



## Full wwPDB EM Validation Report ⓘ

Jun 28, 2025 – 09:45 pm BST

PDB ID : 7ZC1 / pdb\_00007zc1  
EMDB ID : EMD-14617  
Title : Subtomogram averaging of Rubisco from Cyanobium carboxysome  
Authors : Ni, T.; Zhu, Y.; Seaton-Burn, W.; Zhang, P.  
Deposited on : 2022-03-25  
Resolution : 3.80 Å(reported)

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.dev118  
MolProbity : 4-5-2 with Phenix2.0rc1  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

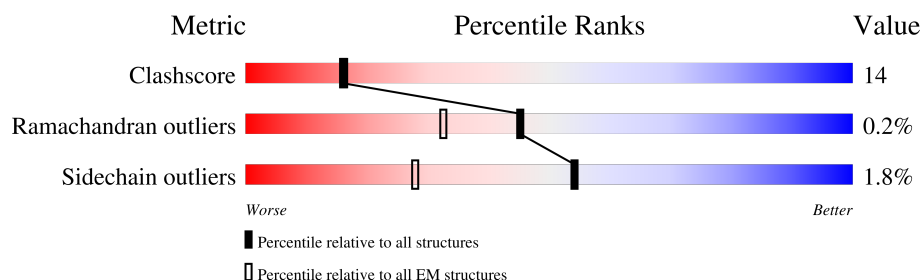
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

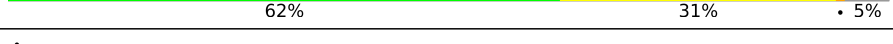
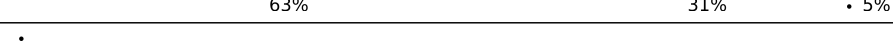
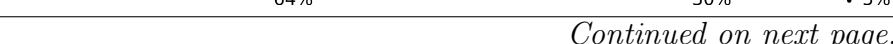
The reported resolution of this entry is 3.80 Å.

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.



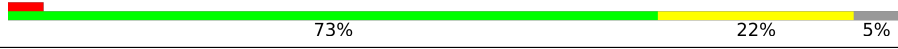
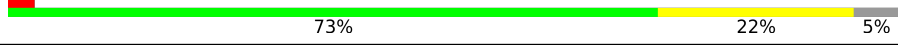
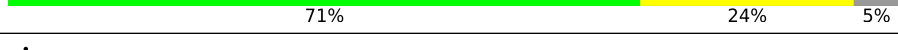
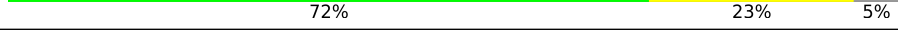
| Metric                | Whole archive (#Entries) | EM structures (#Entries) |
|-----------------------|--------------------------|--------------------------|
| Clashscore            | 210492                   | 15764                    |
| Ramachandran outliers | 207382                   | 16835                    |
| Sidechain outliers    | 206894                   | 16415                    |

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     | 470    |  |
| 1   | D     | 470    |  |
| 1   | G     | 470    |  |
| 1   | J     | 470    |  |
| 1   | M     | 470    |  |
| 1   | P     | 470    |  |
| 1   | S     | 470    |  |
| 1   | V     | 470    |  |

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| Mol | Chain | Length | Quality of chain                                                                            |
|-----|-------|--------|---------------------------------------------------------------------------------------------|
| 2   | B     | 113    |  72%23%5% |
| 2   | E     | 113    |  72%23%5% |
| 2   | H     | 113    |  73%22%5% |
| 2   | K     | 113    |  73%22%5% |
| 2   | N     | 113    |  71%24%5% |
| 2   | Q     | 113    |  74%20%5% |
| 2   | T     | 113    |  71%24%5% |
| 2   | W     | 113    |  72%23%5% |

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 34864 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 protein called Ribulose biphosphate carboxylase large chain.

| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 1   | A     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | D     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | G     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | J     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | M     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | P     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | S     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |
| 1   | V     | 445      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 3489  | 2213 | 614 | 642 | 20 |         |       |

- Molecule 2 is a protein called Ribulose biphosphate carboxylase, small subunit.

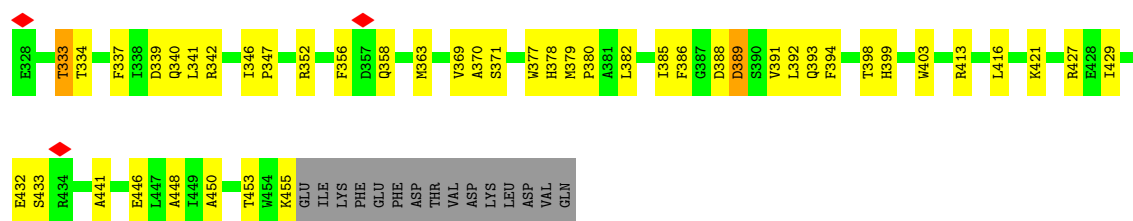
| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 2   | B     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |
| 2   | E     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |
| 2   | H     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |
| 2   | K     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |
| 2   | N     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |
| 2   | Q     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |
| 2   | T     | 107      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 869   | 565 | 140 | 160 | 4 |         |       |

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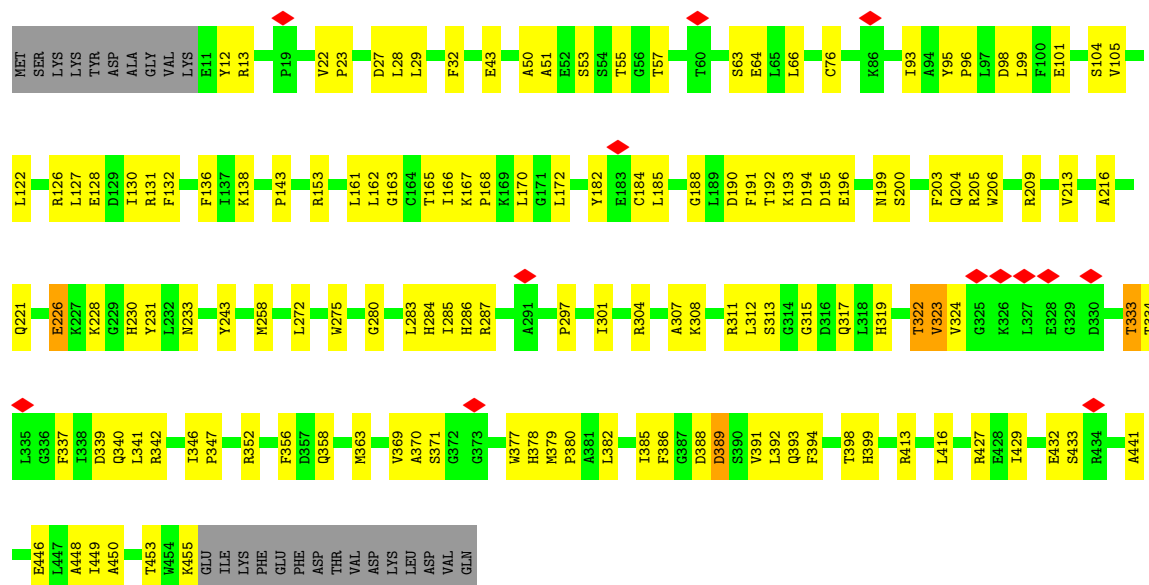
| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
|     |       |          | Total | C   | N   | O   | S |         |       |
| 2   | W     | 107      | 869   | 565 | 140 | 160 | 4 | 0       | 0     |





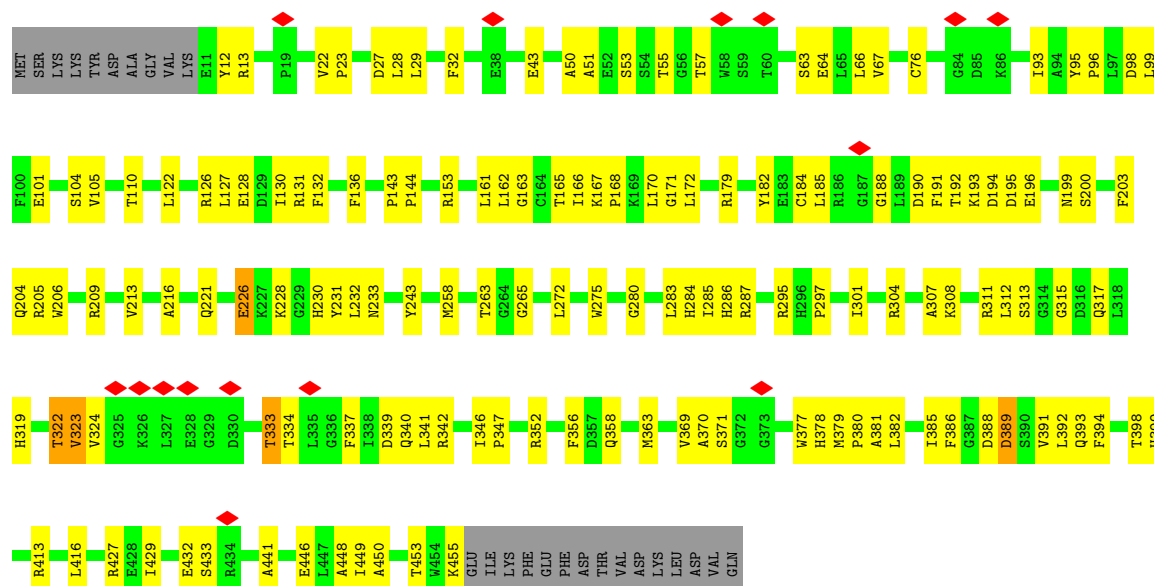
• Molecule 1: Ribulose biphosphate carboxylase large chain

Chain G: 65% 29% 5%

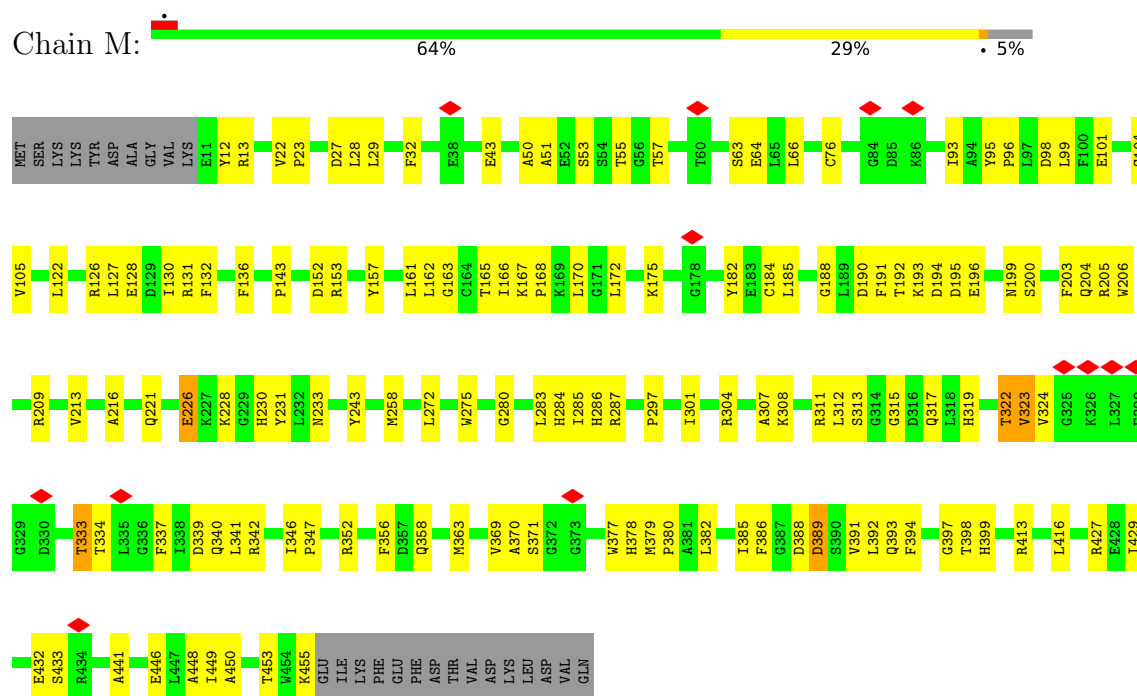


• Molecule 1: Ribulose biphosphate carboxylase large chain

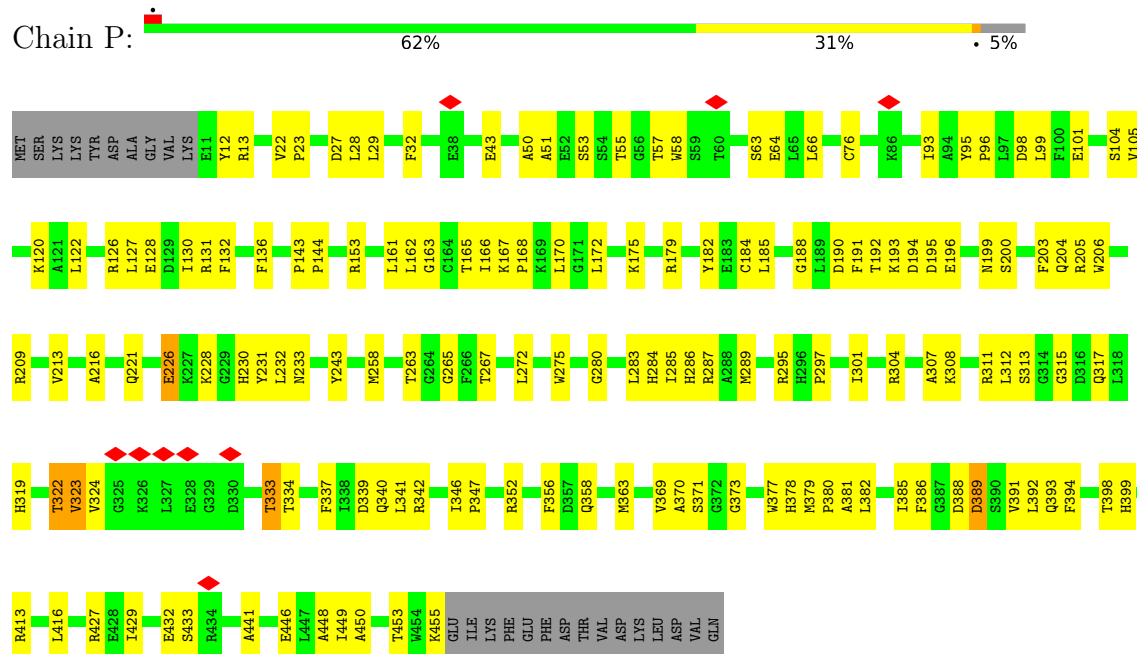
Chain J: 63% 31% 5%



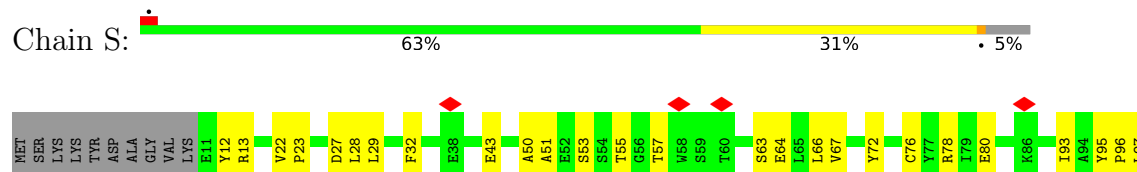
## Chain M:

