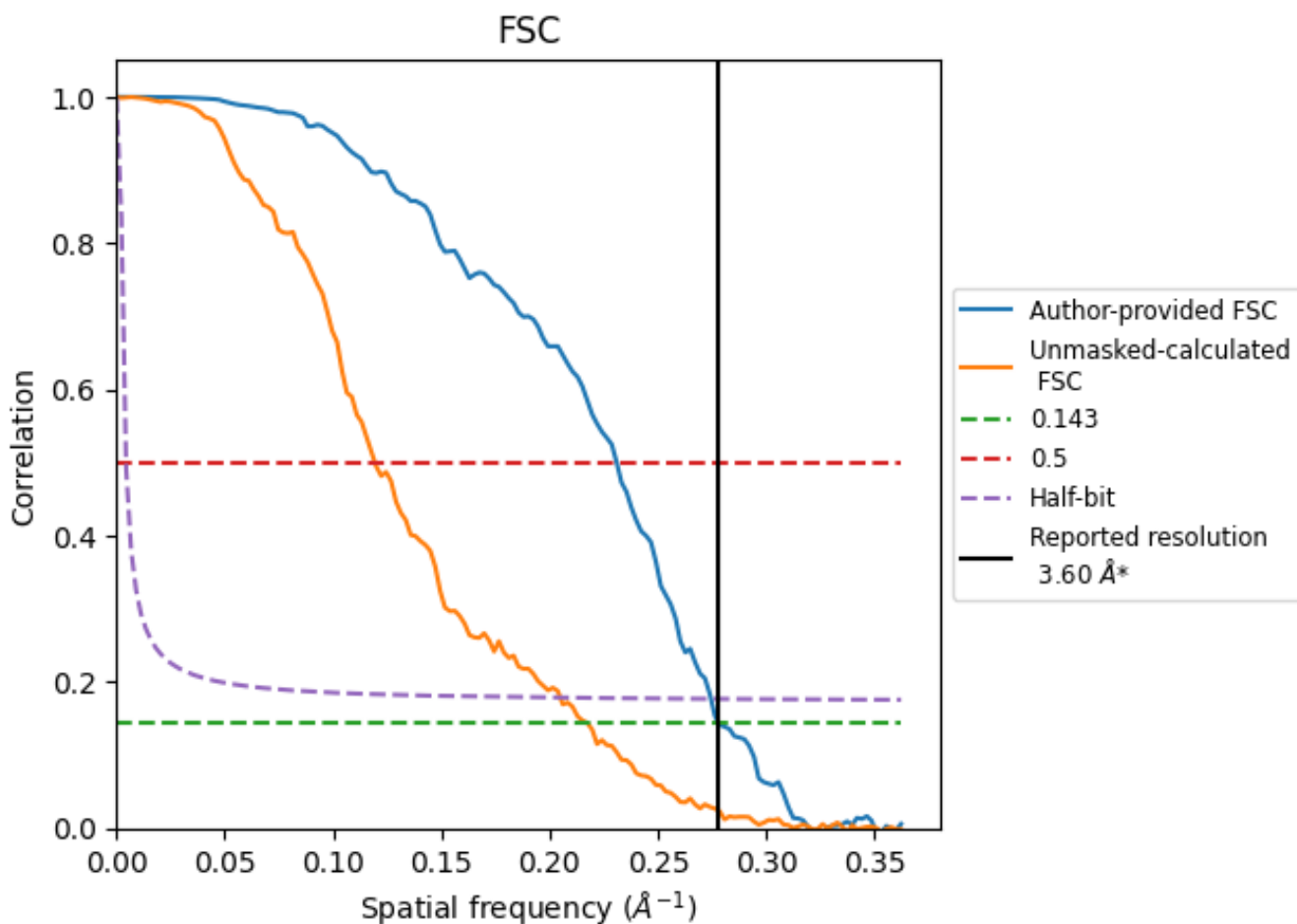


\*Reported resolution corresponds to spatial frequency of 0.278 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.278 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