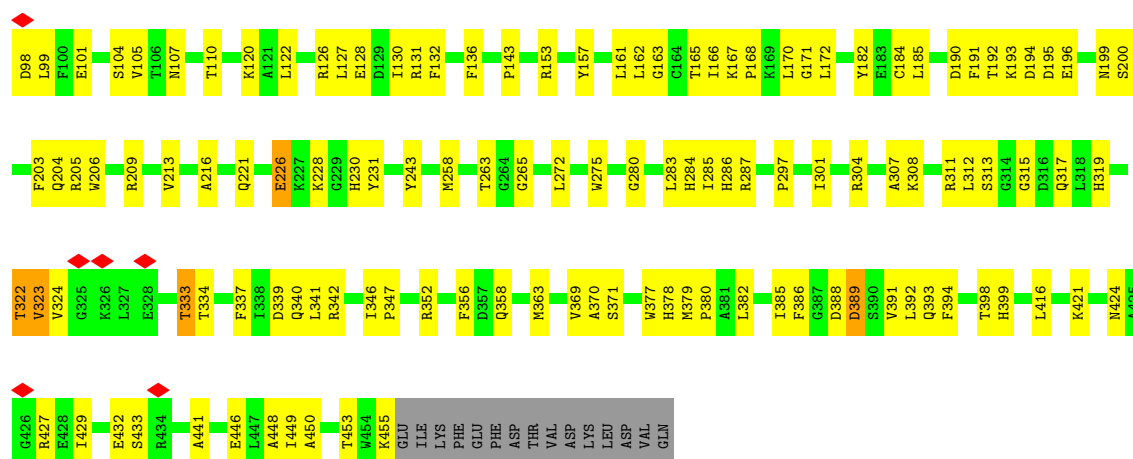


Chain P:

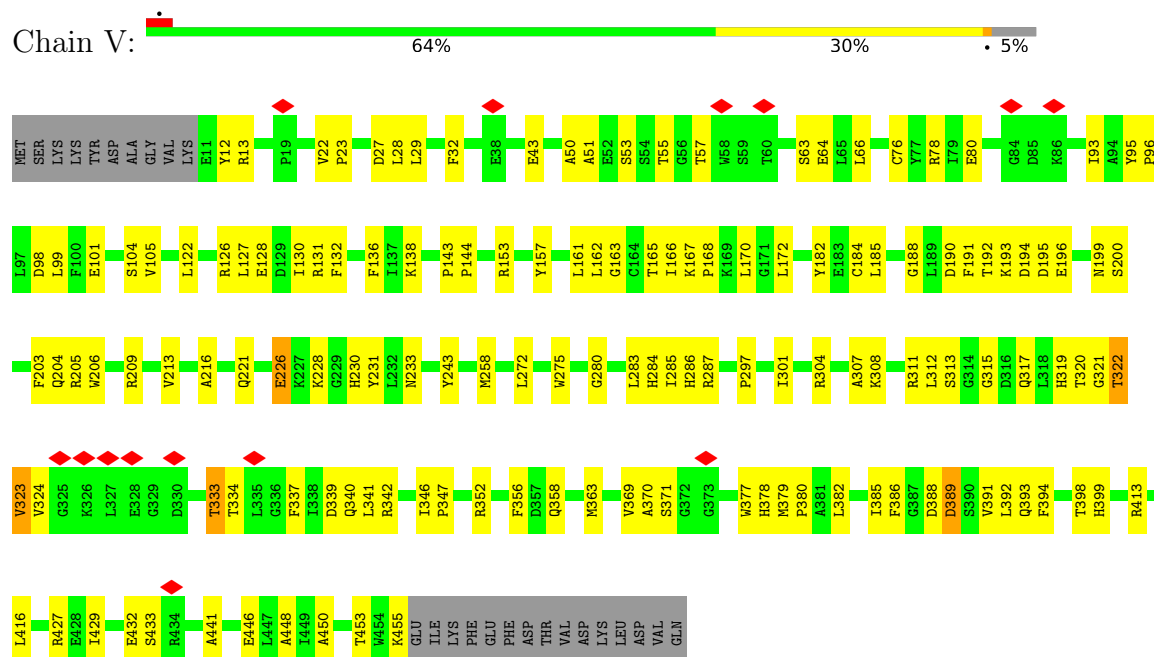


Chain S:

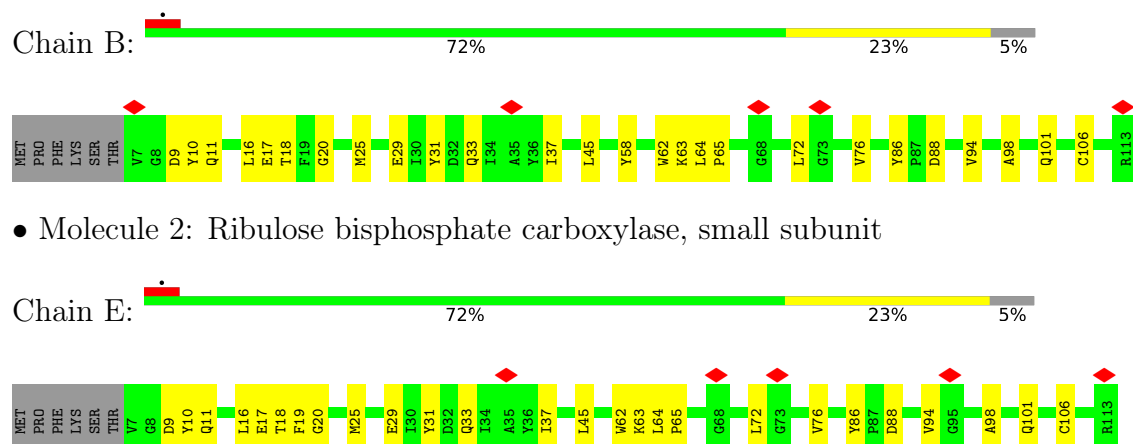




- Molecule 1: Ribulose biphosphate carboxylase large chain

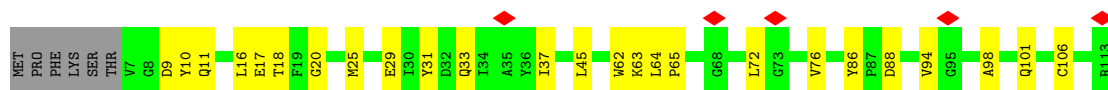


- Molecule 2: Ribulose biphosphate carboxylase, small subunit



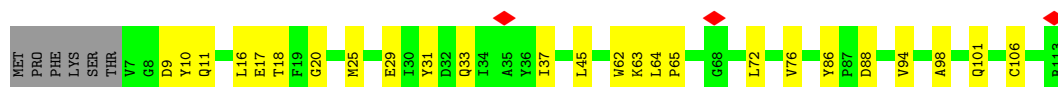
- Molecule 2: Ribulose biphosphate carboxylase, small subunit

Chain H: 



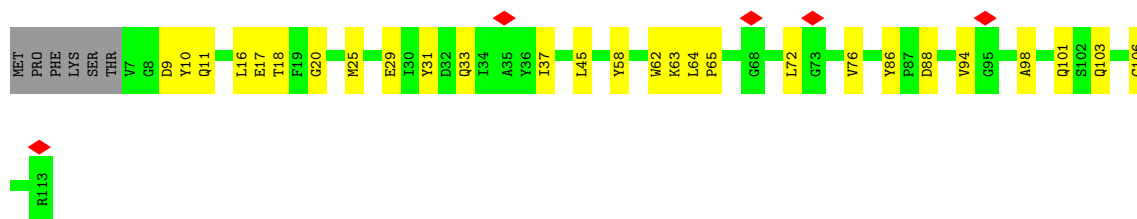
- Molecule 2: Ribulose biphosphate carboxylase, small subunit

Chain K: 



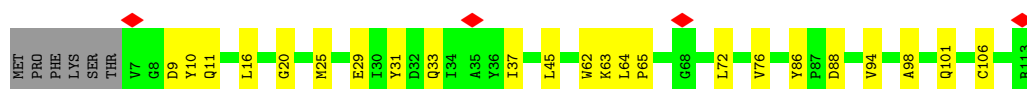
- Molecule 2: Ribulose biphosphate carboxylase, small subunit

Chain N: 



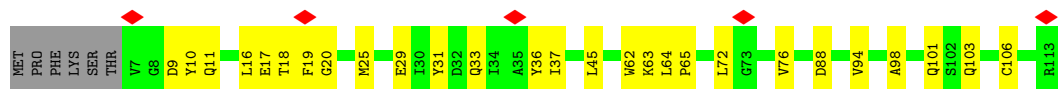
- Molecule 2: Ribulose biphosphate carboxylase, small subunit

Chain Q: 



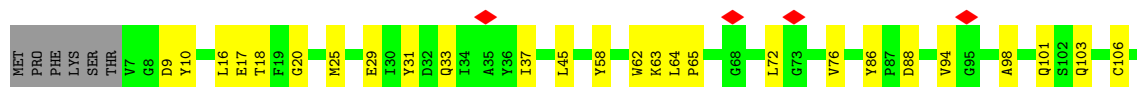
- Molecule 2: Ribulose biphosphate carboxylase, small subunit

Chain T: 



- Molecule 2: Ribulose biphosphate carboxylase, small subunit

Chain W: 





## 4 Experimental information

| Property                             | Value                                   | Source    |
|--------------------------------------|-----------------------------------------|-----------|
| EM reconstruction method             | SUBTOMOGRAM AVERAGING                   | Depositor |
| Imposed symmetry                     | POINT, D4                               | Depositor |
| Number of subtomograms used          | 152317                                  | 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 ( $e^-/\text{\AA}^2$ ) | 150                                     | Depositor |
| Minimum defocus (nm)                 | 2500                                    | Depositor |
| Maximum defocus (nm)                 | 5000                                    | Depositor |
| Magnification                        | Not provided                            |           |
| Image detector                       | GATAN K3 (6k x 4k)                      | Depositor |
| Maximum map value                    | 4.734                                   | Depositor |
| Minimum map value                    | -3.478                                  | Depositor |
| Average map value                    | 0.013                                   | Depositor |
| Map value standard deviation         | 0.221                                   | Depositor |
| Recommended contour level            | 0.485                                   | Depositor |
| Map size (Å)                         | 278.72, 278.72, 278.72                  | wwPDB     |
| Map dimensions                       | 208, 208, 208                           | wwPDB     |
| Map angles (°)                       | 90.0, 90.0, 90.0                        | wwPDB     |
| Pixel spacing (Å)                    | 1.34, 1.34, 1.34                        | Depositor |

## 5 Model quality

### 5.1 Standard geometry

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     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | D     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | G     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | J     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | M     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | P     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | S     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 1   | V     | 0.12         | 0/3577  | 0.32        | 0/4841  |
| 2   | B     | 0.10         | 0/899   | 0.32        | 0/1226  |
| 2   | E     | 0.10         | 0/899   | 0.32        | 0/1226  |
| 2   | H     | 0.10         | 0/899   | 0.31        | 0/1226  |
| 2   | K     | 0.10         | 0/899   | 0.31        | 0/1226  |
| 2   | N     | 0.10         | 0/899   | 0.32        | 0/1226  |
| 2   | Q     | 0.10         | 0/899   | 0.32        | 0/1226  |
| 2   | T     | 0.10         | 0/899   | 0.32        | 0/1226  |
| 2   | W     | 0.10         | 0/899   | 0.32        | 0/1226  |
| All | All   | 0.11         | 0/35808 | 0.32        | 0/48536 |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 1   | A     | 0                   | 1                   |
| 1   | D     | 0                   | 1                   |
| 1   | G     | 0                   | 1                   |
| 1   | J     | 0                   | 1                   |
| 1   | M     | 0                   | 1                   |
| 1   | P     | 0                   | 1                   |
| 1   | S     | 0                   | 1                   |
| 1   | V     | 0                   | 1                   |
| All | All   | 0                   | 8                   |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (8) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group   |
|-----|-------|-----|------|---------|
| 1   | A     | 322 | THR  | Peptide |
| 1   | D     | 322 | THR  | Peptide |
| 1   | G     | 322 | THR  | Peptide |
| 1   | J     | 322 | THR  | Peptide |
| 1   | M     | 322 | THR  | Peptide |
| 1   | P     | 322 | THR  | Peptide |
| 1   | S     | 322 | THR  | Peptide |
| 1   | V     | 322 | THR  | Peptide |

## 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     | 3489  | 0        | 3393     | 112     | 0            |
| 1   | D     | 3489  | 0        | 3393     | 108     | 0            |
| 1   | G     | 3489  | 0        | 3393     | 98      | 0            |
| 1   | J     | 3489  | 0        | 3393     | 115     | 0            |
| 1   | M     | 3489  | 0        | 3393     | 102     | 0            |
| 1   | P     | 3489  | 0        | 3393     | 115     | 0            |
| 1   | S     | 3489  | 0        | 3393     | 117     | 0            |
| 1   | V     | 3489  | 0        | 3393     | 103     | 0            |
| 2   | B     | 869   | 0        | 812      | 19      | 0            |
| 2   | E     | 869   | 0        | 812      | 18      | 0            |
| 2   | H     | 869   | 0        | 812      | 17      | 0            |
| 2   | K     | 869   | 0        | 812      | 16      | 0            |
| 2   | N     | 869   | 0        | 812      | 20      | 0            |
| 2   | Q     | 869   | 0        | 812      | 15      | 0            |
| 2   | T     | 869   | 0        | 812      | 22      | 0            |
| 2   | W     | 869   | 0        | 812      | 20      | 0            |
| All | All   | 34864 | 0        | 33640    | 964     | 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 14.

All (964) 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:G:161:LEU:HB2  | 1:G:391:VAL:HG12 | 1.63                     | 0.80              |
| 1:M:161:LEU:HB2  | 1:M:391:VAL:HG12 | 1.63                     | 0.80              |
| 1:J:161:LEU:HB2  | 1:J:391:VAL:HG12 | 1.63                     | 0.79              |
| 1:V:161:LEU:HB2  | 1:V:391:VAL:HG12 | 1.63                     | 0.79              |
| 1:P:161:LEU:HB2  | 1:P:391:VAL:HG12 | 1.63                     | 0.79              |
| 1:P:307:ALA:HB1  | 1:P:341:LEU:HD21 | 1.65                     | 0.79              |
| 1:J:307:ALA:HB1  | 1:J:341:LEU:HD21 | 1.65                     | 0.79              |
| 1:D:161:LEU:HB2  | 1:D:391:VAL:HG12 | 1.63                     | 0.79              |
| 1:A:161:LEU:HB2  | 1:A:391:VAL:HG12 | 1.63                     | 0.78              |
| 1:S:161:LEU:HB2  | 1:S:391:VAL:HG12 | 1.63                     | 0.78              |
| 1:S:322:THR:HG21 | 1:S:382:LEU:HD22 | 1.65                     | 0.78              |
| 1:A:322:THR:HG21 | 1:A:382:LEU:HD22 | 1.65                     | 0.78              |
| 1:A:307:ALA:HB1  | 1:A:341:LEU:HD21 | 1.65                     | 0.78              |
| 1:M:322:THR:HG21 | 1:M:382:LEU:HD22 | 1.65                     | 0.77              |
| 1:S:307:ALA:HB1  | 1:S:341:LEU:HD21 | 1.65                     | 0.77              |
| 1:G:307:ALA:HB1  | 1:G:341:LEU:HD21 | 1.65                     | 0.77              |
| 1:M:307:ALA:HB1  | 1:M:341:LEU:HD21 | 1.65                     | 0.77              |
| 1:V:322:THR:HG21 | 1:V:382:LEU:HD22 | 1.65                     | 0.77              |
| 1:D:322:THR:HG21 | 1:D:382:LEU:HD22 | 1.65                     | 0.77              |
| 1:G:322:THR:HG21 | 1:G:382:LEU:HD22 | 1.65                     | 0.77              |
| 1:V:307:ALA:HB1  | 1:V:341:LEU:HD21 | 1.65                     | 0.76              |
| 1:D:307:ALA:HB1  | 1:D:341:LEU:HD21 | 1.65                     | 0.76              |
| 1:P:322:THR:HG21 | 1:P:382:LEU:HD22 | 1.65                     | 0.76              |
| 1:J:322:THR:HG21 | 1:J:382:LEU:HD22 | 1.65                     | 0.76              |
| 1:P:319:HIS:HA   | 1:P:369:VAL:HB   | 1.68                     | 0.75              |
| 1:G:319:HIS:HA   | 1:G:369:VAL:HB   | 1.68                     | 0.75              |
| 1:J:319:HIS:HA   | 1:J:369:VAL:HB   | 1.68                     | 0.75              |
| 1:M:319:HIS:HA   | 1:M:369:VAL:HB   | 1.68                     | 0.75              |
| 1:A:319:HIS:HA   | 1:A:369:VAL:HB   | 1.68                     | 0.73              |
| 1:S:319:HIS:HA   | 1:S:369:VAL:HB   | 1.68                     | 0.73              |
| 2:B:86:TYR:OH    | 2:E:11:GLN:NE2   | 2.21                     | 0.73              |
| 1:V:319:HIS:HA   | 1:V:369:VAL:HB   | 1.68                     | 0.73              |
| 1:D:319:HIS:HA   | 1:D:369:VAL:HB   | 1.68                     | 0.73              |
| 2:B:11:GLN:NE2   | 2:K:86:TYR:OH    | 2.22                     | 0.71              |
| 1:J:168:PRO:HB3  | 1:S:64:GLU:HG3   | 1.74                     | 0.69              |
| 1:J:182:TYR:HB2  | 1:J:216:ALA:HB1  | 1.76                     | 0.68              |
| 1:M:182:TYR:HB2  | 1:M:216:ALA:HB1  | 1.76                     | 0.68              |
| 1:P:182:TYR:HB2  | 1:P:216:ALA:HB1  | 1.76                     | 0.68              |
| 1:G:182:TYR:HB2  | 1:G:216:ALA:HB1  | 1.76                     | 0.68              |
| 1:S:385:ILE:HG13 | 1:S:386:PHE:HD1  | 1.59                     | 0.67              |