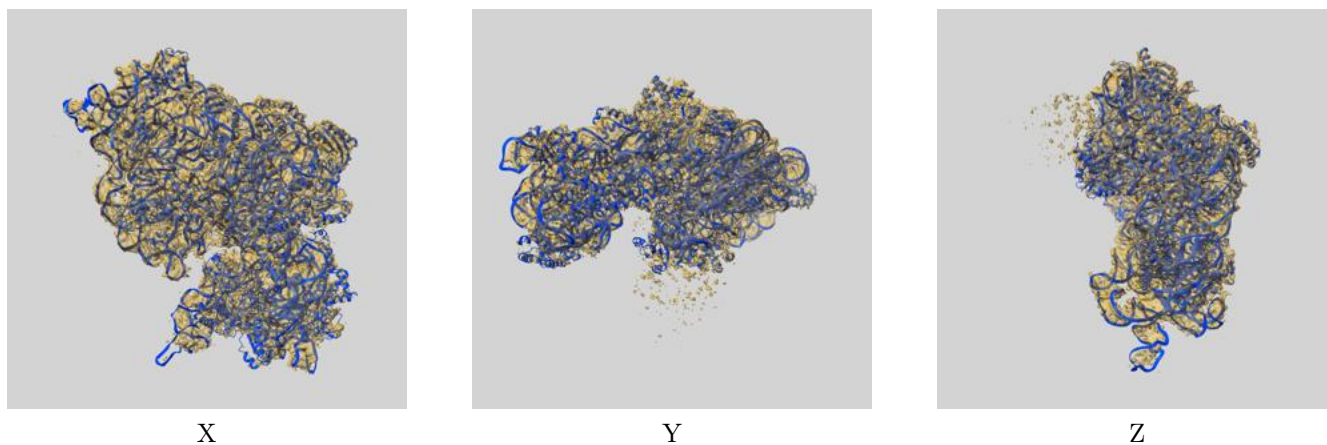
| Resolution estimate (Å)   | Estimation criterion (FSC cut-off) |      |          |
|---------------------------|------------------------------------|------|----------|
|                           | 0.143                              | 0.5  | Half-bit |
| Reported by author        | 3.60                               | -    | -        |
| Author-provided FSC curve | 3.59                               | 4.33 | 3.64     |
| Unmasked-calculated*      | 4.60                               | 8.38 | 4.88     |

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.60 differs from the reported value 3.6 by more than 10 %

## 9 Map-model fit [i](#)

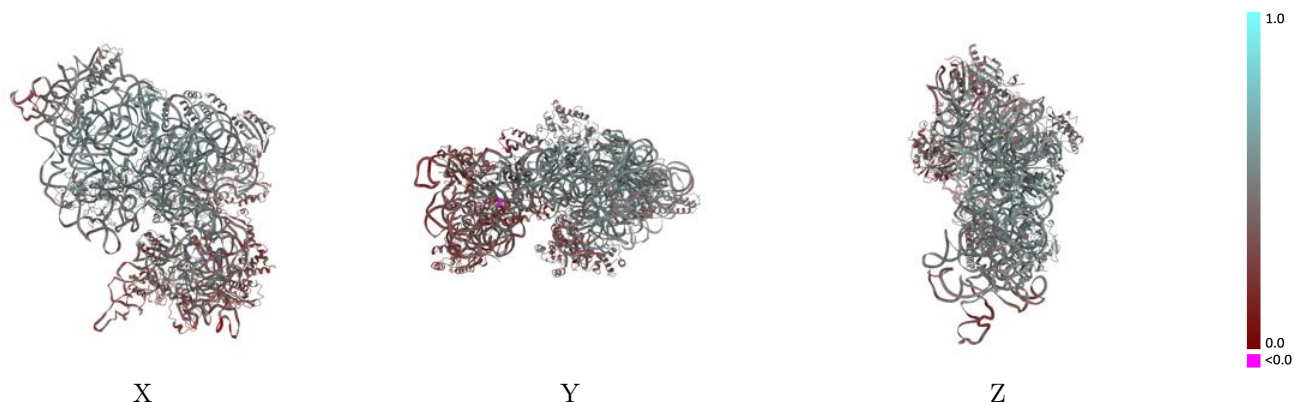
This section contains information regarding the fit between EMDB map EMD-31657 and PDB model 7V2N. Per-residue inclusion information can be found in section 3 on page 8.

### 9.1 Map-model overlay [i](#)



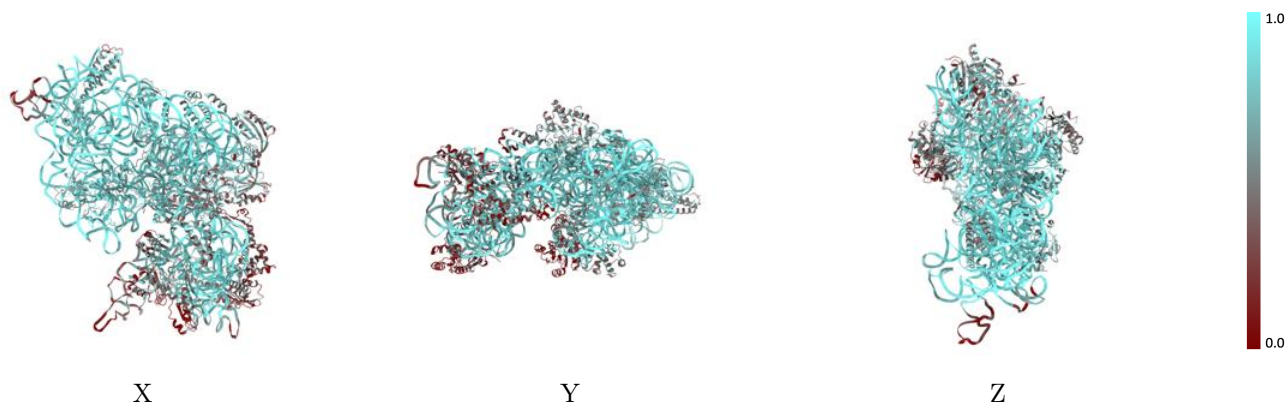
The images above show the 3D surface view of the map at the recommended contour level 0.075 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