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| Atom-1           | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-----------------|--------------------------|-------------------|
| 1:P:385:ILE:HG13 | 1:P:386:PHE:HD1 | 1.59                     | 0.67              |
| 1:D:385:ILE:HG13 | 1:D:386:PHE:HD1 | 1.59                     | 0.67              |
| 1:A:182:TYR:HB2  | 1:A:216:ALA:HB1 | 1.76                     | 0.67              |
| 1:A:385:ILE:HG13 | 1:A:386:PHE:HD1 | 1.59                     | 0.67              |
| 1:J:385:ILE:HG13 | 1:J:386:PHE:HD1 | 1.59                     | 0.67              |
| 1:V:385:ILE:HG13 | 1:V:386:PHE:HD1 | 1.59                     | 0.67              |
| 1:D:182:TYR:HB2  | 1:D:216:ALA:HB1 | 1.76                     | 0.66              |
| 1:S:182:TYR:HB2  | 1:S:216:ALA:HB1 | 1.76                     | 0.66              |
| 1:G:385:ILE:HG13 | 1:G:386:PHE:HD1 | 1.59                     | 0.66              |
| 1:M:385:ILE:HG13 | 1:M:386:PHE:HD1 | 1.59                     | 0.66              |
| 1:V:182:TYR:HB2  | 1:V:216:ALA:HB1 | 1.76                     | 0.66              |
| 2:Q:86:TYR:OH    | 2:T:11:GLN:NE2  | 2.29                     | 0.66              |
| 1:J:27:ASP:O     | 1:J:131:ARG:NH2 | 2.30                     | 0.65              |
| 1:P:27:ASP:O     | 1:P:131:ARG:NH2 | 2.30                     | 0.65              |
| 1:A:27:ASP:O     | 1:A:131:ARG:NH2 | 2.30                     | 0.65              |
| 1:S:27:ASP:O     | 1:S:131:ARG:NH2 | 2.30                     | 0.64              |
| 1:A:304:ARG:NH2  | 1:A:333:THR:OG1 | 2.31                     | 0.64              |
| 1:M:304:ARG:NH2  | 1:M:333:THR:OG1 | 2.31                     | 0.64              |
| 1:G:304:ARG:NH2  | 1:G:333:THR:OG1 | 2.31                     | 0.64              |
| 1:S:304:ARG:NH2  | 1:S:333:THR:OG1 | 2.31                     | 0.64              |
| 2:N:86:TYR:OH    | 2:Q:11:GLN:NE2  | 2.31                     | 0.64              |
| 1:D:304:ARG:NH2  | 1:D:333:THR:OG1 | 2.31                     | 0.64              |
| 1:G:27:ASP:O     | 1:G:131:ARG:NH2 | 2.30                     | 0.64              |
| 1:M:27:ASP:O     | 1:M:131:ARG:NH2 | 2.30                     | 0.64              |
| 1:D:27:ASP:O     | 1:D:131:ARG:NH2 | 2.30                     | 0.63              |
| 1:V:304:ARG:NH2  | 1:V:333:THR:OG1 | 2.31                     | 0.63              |
| 1:P:304:ARG:NH2  | 1:P:333:THR:OG1 | 2.31                     | 0.63              |
| 1:V:27:ASP:O     | 1:V:131:ARG:NH2 | 2.30                     | 0.63              |
| 1:J:304:ARG:NH2  | 1:J:333:THR:OG1 | 2.31                     | 0.63              |
| 1:A:200:SER:HG   | 1:A:206:TRP:CD1 | 2.17                     | 0.62              |
| 1:V:193:LYS:HA   | 1:V:231:TYR:HB2 | 1.81                     | 0.62              |
| 1:D:193:LYS:HA   | 1:D:231:TYR:HB2 | 1.81                     | 0.62              |
| 1:P:200:SER:HG   | 1:P:206:TRP:CD1 | 2.17                     | 0.61              |
| 2:E:86:TYR:OH    | 2:H:11:GLN:NE2  | 2.33                     | 0.61              |
| 1:S:193:LYS:HA   | 1:S:231:TYR:HB2 | 1.81                     | 0.61              |
| 1:J:200:SER:HG   | 1:J:206:TRP:CD1 | 2.17                     | 0.61              |
| 1:G:193:LYS:HA   | 1:G:231:TYR:HB2 | 1.81                     | 0.61              |
| 1:A:193:LYS:HA   | 1:A:231:TYR:HB2 | 1.81                     | 0.61              |
| 1:D:105:VAL:HG21 | 1:D:313:SER:HB2 | 1.83                     | 0.61              |
| 1:M:193:LYS:HA   | 1:M:231:TYR:HB2 | 1.81                     | 0.60              |
| 1:P:311:ARG:NH1  | 1:P:340:GLN:O   | 2.34                     | 0.60              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:V:105:VAL:HG21 | 1:V:313:SER:HB2  | 1.83                     | 0.60              |
| 1:G:105:VAL:HG21 | 1:G:313:SER:HB2  | 1.83                     | 0.60              |
| 1:J:193:LYS:HA   | 1:J:231:TYR:HB2  | 1.81                     | 0.60              |
| 1:J:311:ARG:NH1  | 1:J:340:GLN:O    | 2.34                     | 0.60              |
| 1:J:171:GLY:HA3  | 1:S:67:VAL:HG11  | 1.83                     | 0.60              |
| 1:M:105:VAL:HG21 | 1:M:313:SER:HB2  | 1.83                     | 0.60              |
| 1:P:193:LYS:HA   | 1:P:231:TYR:HB2  | 1.82                     | 0.60              |
| 1:S:105:VAL:HG21 | 1:S:313:SER:HB2  | 1.83                     | 0.60              |
| 1:M:311:ARG:NH1  | 1:M:340:GLN:O    | 2.34                     | 0.60              |
| 1:A:311:ARG:NH1  | 1:A:340:GLN:O    | 2.34                     | 0.60              |
| 1:S:311:ARG:NH1  | 1:S:340:GLN:O    | 2.34                     | 0.60              |
| 1:A:105:VAL:HG21 | 1:A:313:SER:HB2  | 1.83                     | 0.59              |
| 1:G:311:ARG:NH1  | 1:G:340:GLN:O    | 2.34                     | 0.59              |
| 1:V:311:ARG:NH1  | 1:V:340:GLN:O    | 2.34                     | 0.59              |
| 1:D:311:ARG:NH1  | 1:D:340:GLN:O    | 2.34                     | 0.59              |
| 1:M:175:LYS:HG3  | 2:W:58:TYR:HE1   | 1.68                     | 0.59              |
| 1:P:105:VAL:HG21 | 1:P:313:SER:HB2  | 1.83                     | 0.59              |
| 1:J:105:VAL:HG21 | 1:J:313:SER:HB2  | 1.83                     | 0.58              |
| 1:J:204:GLN:NE2  | 1:J:205:ARG:O    | 2.36                     | 0.58              |
| 1:P:204:GLN:NE2  | 1:P:205:ARG:O    | 2.36                     | 0.58              |
| 1:V:204:GLN:NE2  | 1:V:205:ARG:O    | 2.36                     | 0.58              |
| 1:J:110:THR:HG22 | 1:S:263:THR:HG21 | 1.84                     | 0.58              |
| 1:M:204:GLN:NE2  | 1:M:205:ARG:O    | 2.36                     | 0.58              |
| 1:G:204:GLN:NE2  | 1:G:205:ARG:O    | 2.36                     | 0.58              |
| 1:G:322:THR:HG22 | 1:G:370:ALA:HB1  | 1.85                     | 0.58              |
| 1:D:204:GLN:NE2  | 1:D:205:ARG:O    | 2.36                     | 0.58              |
| 1:J:322:THR:HG22 | 1:J:370:ALA:HB1  | 1.85                     | 0.58              |
| 1:M:322:THR:HG22 | 1:M:370:ALA:HB1  | 1.85                     | 0.58              |
| 1:P:322:THR:HG22 | 1:P:370:ALA:HB1  | 1.85                     | 0.58              |
| 1:S:421:LYS:HB2  | 2:T:19:PHE:CZ    | 2.39                     | 0.58              |
| 1:A:204:GLN:NE2  | 1:A:205:ARG:O    | 2.36                     | 0.58              |
| 1:J:127:LEU:HD11 | 1:J:130:ILE:HD11 | 1.86                     | 0.58              |
| 1:P:127:LEU:HD11 | 1:P:130:ILE:HD11 | 1.86                     | 0.58              |
| 1:A:322:THR:HG22 | 1:A:370:ALA:HB1  | 1.85                     | 0.57              |
| 1:G:127:LEU:HD11 | 1:G:130:ILE:HD11 | 1.86                     | 0.57              |
| 1:M:127:LEU:HD11 | 1:M:130:ILE:HD11 | 1.86                     | 0.57              |
| 1:S:204:GLN:NE2  | 1:S:205:ARG:O    | 2.36                     | 0.57              |
| 1:S:127:LEU:HD11 | 1:S:130:ILE:HD11 | 1.86                     | 0.57              |
| 1:D:127:LEU:HD11 | 1:D:130:ILE:HD11 | 1.86                     | 0.57              |
| 1:S:322:THR:HG22 | 1:S:370:ALA:HB1  | 1.85                     | 0.57              |
| 1:A:127:LEU:HD11 | 1:A:130:ILE:HD11 | 1.86                     | 0.57              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:S:200:SER:HG   | 1:S:206:TRP:CD1  | 2.22                     | 0.57              |
| 1:V:127:LEU:HD11 | 1:V:130:ILE:HD11 | 1.86                     | 0.57              |
| 1:A:322:THR:OG1  | 1:A:323:VAL:N    | 2.36                     | 0.57              |
| 1:D:322:THR:HG22 | 1:D:370:ALA:HB1  | 1.85                     | 0.57              |
| 1:V:200:SER:HG   | 1:V:206:TRP:CD1  | 2.22                     | 0.57              |
| 1:S:322:THR:OG1  | 1:S:323:VAL:N    | 2.36                     | 0.57              |
| 1:V:322:THR:HG22 | 1:V:370:ALA:HB1  | 1.85                     | 0.57              |
| 1:D:200:SER:HG   | 1:D:206:TRP:CD1  | 2.22                     | 0.56              |
| 1:J:200:SER:HG   | 1:J:206:TRP:HD1  | 1.53                     | 0.56              |
| 1:M:200:SER:HG   | 1:M:206:TRP:CD1  | 2.23                     | 0.56              |
| 1:P:200:SER:HG   | 1:P:206:TRP:HD1  | 1.53                     | 0.56              |
| 1:A:200:SER:HG   | 1:A:206:TRP:HD1  | 1.53                     | 0.56              |
| 1:G:200:SER:HG   | 1:G:206:TRP:CD1  | 2.23                     | 0.56              |
| 1:J:64:GLU:N     | 1:J:64:GLU:OE1   | 2.38                     | 0.56              |
| 1:M:64:GLU:N     | 1:M:64:GLU:OE1   | 2.38                     | 0.56              |
| 1:M:152:ASP:HB3  | 1:P:175:LYS:HE2  | 1.86                     | 0.56              |
| 1:P:346:ILE:HD12 | 1:P:347:PRO:HD2  | 1.88                     | 0.56              |
| 1:V:64:GLU:N     | 1:V:64:GLU:OE1   | 2.38                     | 0.56              |
| 1:G:64:GLU:N     | 1:G:64:GLU:OE1   | 2.38                     | 0.56              |
| 1:J:346:ILE:HD12 | 1:J:347:PRO:HD2  | 1.88                     | 0.56              |
| 1:P:64:GLU:OE1   | 1:P:64:GLU:N     | 2.38                     | 0.56              |
| 1:D:64:GLU:OE1   | 1:D:64:GLU:N     | 2.38                     | 0.56              |
| 1:A:50:ALA:O     | 1:A:53:SER:OG    | 2.24                     | 0.56              |
| 1:D:322:THR:OG1  | 1:D:323:VAL:N    | 2.36                     | 0.56              |
| 1:G:128:GLU:OE1  | 1:G:304:ARG:NH1  | 2.39                     | 0.56              |
| 1:M:128:GLU:OE1  | 1:M:304:ARG:NH1  | 2.39                     | 0.56              |
| 1:S:346:ILE:HD12 | 1:S:347:PRO:HD2  | 1.88                     | 0.56              |
| 1:V:322:THR:OG1  | 1:V:323:VAL:N    | 2.36                     | 0.56              |
| 1:A:346:ILE:HD12 | 1:A:347:PRO:HD2  | 1.88                     | 0.56              |
| 1:A:450:ALA:O    | 1:A:453:THR:OG1  | 2.23                     | 0.56              |
| 1:J:185:LEU:HD11 | 1:J:228:LYS:HB3  | 1.88                     | 0.56              |
| 1:P:185:LEU:HD11 | 1:P:228:LYS:HB3  | 1.88                     | 0.56              |
| 1:A:64:GLU:OE1   | 1:A:64:GLU:N     | 2.38                     | 0.56              |
| 1:P:128:GLU:OE1  | 1:P:304:ARG:NH1  | 2.39                     | 0.56              |
| 1:D:450:ALA:O    | 1:D:453:THR:OG1  | 2.23                     | 0.55              |
| 1:J:128:GLU:OE1  | 1:J:304:ARG:NH1  | 2.39                     | 0.55              |
| 1:S:64:GLU:N     | 1:S:64:GLU:OE1   | 2.38                     | 0.55              |
| 1:S:450:ALA:O    | 1:S:453:THR:OG1  | 2.23                     | 0.55              |
| 1:V:450:ALA:O    | 1:V:453:THR:OG1  | 2.23                     | 0.55              |
| 1:G:322:THR:OG1  | 1:G:323:VAL:N    | 2.36                     | 0.55              |
| 1:M:185:LEU:HD11 | 1:M:228:LYS:HB3  | 1.88                     | 0.55              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:P:322:THR:OG1  | 1:P:323:VAL:N    | 2.36                     | 0.55              |
| 1:D:346:ILE:HD12 | 1:D:347:PRO:HD2  | 1.88                     | 0.55              |
| 1:G:185:LEU:HD11 | 1:G:228:LYS:HB3  | 1.88                     | 0.55              |
| 1:M:450:ALA:O    | 1:M:453:THR:OG1  | 2.23                     | 0.55              |
| 2:N:58:TYR:CE1   | 1:P:179:ARG:HB3  | 2.42                     | 0.55              |
| 1:S:185:LEU:HD11 | 1:S:228:LYS:HB3  | 1.88                     | 0.55              |
| 1:G:450:ALA:O    | 1:G:453:THR:OG1  | 2.23                     | 0.55              |
| 1:J:450:ALA:O    | 1:J:453:THR:OG1  | 2.23                     | 0.55              |
| 1:M:322:THR:OG1  | 1:M:323:VAL:N    | 2.36                     | 0.55              |
| 1:P:450:ALA:O    | 1:P:453:THR:OG1  | 2.23                     | 0.55              |
| 1:A:185:LEU:HD11 | 1:A:228:LYS:HB3  | 1.88                     | 0.55              |
| 2:B:9:ASP:OD1    | 2:B:10:TYR:N     | 2.40                     | 0.55              |
| 1:J:322:THR:OG1  | 1:J:323:VAL:N    | 2.36                     | 0.55              |
| 1:G:346:ILE:HD12 | 1:G:347:PRO:HD2  | 1.88                     | 0.55              |
| 2:T:9:ASP:OD1    | 2:T:10:TYR:N     | 2.40                     | 0.55              |
| 1:V:346:ILE:HD12 | 1:V:347:PRO:HD2  | 1.88                     | 0.55              |
| 1:A:62:TRP:CD1   | 1:P:399:HIS:O    | 2.60                     | 0.55              |
| 1:A:128:GLU:OE1  | 1:A:304:ARG:NH1  | 2.39                     | 0.55              |
| 1:D:128:GLU:OE1  | 1:D:304:ARG:NH1  | 2.39                     | 0.55              |
| 1:J:67:VAL:HG11  | 1:S:171:GLY:HA3  | 1.89                     | 0.55              |
| 1:J:429:ILE:O    | 1:J:433:SER:OG   | 2.24                     | 0.55              |
| 1:M:346:ILE:HD12 | 1:M:347:PRO:HD2  | 1.88                     | 0.55              |
| 1:S:128:GLU:OE1  | 1:S:304:ARG:NH1  | 2.39                     | 0.55              |
| 1:V:128:GLU:OE1  | 1:V:304:ARG:NH1  | 2.39                     | 0.55              |
| 1:D:185:LEU:HD11 | 1:D:228:LYS:HB3  | 1.88                     | 0.55              |
| 2:H:9:ASP:OD1    | 2:H:10:TYR:N     | 2.40                     | 0.55              |
| 2:N:9:ASP:OD1    | 2:N:10:TYR:N     | 2.40                     | 0.55              |
| 1:S:272:LEU:HD22 | 1:S:283:LEU:HD13 | 1.89                     | 0.55              |
| 1:P:429:ILE:O    | 1:P:433:SER:OG   | 2.24                     | 0.54              |
| 1:A:272:LEU:HD22 | 1:A:283:LEU:HD13 | 1.89                     | 0.54              |
| 2:K:9:ASP:OD1    | 2:K:10:TYR:N     | 2.40                     | 0.54              |
| 1:M:272:LEU:HD22 | 1:M:283:LEU:HD13 | 1.89                     | 0.54              |
| 2:Q:9:ASP:OD1    | 2:Q:10:TYR:N     | 2.40                     | 0.54              |
| 1:V:185:LEU:HD11 | 1:V:228:LYS:HB3  | 1.88                     | 0.54              |
| 1:G:272:LEU:HD22 | 1:G:283:LEU:HD13 | 1.89                     | 0.54              |
| 1:S:168:PRO:HD2  | 1:S:172:LEU:HD21 | 1.90                     | 0.54              |
| 1:V:272:LEU:HD22 | 1:V:283:LEU:HD13 | 1.89                     | 0.54              |
| 2:E:16:LEU:H     | 2:E:20:GLY:HA3   | 1.73                     | 0.54              |
| 2:W:16:LEU:H     | 2:W:20:GLY:HA3   | 1.73                     | 0.54              |
| 1:A:168:PRO:HD2  | 1:A:172:LEU:HD21 | 1.90                     | 0.54              |
| 1:D:272:LEU:HD22 | 1:D:283:LEU:HD13 | 1.89                     | 0.54              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:G:50:ALA:O     | 1:G:53:SER:OG    | 2.24                     | 0.54              |
| 1:M:50:ALA:O     | 1:M:53:SER:OG    | 2.24                     | 0.54              |
| 2:H:88:ASP:OD1   | 2:H:88:ASP:N     | 2.40                     | 0.54              |
| 2:N:88:ASP:OD1   | 2:N:88:ASP:N     | 2.40                     | 0.54              |
| 1:V:50:ALA:O     | 1:V:53:SER:OG    | 2.24                     | 0.54              |
| 1:M:51:ALA:O     | 1:M:55:THR:N     | 2.41                     | 0.54              |
| 1:D:50:ALA:O     | 1:D:53:SER:OG    | 2.24                     | 0.54              |
| 1:G:51:ALA:O     | 1:G:55:THR:N     | 2.41                     | 0.54              |
| 2:H:16:LEU:H     | 2:H:20:GLY:HA3   | 1.73                     | 0.54              |
| 2:N:16:LEU:H     | 2:N:20:GLY:HA3   | 1.73                     | 0.54              |
| 2:Q:16:LEU:H     | 2:Q:20:GLY:HA3   | 1.73                     | 0.54              |
| 1:V:168:PRO:HD2  | 1:V:172:LEU:HD21 | 1.90                     | 0.54              |
| 1:J:272:LEU:HD22 | 1:J:283:LEU:HD13 | 1.89                     | 0.53              |
| 2:K:16:LEU:H     | 2:K:20:GLY:HA3   | 1.73                     | 0.53              |
| 1:P:272:LEU:HD22 | 1:P:283:LEU:HD13 | 1.89                     | 0.53              |
| 2:W:9:ASP:OD1    | 2:W:10:TYR:N     | 2.40                     | 0.53              |
| 1:D:168:PRO:HD2  | 1:D:172:LEU:HD21 | 1.90                     | 0.53              |
| 1:A:397:GLY:H    | 1:P:58:TRP:HZ3   | 1.55                     | 0.53              |
| 2:E:9:ASP:OD1    | 2:E:10:TYR:N     | 2.40                     | 0.53              |
| 2:T:16:LEU:H     | 2:T:20:GLY:HA3   | 1.73                     | 0.53              |
| 2:H:98:ALA:O     | 2:H:101:GLN:NE2  | 2.41                     | 0.53              |
| 2:K:98:ALA:O     | 2:K:101:GLN:NE2  | 2.41                     | 0.53              |
| 2:N:98:ALA:O     | 2:N:101:GLN:NE2  | 2.41                     | 0.53              |
| 2:B:16:LEU:H     | 2:B:20:GLY:HA3   | 1.73                     | 0.53              |
| 2:B:98:ALA:O     | 2:B:101:GLN:NE2  | 2.41                     | 0.53              |
| 2:Q:98:ALA:O     | 2:Q:101:GLN:NE2  | 2.41                     | 0.53              |
| 2:T:98:ALA:O     | 2:T:101:GLN:NE2  | 2.41                     | 0.53              |
| 1:A:51:ALA:O     | 1:A:55:THR:N     | 2.41                     | 0.53              |
| 1:G:168:PRO:HD2  | 1:G:172:LEU:HD21 | 1.90                     | 0.53              |
| 1:M:168:PRO:HD2  | 1:M:172:LEU:HD21 | 1.90                     | 0.53              |
| 1:D:51:ALA:O     | 1:D:55:THR:N     | 2.41                     | 0.53              |
| 2:E:98:ALA:O     | 2:E:101:GLN:NE2  | 2.41                     | 0.53              |
| 1:V:287:ARG:HG2  | 1:V:319:HIS:HB2  | 1.91                     | 0.53              |
| 1:D:287:ARG:HG2  | 1:D:319:HIS:HB2  | 1.91                     | 0.53              |
| 1:P:168:PRO:HD2  | 1:P:172:LEU:HD21 | 1.90                     | 0.53              |
| 2:W:98:ALA:O     | 2:W:101:GLN:NE2  | 2.41                     | 0.53              |
| 1:A:429:ILE:O    | 1:A:433:SER:OG   | 2.24                     | 0.52              |
| 1:P:51:ALA:O     | 1:P:55:THR:N     | 2.41                     | 0.52              |
| 1:G:334:THR:HA   | 1:G:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:J:51:ALA:O     | 1:J:55:THR:N     | 2.41                     | 0.52              |
| 1:J:168:PRO:HD2  | 1:J:172:LEU:HD21 | 1.90                     | 0.52              |