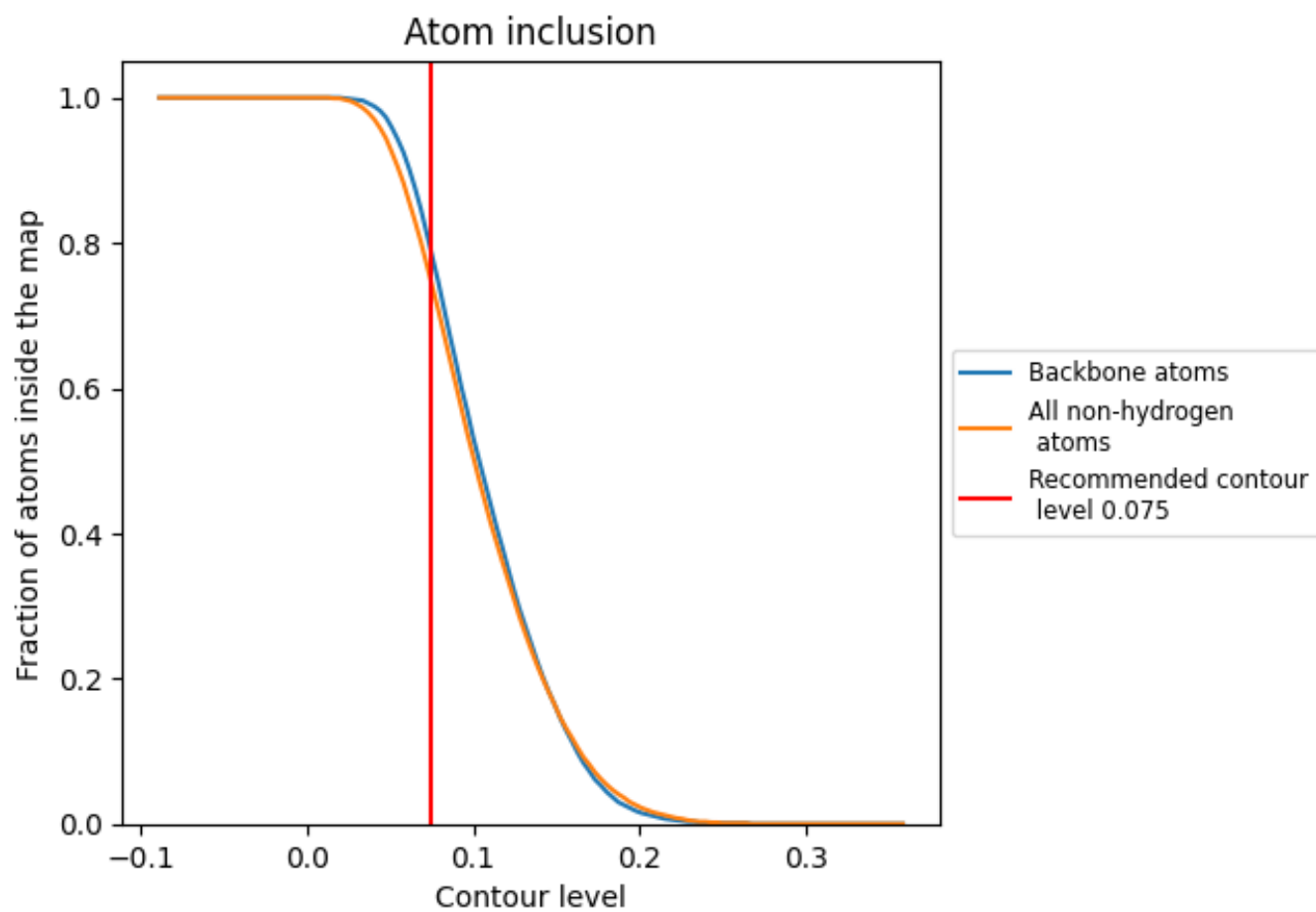
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.075).















































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 78% of all backbone atoms, 74% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.075) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion   | Q-score  |
|-------|--|--|
| All   |  0.7430   |  0.4460   |
| A     |  0.8740   |  0.4620   |
| B     |  0.5280   |  0.4450   |
| C     |  0.4260   |  0.3660   |
| D     |  0.7420   |  0.4970   |
| E     |  0.7840   |  0.5190   |
| F     |  0.5770   |  0.4370   |
| G     |  0.3080   |  0.2910   |
| H     |  0.8190   |  0.5340   |
| I     |  0.4380   |  0.3400   |
| J     |  0.3910   |  0.3640   |
| K     |  0.4920   |  0.3730   |
| L     |  0.7440   |  0.5000   |
| M     |  0.2260   |  0.2680   |
| N     |  0.6300  |  0.4220  |
| O     |  0.7270 |  0.4980 |
| P     |  0.8320 |  0.5380 |
| Q     |  0.7980 |  0.5430 |
| R     |  0.6210 |  0.4770 |
| S     |  0.2850 |  0.3120 |
| T     |  0.6130 |  0.4510 |
| U     |  0.3370 |  0.3630 |
| V     |  0.5860 |  0.3510 |