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| Atom-1          | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|------------------|--------------------------|-------------------|
| 1:V:51:ALA:O    | 1:V:55:THR:N     | 2.41                     | 0.52              |
| 1:V:334:THR:HA  | 1:V:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:J:287:ARG:HG2 | 1:J:319:HIS:HB2  | 1.91                     | 0.52              |
| 1:M:334:THR:HA  | 1:M:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:P:287:ARG:HG2 | 1:P:319:HIS:HB2  | 1.91                     | 0.52              |
| 1:D:334:THR:HA  | 1:D:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:J:308:LYS:HZ2 | 1:J:358:GLN:HG2  | 1.74                     | 0.52              |
| 1:P:308:LYS:HZ2 | 1:P:358:GLN:HG2  | 1.74                     | 0.52              |
| 1:P:334:THR:HA  | 1:P:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:J:194:ASP:OD1 | 1:J:195:ASP:N    | 2.43                     | 0.52              |
| 1:J:334:THR:HA  | 1:J:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:A:194:ASP:OD1 | 1:A:195:ASP:N    | 2.43                     | 0.52              |
| 2:N:11:GLN:NE2  | 2:W:86:TYR:OH    | 2.43                     | 0.52              |
| 1:P:194:ASP:OD1 | 1:P:195:ASP:N    | 2.43                     | 0.52              |
| 1:S:334:THR:HA  | 1:S:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:A:334:THR:HA  | 1:A:337:PHE:CE2  | 2.44                     | 0.52              |
| 1:D:283:LEU:HG  | 1:D:285:ILE:HD11 | 1.92                     | 0.52              |
| 1:G:194:ASP:OD1 | 1:G:195:ASP:N    | 2.43                     | 0.52              |
| 1:S:51:ALA:O    | 1:S:55:THR:N     | 2.41                     | 0.52              |
| 1:S:194:ASP:OD1 | 1:S:195:ASP:N    | 2.43                     | 0.52              |
| 1:M:101:GLU:HB3 | 1:M:104:SER:HB3  | 1.92                     | 0.51              |
| 1:M:194:ASP:OD1 | 1:M:195:ASP:N    | 2.43                     | 0.51              |
| 1:S:101:GLU:HB3 | 1:S:104:SER:HB3  | 1.92                     | 0.51              |
| 1:G:101:GLU:HB3 | 1:G:104:SER:HB3  | 1.92                     | 0.51              |
| 1:G:287:ARG:HG2 | 1:G:319:HIS:HB2  | 1.91                     | 0.51              |
| 1:M:200:SER:HG  | 1:M:206:TRP:HD1  | 1.58                     | 0.51              |
| 1:S:429:ILE:O   | 1:S:433:SER:OG   | 2.24                     | 0.51              |
| 1:V:283:LEU:HG  | 1:V:285:ILE:HD11 | 1.93                     | 0.51              |
| 1:A:101:GLU:HB3 | 1:A:104:SER:HB3  | 1.92                     | 0.51              |
| 1:G:200:SER:HG  | 1:G:206:TRP:HD1  | 1.58                     | 0.51              |
| 1:G:283:LEU:HG  | 1:G:285:ILE:HD11 | 1.92                     | 0.51              |
| 1:J:283:LEU:HG  | 1:J:285:ILE:HD11 | 1.93                     | 0.51              |
| 1:M:287:ARG:HG2 | 1:M:319:HIS:HB2  | 1.91                     | 0.51              |
| 1:P:283:LEU:HG  | 1:P:285:ILE:HD11 | 1.92                     | 0.51              |
| 1:S:283:LEU:HG  | 1:S:285:ILE:HD11 | 1.92                     | 0.51              |
| 1:D:194:ASP:OD1 | 1:D:195:ASP:N    | 2.43                     | 0.51              |
| 1:M:283:LEU:HG  | 1:M:285:ILE:HD11 | 1.92                     | 0.51              |
| 1:A:58:TRP:HZ2  | 1:P:373:GLY:H    | 1.54                     | 0.51              |
| 1:A:192:THR:O   | 1:A:230:HIS:ND1  | 2.44                     | 0.51              |
| 1:S:192:THR:O   | 1:S:230:HIS:ND1  | 2.44                     | 0.51              |
| 1:V:194:ASP:OD1 | 1:V:195:ASP:N    | 2.43                     | 0.51              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:283:LEU:HG   | 1:A:285:ILE:HD11 | 1.93                     | 0.51              |
| 1:J:179:ARG:HH12 | 1:S:66:LEU:CD2   | 2.24                     | 0.51              |
| 1:J:192:THR:O    | 1:J:230:HIS:ND1  | 2.44                     | 0.51              |
| 1:M:308:LYS:HZ2  | 1:M:358:GLN:HG2  | 1.75                     | 0.51              |
| 1:P:192:THR:O    | 1:P:230:HIS:ND1  | 2.44                     | 0.51              |
| 1:G:308:LYS:HZ2  | 1:G:358:GLN:HG2  | 1.75                     | 0.51              |
| 1:J:371:SER:HB2  | 1:J:393:GLN:HB2  | 1.93                     | 0.51              |
| 1:A:287:ARG:HG2  | 1:A:319:HIS:HB2  | 1.91                     | 0.51              |
| 1:M:371:SER:HB2  | 1:M:393:GLN:HB2  | 1.93                     | 0.51              |
| 2:N:25:MET:HE3   | 2:N:29:GLU:HB3   | 1.93                     | 0.51              |
| 1:G:192:THR:O    | 1:G:230:HIS:ND1  | 2.44                     | 0.51              |
| 1:G:371:SER:HB2  | 1:G:393:GLN:HB2  | 1.93                     | 0.51              |
| 1:P:50:ALA:O     | 1:P:53:SER:OG    | 2.24                     | 0.51              |
| 1:S:287:ARG:HG2  | 1:S:319:HIS:HB2  | 1.91                     | 0.51              |
| 1:V:200:SER:HG   | 1:V:206:TRP:HD1  | 1.57                     | 0.51              |
| 2:B:45:LEU:HD13  | 2:B:65:PRO:HG3   | 1.93                     | 0.50              |
| 1:D:200:SER:HG   | 1:D:206:TRP:HD1  | 1.58                     | 0.50              |
| 2:E:45:LEU:HD13  | 2:E:65:PRO:HG3   | 1.93                     | 0.50              |
| 2:H:25:MET:HE3   | 2:H:29:GLU:HB3   | 1.93                     | 0.50              |
| 1:J:50:ALA:O     | 1:J:53:SER:OG    | 2.24                     | 0.50              |
| 1:M:192:THR:O    | 1:M:230:HIS:ND1  | 2.44                     | 0.50              |
| 1:P:371:SER:HB2  | 1:P:393:GLN:HB2  | 1.93                     | 0.50              |
| 2:W:45:LEU:HD13  | 2:W:65:PRO:HG3   | 1.93                     | 0.50              |
| 1:A:153:ARG:HH12 | 1:A:280:GLY:C    | 2.19                     | 0.50              |
| 1:D:101:GLU:HB3  | 1:D:104:SER:HB3  | 1.92                     | 0.50              |
| 2:T:25:MET:HE3   | 2:T:29:GLU:HB3   | 1.93                     | 0.50              |
| 1:V:101:GLU:HB3  | 1:V:104:SER:HB3  | 1.92                     | 0.50              |
| 1:G:153:ARG:HH12 | 1:G:280:GLY:C    | 2.19                     | 0.50              |
| 1:G:167:LYS:H    | 1:G:399:HIS:CE1  | 2.29                     | 0.50              |
| 1:M:153:ARG:HH12 | 1:M:280:GLY:C    | 2.19                     | 0.50              |
| 1:M:167:LYS:H    | 1:M:399:HIS:CE1  | 2.30                     | 0.50              |
| 2:T:45:LEU:HD13  | 2:T:65:PRO:HG3   | 1.93                     | 0.50              |
| 2:W:25:MET:HE3   | 2:W:29:GLU:HB3   | 1.93                     | 0.50              |
| 1:D:371:SER:HB2  | 1:D:393:GLN:HB2  | 1.93                     | 0.50              |
| 2:E:25:MET:HE3   | 2:E:29:GLU:HB3   | 1.93                     | 0.50              |
| 1:S:424:ASN:O    | 2:T:36:TYR:CD1   | 2.65                     | 0.50              |
| 2:B:25:MET:HE3   | 2:B:29:GLU:HB3   | 1.93                     | 0.50              |
| 1:S:153:ARG:HH12 | 1:S:280:GLY:C    | 2.19                     | 0.50              |
| 1:S:167:LYS:H    | 1:S:399:HIS:CE1  | 2.29                     | 0.50              |
| 1:A:167:LYS:H    | 1:A:399:HIS:CE1  | 2.29                     | 0.50              |
| 1:V:371:SER:HB2  | 1:V:393:GLN:HB2  | 1.93                     | 0.50              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:S:200:SER:HG   | 1:S:206:TRP:HD1  | 1.58                     | 0.50              |
| 1:D:192:THR:O    | 1:D:230:HIS:ND1  | 2.44                     | 0.50              |
| 1:V:192:THR:O    | 1:V:230:HIS:ND1  | 2.44                     | 0.50              |
| 1:P:167:LYS:H    | 1:P:399:HIS:CE1  | 2.29                     | 0.50              |
| 1:J:101:GLU:HB3  | 1:J:104:SER:HB3  | 1.92                     | 0.49              |
| 1:J:167:LYS:H    | 1:J:399:HIS:CE1  | 2.29                     | 0.49              |
| 2:K:25:MET:HE3   | 2:K:29:GLU:HB3   | 1.93                     | 0.49              |
| 2:Q:25:MET:HE3   | 2:Q:29:GLU:HB3   | 1.93                     | 0.49              |
| 1:J:153:ARG:HH12 | 1:J:280:GLY:C    | 2.19                     | 0.49              |
| 1:S:371:SER:HB2  | 1:S:393:GLN:HB2  | 1.93                     | 0.49              |
| 1:P:101:GLU:HB3  | 1:P:104:SER:HB3  | 1.92                     | 0.49              |
| 1:P:153:ARG:HH12 | 1:P:280:GLY:C    | 2.19                     | 0.49              |
| 1:V:167:LYS:H    | 1:V:399:HIS:CE1  | 2.29                     | 0.49              |
| 1:A:371:SER:HB2  | 1:A:393:GLN:HB2  | 1.93                     | 0.49              |
| 1:D:58:TRP:HZ3   | 1:M:397:GLY:H    | 1.61                     | 0.49              |
| 1:D:167:LYS:H    | 1:D:399:HIS:CE1  | 2.29                     | 0.49              |
| 2:Q:45:LEU:HD13  | 2:Q:65:PRO:HG3   | 1.93                     | 0.49              |
| 1:V:153:ARG:HH12 | 1:V:280:GLY:C    | 2.19                     | 0.49              |
| 1:D:153:ARG:HH12 | 1:D:280:GLY:C    | 2.19                     | 0.49              |
| 2:K:45:LEU:HD13  | 2:K:65:PRO:HG3   | 1.93                     | 0.49              |
| 2:H:45:LEU:HD13  | 2:H:65:PRO:HG3   | 1.94                     | 0.49              |
| 2:N:45:LEU:HD13  | 2:N:65:PRO:HG3   | 1.93                     | 0.49              |
| 1:V:308:LYS:HZ2  | 1:V:358:GLN:HG2  | 1.78                     | 0.49              |
| 1:D:308:LYS:HZ2  | 1:D:358:GLN:HG2  | 1.78                     | 0.49              |
| 2:W:17:GLU:O     | 2:W:18:THR:OG1   | 2.29                     | 0.49              |
| 1:D:143:PRO:HA   | 1:D:315:GLY:H    | 1.78                     | 0.49              |
| 1:G:143:PRO:HA   | 1:G:315:GLY:H    | 1.78                     | 0.49              |
| 1:M:143:PRO:HA   | 1:M:315:GLY:H    | 1.78                     | 0.49              |
| 1:S:143:PRO:HA   | 1:S:315:GLY:H    | 1.78                     | 0.49              |
| 1:V:143:PRO:HA   | 1:V:315:GLY:H    | 1.78                     | 0.49              |
| 1:A:143:PRO:HA   | 1:A:315:GLY:H    | 1.78                     | 0.48              |
| 2:E:17:GLU:O     | 2:E:18:THR:OG1   | 2.29                     | 0.48              |
| 1:G:339:ASP:OD2  | 1:G:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:M:339:ASP:OD2  | 1:M:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:S:50:ALA:O     | 1:S:53:SER:OG    | 2.24                     | 0.48              |
| 1:D:339:ASP:OD2  | 1:D:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:G:308:LYS:HE2  | 1:G:340:GLN:HG2  | 1.95                     | 0.48              |
| 1:G:370:ALA:HB3  | 1:G:392:LEU:HD23 | 1.95                     | 0.48              |
| 1:M:12:TYR:OH    | 1:M:57:THR:O     | 2.31                     | 0.48              |
| 1:M:308:LYS:HE2  | 1:M:340:GLN:HG2  | 1.96                     | 0.48              |
| 1:M:370:ALA:HB3  | 1:M:392:LEU:HD23 | 1.95                     | 0.48              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:V:339:ASP:OD2  | 1:V:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:D:308:LYS:HE2  | 1:D:340:GLN:HG2  | 1.95                     | 0.48              |
| 2:E:88:ASP:OD1   | 2:E:88:ASP:N     | 2.40                     | 0.48              |
| 1:G:12:TYR:OH    | 1:G:57:THR:O     | 2.32                     | 0.48              |
| 1:J:339:ASP:OD2  | 1:J:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:A:308:LYS:HZ2  | 1:A:358:GLN:HG2  | 1.77                     | 0.48              |
| 1:D:12:TYR:OH    | 1:D:57:THR:O     | 2.31                     | 0.48              |
| 1:P:339:ASP:OD2  | 1:P:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:S:339:ASP:OD2  | 1:S:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:V:193:LYS:HB3  | 1:V:231:TYR:HD2  | 1.79                     | 0.48              |
| 2:W:88:ASP:OD1   | 2:W:88:ASP:N     | 2.40                     | 0.48              |
| 2:B:62:TRP:CG    | 2:B:63:LYS:H     | 2.32                     | 0.48              |
| 1:D:193:LYS:HB3  | 1:D:231:TYR:HD2  | 1.79                     | 0.48              |
| 1:J:295:ARG:HH22 | 1:S:120:LYS:HA   | 1.77                     | 0.48              |
| 2:T:62:TRP:CG    | 2:T:63:LYS:H     | 2.32                     | 0.48              |
| 1:V:12:TYR:OH    | 1:V:57:THR:O     | 2.32                     | 0.48              |
| 1:V:308:LYS:HE2  | 1:V:340:GLN:HG2  | 1.96                     | 0.48              |
| 1:A:166:ILE:HA   | 1:A:399:HIS:HE1  | 1.79                     | 0.48              |
| 1:A:339:ASP:OD2  | 1:A:352:ARG:NH1  | 2.46                     | 0.48              |
| 1:G:193:LYS:HB3  | 1:G:231:TYR:HD2  | 1.79                     | 0.48              |
| 1:J:12:TYR:OH    | 1:J:57:THR:O     | 2.32                     | 0.48              |
| 1:J:308:LYS:HE2  | 1:J:340:GLN:HG2  | 1.96                     | 0.48              |
| 2:K:62:TRP:CG    | 2:K:63:LYS:H     | 2.32                     | 0.48              |
| 1:P:12:TYR:OH    | 1:P:57:THR:O     | 2.31                     | 0.48              |
| 1:P:308:LYS:HE2  | 1:P:340:GLN:HG2  | 1.95                     | 0.48              |
| 2:Q:62:TRP:CG    | 2:Q:63:LYS:H     | 2.32                     | 0.48              |
| 2:E:62:TRP:CG    | 2:E:63:LYS:H     | 2.32                     | 0.48              |
| 1:S:193:LYS:HB3  | 1:S:231:TYR:HD2  | 1.79                     | 0.48              |
| 1:S:308:LYS:HZ2  | 1:S:358:GLN:HG2  | 1.77                     | 0.48              |
| 2:T:17:GLU:O     | 2:T:18:THR:OG1   | 2.29                     | 0.48              |
| 2:W:62:TRP:CG    | 2:W:63:LYS:H     | 2.32                     | 0.48              |
| 2:B:17:GLU:O     | 2:B:18:THR:OG1   | 2.29                     | 0.48              |
| 1:M:193:LYS:HB3  | 1:M:231:TYR:HD2  | 1.79                     | 0.48              |
| 1:P:166:ILE:HA   | 1:P:399:HIS:HE1  | 1.78                     | 0.48              |
| 1:S:166:ILE:HA   | 1:S:399:HIS:HE1  | 1.78                     | 0.48              |
| 2:N:62:TRP:CG    | 2:N:63:LYS:H     | 2.32                     | 0.47              |
| 2:H:62:TRP:CG    | 2:H:63:LYS:H     | 2.32                     | 0.47              |
| 1:J:143:PRO:HA   | 1:J:315:GLY:H    | 1.78                     | 0.47              |
| 1:A:193:LYS:HB3  | 1:A:231:TYR:HD2  | 1.79                     | 0.47              |
| 1:A:370:ALA:HB3  | 1:A:392:LEU:HD23 | 1.95                     | 0.47              |
| 2:B:88:ASP:OD1   | 2:B:88:ASP:N     | 2.40                     | 0.47              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:166:ILE:HA   | 1:D:399:HIS:HE1  | 1.78                     | 0.47              |
| 1:J:166:ILE:HA   | 1:J:399:HIS:HE1  | 1.79                     | 0.47              |
| 1:M:29:LEU:HB2   | 1:M:131:ARG:HB3  | 1.96                     | 0.47              |
| 1:P:29:LEU:HB2   | 1:P:131:ARG:HB3  | 1.97                     | 0.47              |
| 1:P:370:ALA:HB3  | 1:P:392:LEU:HD23 | 1.95                     | 0.47              |
| 1:S:370:ALA:HB3  | 1:S:392:LEU:HD23 | 1.95                     | 0.47              |
| 1:V:166:ILE:HA   | 1:V:399:HIS:HE1  | 1.78                     | 0.47              |
| 1:A:196:GLU:HG2  | 1:A:286:HIS:CG   | 2.50                     | 0.47              |
| 1:G:29:LEU:HB2   | 1:G:131:ARG:HB3  | 1.97                     | 0.47              |
| 1:J:29:LEU:HB2   | 1:J:131:ARG:HB3  | 1.96                     | 0.47              |
| 1:J:265:GLY:HA3  | 1:S:265:GLY:HA3  | 1.97                     | 0.47              |
| 2:Q:33:GLN:O     | 2:Q:37:ILE:HG12  | 2.14                     | 0.47              |
| 2:W:62:TRP:CD1   | 2:W:63:LYS:H     | 2.32                     | 0.47              |
| 1:A:308:LYS:HE2  | 1:A:340:GLN:HG2  | 1.95                     | 0.47              |
| 2:B:62:TRP:CD1   | 2:B:63:LYS:H     | 2.32                     | 0.47              |
| 2:E:62:TRP:CD1   | 2:E:63:LYS:H     | 2.32                     | 0.47              |
| 1:J:370:ALA:HB3  | 1:J:392:LEU:HD23 | 1.95                     | 0.47              |
| 2:K:33:GLN:O     | 2:K:37:ILE:HG12  | 2.14                     | 0.47              |
| 2:N:62:TRP:CD1   | 2:N:63:LYS:H     | 2.32                     | 0.47              |
| 1:P:143:PRO:HA   | 1:P:315:GLY:H    | 1.78                     | 0.47              |
| 1:S:308:LYS:HE2  | 1:S:340:GLN:HG2  | 1.95                     | 0.47              |
| 1:A:12:TYR:OH    | 1:A:57:THR:O     | 2.31                     | 0.47              |
| 1:A:76:CYS:HA    | 1:A:93:ILE:HA    | 1.96                     | 0.47              |
| 2:H:62:TRP:CD1   | 2:H:63:LYS:H     | 2.33                     | 0.47              |
| 1:P:196:GLU:HG2  | 1:P:286:HIS:CG   | 2.50                     | 0.47              |
| 1:S:196:GLU:HG2  | 1:S:286:HIS:CG   | 2.50                     | 0.47              |
| 2:E:64:LEU:HD12  | 2:E:64:LEU:H     | 1.80                     | 0.47              |
| 1:G:231:TYR:HB3  | 1:G:258:MET:HB3  | 1.96                     | 0.47              |
| 1:J:196:GLU:HG2  | 1:J:286:HIS:CG   | 2.50                     | 0.47              |
| 1:J:199:ASN:HD21 | 1:S:107:ASN:HD22 | 1.62                     | 0.47              |
| 1:J:231:TYR:HB3  | 1:J:258:MET:HB3  | 1.96                     | 0.47              |
| 1:M:231:TYR:HB3  | 1:M:258:MET:HB3  | 1.96                     | 0.47              |
| 1:M:441:ALA:HB1  | 1:M:448:ALA:HB2  | 1.97                     | 0.47              |
| 1:P:23:PRO:HB3   | 1:P:29:LEU:HD21  | 1.97                     | 0.47              |
| 1:P:193:LYS:HB3  | 1:P:231:TYR:HD2  | 1.79                     | 0.47              |
| 1:S:76:CYS:HA    | 1:S:93:ILE:HA    | 1.97                     | 0.47              |
| 2:T:62:TRP:CD1   | 2:T:63:LYS:H     | 2.32                     | 0.47              |
| 2:T:64:LEU:HD12  | 2:T:64:LEU:H     | 1.80                     | 0.47              |
| 1:V:157:TYR:HB3  | 2:W:103:GLN:O    | 2.15                     | 0.47              |
| 1:V:231:TYR:HB3  | 1:V:258:MET:HB3  | 1.96                     | 0.47              |
| 1:V:441:ALA:HB1  | 1:V:448:ALA:HB2  | 1.97                     | 0.47              |

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| Atom-1          | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|------------------|--------------------------|-------------------|
| 2:W:33:GLN:O    | 2:W:37:ILE:HG12  | 2.14                     | 0.47              |
| 2:W:64:LEU:HD12 | 2:W:64:LEU:H     | 1.80                     | 0.47              |
| 1:D:441:ALA:HB1 | 1:D:448:ALA:HB2  | 1.97                     | 0.47              |
| 2:E:33:GLN:O    | 2:E:37:ILE:HG12  | 2.15                     | 0.47              |
| 1:G:196:GLU:HG2 | 1:G:286:HIS:ND1  | 2.30                     | 0.47              |
| 1:J:23:PRO:HB3  | 1:J:29:LEU:HD21  | 1.97                     | 0.47              |
| 1:J:193:LYS:HB3 | 1:J:231:TYR:HD2  | 1.79                     | 0.47              |
| 1:M:166:ILE:HA  | 1:M:399:HIS:HE1  | 1.79                     | 0.47              |
| 1:M:196:GLU:HG2 | 1:M:286:HIS:ND1  | 2.30                     | 0.47              |
| 1:P:231:TYR:HB3 | 1:P:258:MET:HB3  | 1.96                     | 0.47              |
| 2:Q:62:TRP:CD1  | 2:Q:63:LYS:H     | 2.32                     | 0.47              |
| 1:S:12:TYR:OH   | 1:S:57:THR:O     | 2.32                     | 0.47              |
| 2:B:33:GLN:O    | 2:B:37:ILE:HG12  | 2.15                     | 0.47              |
| 2:B:64:LEU:HD12 | 2:B:64:LEU:H     | 1.80                     | 0.47              |
| 1:D:231:TYR:HB3 | 1:D:258:MET:HB3  | 1.96                     | 0.47              |
| 1:G:441:ALA:HB1 | 1:G:448:ALA:HB2  | 1.97                     | 0.47              |
| 2:H:64:LEU:H    | 2:H:64:LEU:HD12  | 1.80                     | 0.47              |
| 2:K:62:TRP:CD1  | 2:K:63:LYS:H     | 2.32                     | 0.47              |
| 2:T:33:GLN:O    | 2:T:37:ILE:HG12  | 2.15                     | 0.47              |
| 2:T:88:ASP:OD1  | 2:T:88:ASP:N     | 2.40                     | 0.47              |
| 1:V:76:CYS:HA   | 1:V:93:ILE:HA    | 1.97                     | 0.47              |
| 1:A:13:ARG:HH21 | 1:A:43:GLU:HB2   | 1.80                     | 0.47              |
| 1:D:76:CYS:HA   | 1:D:93:ILE:HA    | 1.97                     | 0.47              |
| 1:D:342:ARG:HD2 | 1:D:389:ASP:HB2  | 1.97                     | 0.47              |
| 1:D:370:ALA:HB3 | 1:D:392:LEU:HD23 | 1.96                     | 0.47              |
| 1:G:166:ILE:HA  | 1:G:399:HIS:HE1  | 1.79                     | 0.47              |
| 2:H:33:GLN:O    | 2:H:37:ILE:HG12  | 2.14                     | 0.47              |
| 1:J:171:GLY:CA  | 1:S:67:VAL:HG11  | 2.44                     | 0.47              |
| 2:N:64:LEU:HD12 | 2:N:64:LEU:H     | 1.80                     | 0.47              |
| 1:S:13:ARG:HH21 | 1:S:43:GLU:HB2   | 1.80                     | 0.47              |
| 1:S:23:PRO:HB3  | 1:S:29:LEU:HD21  | 1.97                     | 0.47              |
| 1:S:231:TYR:HB3 | 1:S:258:MET:HB3  | 1.96                     | 0.47              |
| 1:D:196:GLU:HG2 | 1:D:286:HIS:CG   | 2.50                     | 0.46              |
| 1:M:196:GLU:HG2 | 1:M:286:HIS:CG   | 2.50                     | 0.46              |
| 1:V:13:ARG:HH21 | 1:V:43:GLU:HB2   | 1.80                     | 0.46              |
| 1:V:196:GLU:HG2 | 1:V:286:HIS:CG   | 2.50                     | 0.46              |
| 1:V:342:ARG:HD2 | 1:V:389:ASP:HB2  | 1.98                     | 0.46              |
| 1:V:370:ALA:HB3 | 1:V:392:LEU:HD23 | 1.95                     | 0.46              |
| 1:A:196:GLU:HG2 | 1:A:286:HIS:ND1  | 2.30                     | 0.46              |
| 1:D:13:ARG:HH21 | 1:D:43:GLU:HB2   | 1.81                     | 0.46              |
| 1:G:196:GLU:HG2 | 1:G:286:HIS:CG   | 2.50                     | 0.46              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:G:284:HIS:ND1 | 1:G:317:GLN:OE1 | 2.48                     | 0.46              |
| 1:J:342:ARG:HD2 | 1:J:389:ASP:HB2 | 1.98                     | 0.46              |
| 1:M:284:HIS:ND1 | 1:M:317:GLN:OE1 | 2.48                     | 0.46              |
| 2:N:33:GLN:O    | 2:N:37:ILE:HG12 | 2.14                     | 0.46              |
| 1:P:76:CYS:HA   | 1:P:93:ILE:HA   | 1.96                     | 0.46              |
| 1:P:184:CYS:SG  | 1:P:399:HIS:NE2 | 2.89                     | 0.46              |
| 1:V:284:HIS:ND1 | 1:V:317:GLN:OE1 | 2.48                     | 0.46              |
| 1:A:23:PRO:HB3  | 1:A:29:LEU:HD21 | 1.97                     | 0.46              |
| 1:A:231:TYR:HB3 | 1:A:258:MET:HB3 | 1.96                     | 0.46              |
| 1:M:13:ARG:HH21 | 1:M:43:GLU:HB2  | 1.80                     | 0.46              |
| 1:M:143:PRO:HD2 | 1:M:363:MET:SD  | 2.55                     | 0.46              |
| 1:S:29:LEU:HB2  | 1:S:131:ARG:HB3 | 1.96                     | 0.46              |
| 1:A:29:LEU:HB2  | 1:A:131:ARG:HB3 | 1.97                     | 0.46              |
| 1:D:143:PRO:HD2 | 1:D:363:MET:SD  | 2.55                     | 0.46              |
| 1:G:143:PRO:HD2 | 1:G:363:MET:SD  | 2.55                     | 0.46              |
| 1:G:184:CYS:SG  | 1:G:399:HIS:NE2 | 2.89                     | 0.46              |
| 1:J:76:CYS:HA   | 1:J:93:ILE:HA   | 1.97                     | 0.46              |
| 1:J:184:CYS:SG  | 1:J:399:HIS:NE2 | 2.89                     | 0.46              |
| 1:M:184:CYS:SG  | 1:M:399:HIS:NE2 | 2.89                     | 0.46              |
| 1:P:196:GLU:HG2 | 1:P:286:HIS:ND1 | 2.30                     | 0.46              |
| 1:P:342:ARG:HD2 | 1:P:389:ASP:HB2 | 1.98                     | 0.46              |
| 1:V:143:PRO:HD2 | 1:V:363:MET:SD  | 2.55                     | 0.46              |
| 1:A:236:ALA:O   | 1:P:267:THR:OG1 | 2.27                     | 0.46              |
| 1:D:23:PRO:HB3  | 1:D:29:LEU:HD21 | 1.97                     | 0.46              |
| 1:D:29:LEU:HB2  | 1:D:131:ARG:HB3 | 1.97                     | 0.46              |
| 1:D:196:GLU:HG2 | 1:D:286:HIS:ND1 | 2.30                     | 0.46              |
| 1:D:243:TYR:HE1 | 1:D:275:TRP:HB2 | 1.81                     | 0.46              |
| 1:G:13:ARG:HH21 | 1:G:43:GLU:HB2  | 1.81                     | 0.46              |
| 1:G:23:PRO:HB3  | 1:G:29:LEU:HD21 | 1.97                     | 0.46              |
| 1:J:196:GLU:HG2 | 1:J:286:HIS:ND1 | 2.30                     | 0.46              |
| 1:V:23:PRO:HB3  | 1:V:29:LEU:HD21 | 1.97                     | 0.46              |
| 1:V:196:GLU:HG2 | 1:V:286:HIS:ND1 | 2.30                     | 0.46              |
| 1:A:287:ARG:HD3 | 1:A:319:HIS:O   | 2.16                     | 0.46              |
| 1:D:377:TRP:CE2 | 1:D:455:LYS:HA  | 2.51                     | 0.46              |
| 1:V:29:LEU:HB2  | 1:V:131:ARG:HB3 | 1.97                     | 0.46              |
| 1:V:243:TYR:HE1 | 1:V:275:TRP:HB2 | 1.81                     | 0.46              |
| 1:V:377:TRP:CE2 | 1:V:455:LYS:HA  | 2.51                     | 0.46              |
| 1:A:196:GLU:CD  | 1:A:196:GLU:H   | 2.24                     | 0.46              |
| 1:A:441:ALA:HB1 | 1:A:448:ALA:HB2 | 1.97                     | 0.46              |
| 1:D:322:THR:HA  | 1:D:386:PHE:CE1 | 2.51                     | 0.46              |
| 1:D:380:PRO:HG3 | 1:D:433:SER:HB3 | 1.98                     | 0.46              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:J:441:ALA:HB1  | 1:J:448:ALA:HB2  | 1.97                     | 0.46              |
| 1:M:23:PRO:HB3   | 1:M:29:LEU:HD21  | 1.97                     | 0.46              |
| 2:Q:64:LEU:HD12  | 2:Q:64:LEU:H     | 1.80                     | 0.46              |
| 1:S:196:GLU:CD   | 1:S:196:GLU:H    | 2.24                     | 0.46              |
| 1:S:243:TYR:HE1  | 1:S:275:TRP:HB2  | 1.81                     | 0.46              |
| 1:V:184:CYS:SG   | 1:V:399:HIS:NE2  | 2.89                     | 0.46              |
| 1:A:243:TYR:HE1  | 1:A:275:TRP:HB2  | 1.81                     | 0.46              |
| 2:B:58:TYR:CE1   | 1:D:179:ARG:HB3  | 2.51                     | 0.46              |
| 1:J:287:ARG:HD3  | 1:J:319:HIS:O    | 2.16                     | 0.46              |
| 1:J:322:THR:HA   | 1:J:386:PHE:CE1  | 2.51                     | 0.46              |
| 2:K:64:LEU:HD12  | 2:K:64:LEU:H     | 1.80                     | 0.46              |
| 1:P:322:THR:HA   | 1:P:386:PHE:CE1  | 2.51                     | 0.46              |
| 1:S:196:GLU:HG2  | 1:S:286:HIS:ND1  | 2.30                     | 0.46              |
| 1:S:287:ARG:HD3  | 1:S:319:HIS:O    | 2.16                     | 0.46              |
| 1:S:322:THR:HA   | 1:S:386:PHE:CE1  | 2.51                     | 0.46              |
| 1:V:380:PRO:HG3  | 1:V:433:SER:HB3  | 1.98                     | 0.46              |
| 1:A:143:PRO:HD2  | 1:A:363:MET:SD   | 2.55                     | 0.46              |
| 1:D:184:CYS:SG   | 1:D:399:HIS:NE2  | 2.89                     | 0.46              |
| 2:H:86:TYR:OH    | 2:K:11:GLN:NE2   | 2.49                     | 0.46              |
| 1:M:243:TYR:HE1  | 1:M:275:TRP:HB2  | 1.81                     | 0.46              |
| 1:P:13:ARG:HH21  | 1:P:43:GLU:HB2   | 1.81                     | 0.46              |
| 1:P:143:PRO:HD2  | 1:P:363:MET:SD   | 2.55                     | 0.46              |
| 1:P:394:PHE:HB2  | 1:P:398:THR:HG23 | 1.97                     | 0.46              |
| 1:S:441:ALA:HB1  | 1:S:448:ALA:HB2  | 1.97                     | 0.46              |
| 1:V:322:THR:HA   | 1:V:386:PHE:CE1  | 2.51                     | 0.46              |
| 1:A:322:THR:HA   | 1:A:386:PHE:CE1  | 2.51                     | 0.46              |
| 1:J:143:PRO:HD2  | 1:J:363:MET:SD   | 2.55                     | 0.46              |
| 1:J:378:HIS:O    | 1:J:382:LEU:HG   | 2.16                     | 0.46              |
| 1:J:394:PHE:HB2  | 1:J:398:THR:HG23 | 1.97                     | 0.46              |
| 1:M:322:THR:HA   | 1:M:386:PHE:CE1  | 2.51                     | 0.46              |
| 1:P:441:ALA:HB1  | 1:P:448:ALA:HB2  | 1.97                     | 0.46              |
| 1:S:143:PRO:HD2  | 1:S:363:MET:SD   | 2.55                     | 0.46              |
| 1:S:377:TRP:CE2  | 1:S:455:LYS:HA   | 2.51                     | 0.46              |
| 1:A:327:LEU:HD22 | 1:P:120:LYS:HE3  | 1.99                     | 0.45              |
| 1:A:377:TRP:CE2  | 1:A:455:LYS:HA   | 2.51                     | 0.45              |
| 1:D:196:GLU:CD   | 1:D:196:GLU:H    | 2.24                     | 0.45              |
| 1:G:243:TYR:HE1  | 1:G:275:TRP:HB2  | 1.81                     | 0.45              |
| 1:G:322:THR:HA   | 1:G:386:PHE:CE1  | 2.51                     | 0.45              |
| 1:J:13:ARG:HH21  | 1:J:43:GLU:HB2   | 1.81                     | 0.45              |
| 1:J:380:PRO:HG3  | 1:J:433:SER:HB3  | 1.98                     | 0.45              |
| 1:M:287:ARG:HD3  | 1:M:319:HIS:O    | 2.16                     | 0.45              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:P:287:ARG:HD3  | 1:P:319:HIS:O    | 2.16                     | 0.45              |
| 1:P:378:HIS:O    | 1:P:382:LEU:HG   | 2.17                     | 0.45              |
| 1:P:380:PRO:HG3  | 1:P:433:SER:HB3  | 1.98                     | 0.45              |
| 1:S:157:TYR:HB3  | 2:T:103:GLN:O    | 2.16                     | 0.45              |
| 1:A:380:PRO:HG3  | 1:A:433:SER:HB3  | 1.98                     | 0.45              |
| 1:A:394:PHE:HB2  | 1:A:398:THR:HG23 | 1.97                     | 0.45              |
| 1:D:284:HIS:ND1  | 1:D:317:GLN:OE1  | 2.48                     | 0.45              |
| 1:D:394:PHE:HB2  | 1:D:398:THR:HG23 | 1.97                     | 0.45              |
| 1:M:394:PHE:HB2  | 1:M:398:THR:HG23 | 1.97                     | 0.45              |
| 1:P:379:MET:HE1  | 1:P:416:LEU:HB2  | 1.99                     | 0.45              |
| 1:V:394:PHE:HB2  | 1:V:398:THR:HG23 | 1.97                     | 0.45              |
| 1:A:109:LEU:HD23 | 1:P:289:MET:SD   | 2.56                     | 0.45              |
| 1:A:184:CYS:SG   | 1:A:399:HIS:NE2  | 2.89                     | 0.45              |
| 1:G:287:ARG:HD3  | 1:G:319:HIS:O    | 2.16                     | 0.45              |
| 1:G:377:TRP:CE2  | 1:G:455:LYS:HA   | 2.51                     | 0.45              |
| 1:G:378:HIS:O    | 1:G:382:LEU:HG   | 2.16                     | 0.45              |
| 1:G:394:PHE:HB2  | 1:G:398:THR:HG23 | 1.97                     | 0.45              |
| 1:J:379:MET:HE1  | 1:J:416:LEU:HB2  | 1.99                     | 0.45              |
| 1:M:377:TRP:CE2  | 1:M:455:LYS:HA   | 2.51                     | 0.45              |
| 1:M:378:HIS:O    | 1:M:382:LEU:HG   | 2.16                     | 0.45              |
| 1:V:196:GLU:H    | 1:V:196:GLU:CD   | 2.24                     | 0.45              |
| 1:A:165:THR:HG22 | 1:A:193:LYS:HD3  | 1.99                     | 0.45              |
| 1:D:287:ARG:HD3  | 1:D:319:HIS:O    | 2.16                     | 0.45              |
| 1:G:76:CYS:HA    | 1:G:93:ILE:HA    | 1.96                     | 0.45              |
| 1:G:342:ARG:HD2  | 1:G:389:ASP:HB2  | 1.98                     | 0.45              |
| 1:J:243:TYR:HE1  | 1:J:275:TRP:HB2  | 1.81                     | 0.45              |
| 1:M:76:CYS:HA    | 1:M:93:ILE:HA    | 1.96                     | 0.45              |
| 1:P:165:THR:HG22 | 1:P:193:LYS:HD3  | 1.99                     | 0.45              |
| 1:P:196:GLU:CD   | 1:P:196:GLU:H    | 2.24                     | 0.45              |
| 1:S:424:ASN:HB3  | 2:T:36:TYR:CD2   | 2.51                     | 0.45              |
| 1:V:287:ARG:HD3  | 1:V:319:HIS:O    | 2.16                     | 0.45              |
| 1:A:96:PRO:HG2   | 1:A:99:LEU:HG    | 1.99                     | 0.45              |
| 1:D:96:PRO:HG2   | 1:D:99:LEU:HG    | 1.99                     | 0.45              |
| 1:J:96:PRO:HG2   | 1:J:99:LEU:HG    | 1.99                     | 0.45              |
| 1:J:165:THR:HG22 | 1:J:193:LYS:HD3  | 1.99                     | 0.45              |
| 1:M:342:ARG:HD2  | 1:M:389:ASP:HB2  | 1.98                     | 0.45              |
| 1:P:243:TYR:HE1  | 1:P:275:TRP:HB2  | 1.81                     | 0.45              |
| 1:S:165:THR:HG22 | 1:S:193:LYS:HD3  | 1.99                     | 0.45              |
| 1:S:284:HIS:ND1  | 1:S:317:GLN:OE1  | 2.48                     | 0.45              |
| 1:S:342:ARG:HD2  | 1:S:389:ASP:HB2  | 1.98                     | 0.45              |
| 1:S:394:PHE:HB2  | 1:S:398:THR:HG23 | 1.97                     | 0.45              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:V:157:TYR:CG   | 2:W:103:GLN:HB2  | 2.52                     | 0.45              |
| 1:M:166:ILE:HD11 | 1:M:192:THR:HB   | 1.99                     | 0.45              |
| 1:S:380:PRO:HG3  | 1:S:433:SER:HB3  | 1.98                     | 0.45              |
| 1:G:166:ILE:HD11 | 1:G:192:THR:HB   | 1.99                     | 0.45              |
| 1:J:196:GLU:H    | 1:J:196:GLU:CD   | 2.24                     | 0.45              |
| 1:P:96:PRO:HG2   | 1:P:99:LEU:HG    | 1.99                     | 0.45              |
| 1:P:377:TRP:CE2  | 1:P:455:LYS:HA   | 2.51                     | 0.45              |
| 1:S:96:PRO:HG2   | 1:S:99:LEU:HG    | 1.99                     | 0.45              |
| 1:S:378:HIS:O    | 1:S:382:LEU:HG   | 2.17                     | 0.45              |
| 1:V:96:PRO:HG2   | 1:V:99:LEU:HG    | 1.99                     | 0.45              |
| 1:V:166:ILE:HD11 | 1:V:192:THR:HB   | 1.99                     | 0.45              |
| 1:D:166:ILE:HD11 | 1:D:192:THR:HB   | 1.99                     | 0.45              |
| 1:D:378:HIS:O    | 1:D:382:LEU:HG   | 2.17                     | 0.45              |
| 1:M:380:PRO:HG3  | 1:M:433:SER:HB3  | 1.98                     | 0.45              |
| 1:A:284:HIS:ND1  | 1:A:317:GLN:OE1  | 2.48                     | 0.45              |
| 1:G:380:PRO:HG3  | 1:G:433:SER:HB3  | 1.98                     | 0.45              |
| 1:J:199:ASN:ND2  | 1:S:107:ASN:HD22 | 2.14                     | 0.45              |
| 1:J:284:HIS:ND1  | 1:J:317:GLN:OE1  | 2.48                     | 0.45              |
| 1:S:184:CYS:SG   | 1:S:399:HIS:NE2  | 2.89                     | 0.45              |
| 1:V:378:HIS:O    | 1:V:382:LEU:HG   | 2.16                     | 0.45              |
| 1:A:168:PRO:HB3  | 1:P:64:GLU:HG3   | 1.99                     | 0.45              |
| 1:J:28:LEU:HB3   | 1:J:95:TYR:HB2   | 1.99                     | 0.45              |
| 1:P:28:LEU:HB3   | 1:P:95:TYR:HB2   | 1.99                     | 0.45              |
| 1:P:284:HIS:ND1  | 1:P:317:GLN:OE1  | 2.48                     | 0.45              |
| 1:A:32:PHE:CZ    | 1:A:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:A:342:ARG:HD2  | 1:A:389:ASP:HB2  | 1.98                     | 0.44              |
| 2:H:16:LEU:HD23  | 2:H:16:LEU:HA    | 1.85                     | 0.44              |
| 1:J:377:TRP:CE2  | 1:J:455:LYS:HA   | 2.51                     | 0.44              |
| 1:M:96:PRO:HG2   | 1:M:99:LEU:HG    | 1.99                     | 0.44              |
| 1:M:165:THR:HG22 | 1:M:193:LYS:HD3  | 1.99                     | 0.44              |
| 1:A:378:HIS:O    | 1:A:382:LEU:HG   | 2.17                     | 0.44              |
| 1:D:32:PHE:CZ    | 1:D:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:G:32:PHE:CZ    | 1:G:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:G:96:PRO:HG2   | 1:G:99:LEU:HG    | 1.99                     | 0.44              |
| 1:G:165:THR:HG22 | 1:G:193:LYS:HD3  | 1.99                     | 0.44              |
| 1:J:32:PHE:CZ    | 1:J:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:J:284:HIS:NE2  | 1:J:319:HIS:HE1  | 2.15                     | 0.44              |
| 1:J:308:LYS:NZ   | 1:J:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:M:32:PHE:CZ    | 1:M:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:P:308:LYS:NZ   | 1:P:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:S:284:HIS:NE2  | 1:S:319:HIS:HE1  | 2.15                     | 0.44              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:G:308:LYS:NZ   | 1:G:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:M:196:GLU:CD   | 1:M:196:GLU:H    | 2.24                     | 0.44              |
| 1:M:308:LYS:NZ   | 1:M:358:GLN:HG2  | 2.32                     | 0.44              |
| 2:N:16:LEU:HD23  | 2:N:16:LEU:HA    | 1.85                     | 0.44              |
| 1:P:284:HIS:NE2  | 1:P:319:HIS:HE1  | 2.15                     | 0.44              |
| 1:S:32:PHE:CZ    | 1:S:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:S:379:MET:HE1  | 1:S:416:LEU:HB2  | 1.99                     | 0.44              |
| 1:V:32:PHE:CZ    | 1:V:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:V:136:PHE:HE2  | 1:V:312:LEU:HD13 | 1.83                     | 0.44              |
| 1:A:265:GLY:HA3  | 1:P:265:GLY:HA3  | 1.99                     | 0.44              |
| 1:A:379:MET:HE1  | 1:A:416:LEU:HB2  | 1.99                     | 0.44              |
| 1:D:136:PHE:HE2  | 1:D:312:LEU:HD13 | 1.82                     | 0.44              |
| 1:G:28:LEU:HB3   | 1:G:95:TYR:HB2   | 1.99                     | 0.44              |
| 1:G:196:GLU:CD   | 1:G:196:GLU:H    | 2.24                     | 0.44              |
| 1:J:166:ILE:HD11 | 1:J:192:THR:HB   | 1.99                     | 0.44              |
| 1:M:379:MET:HE1  | 1:M:416:LEU:HB2  | 1.99                     | 0.44              |
| 1:P:32:PHE:CZ    | 1:P:127:LEU:HD13 | 2.52                     | 0.44              |
| 1:S:308:LYS:NZ   | 1:S:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:V:126:ARG:NH1  | 1:V:297:PRO:O    | 2.51                     | 0.44              |
| 1:V:284:HIS:NE2  | 1:V:319:HIS:HE1  | 2.15                     | 0.44              |
| 1:A:284:HIS:NE2  | 1:A:319:HIS:HE1  | 2.15                     | 0.44              |
| 1:A:308:LYS:NZ   | 1:A:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:D:126:ARG:NH1  | 1:D:297:PRO:O    | 2.51                     | 0.44              |
| 1:G:379:MET:HE1  | 1:G:416:LEU:HB2  | 1.99                     | 0.44              |
| 1:M:28:LEU:HB3   | 1:M:95:TYR:HB2   | 1.99                     | 0.44              |
| 1:P:166:ILE:HD11 | 1:P:192:THR:HB   | 1.99                     | 0.44              |
| 1:D:284:HIS:NE2  | 1:D:319:HIS:HE1  | 2.15                     | 0.44              |
| 1:A:28:LEU:HB3   | 1:A:95:TYR:HB2   | 2.00                     | 0.44              |
| 1:A:166:ILE:HD11 | 1:A:192:THR:HB   | 1.99                     | 0.44              |
| 1:D:165:THR:HG22 | 1:D:193:LYS:HD3  | 1.99                     | 0.44              |
| 1:S:28:LEU:HB3   | 1:S:95:TYR:HB2   | 2.00                     | 0.44              |
| 1:S:166:ILE:HD11 | 1:S:192:THR:HB   | 1.99                     | 0.44              |
| 1:V:379:MET:HE1  | 1:V:416:LEU:HB2  | 1.99                     | 0.44              |
| 1:V:308:LYS:NZ   | 1:V:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:A:62:TRP:HD1   | 1:P:399:HIS:O    | 1.98                     | 0.44              |
| 1:A:136:PHE:HE2  | 1:A:312:LEU:HD13 | 1.83                     | 0.44              |
| 1:D:308:LYS:NZ   | 1:D:358:GLN:HG2  | 2.32                     | 0.44              |
| 1:G:284:HIS:NE2  | 1:G:319:HIS:HE1  | 2.15                     | 0.44              |
| 1:D:379:MET:HE1  | 1:D:416:LEU:HB2  | 1.99                     | 0.43              |
| 1:G:213:VAL:HG21 | 1:G:230:HIS:CD2  | 2.53                     | 0.43              |
| 2:H:94:VAL:HG22  | 2:H:106:CYS:HB2  | 2.00                     | 0.43              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:V:165:THR:HG22 | 1:V:193:LYS:HD3  | 1.99                     | 0.43              |
| 1:A:213:VAL:HG21 | 1:A:230:HIS:CD2  | 2.53                     | 0.43              |
| 1:A:337:PHE:O    | 1:A:341:LEU:HD23 | 2.18                     | 0.43              |
| 2:B:94:VAL:HG22  | 2:B:106:CYS:HB2  | 2.00                     | 0.43              |
| 1:D:28:LEU:HB3   | 1:D:95:TYR:HB2   | 1.99                     | 0.43              |
| 1:D:97:LEU:HD21  | 1:V:138:LYS:HG3  | 2.00                     | 0.43              |
| 1:D:429:ILE:O    | 1:D:433:SER:OG   | 2.24                     | 0.43              |
| 1:M:213:VAL:HG21 | 1:M:230:HIS:CD2  | 2.53                     | 0.43              |
| 1:M:284:HIS:NE2  | 1:M:319:HIS:HE1  | 2.15                     | 0.43              |
| 2:N:94:VAL:HG22  | 2:N:106:CYS:HB2  | 2.01                     | 0.43              |
| 1:D:213:VAL:HG21 | 1:D:230:HIS:CD2  | 2.53                     | 0.43              |
| 1:P:63:SER:HA    | 1:P:66:LEU:HD13  | 2.00                     | 0.43              |
| 1:S:136:PHE:HE2  | 1:S:312:LEU:HD13 | 1.83                     | 0.43              |
| 1:S:213:VAL:HG21 | 1:S:230:HIS:CD2  | 2.53                     | 0.43              |
| 2:T:94:VAL:HG22  | 2:T:106:CYS:HB2  | 2.01                     | 0.43              |
| 1:A:110:THR:HG22 | 1:P:263:THR:HG21 | 2.00                     | 0.43              |
| 1:J:213:VAL:HG21 | 1:J:230:HIS:CD2  | 2.53                     | 0.43              |
| 1:M:136:PHE:HE2  | 1:M:312:LEU:HD13 | 1.83                     | 0.43              |
| 1:V:28:LEU:HB3   | 1:V:95:TYR:HB2   | 2.00                     | 0.43              |
| 1:V:213:VAL:HG21 | 1:V:230:HIS:CD2  | 2.53                     | 0.43              |
| 2:B:64:LEU:HD11  | 1:D:403:TRP:C    | 2.43                     | 0.43              |
| 1:D:337:PHE:O    | 1:D:341:LEU:HD23 | 2.18                     | 0.43              |
| 1:J:63:SER:HA    | 1:J:66:LEU:HD13  | 2.00                     | 0.43              |
| 1:J:136:PHE:HE2  | 1:J:312:LEU:HD13 | 1.83                     | 0.43              |
| 1:P:213:VAL:HG21 | 1:P:230:HIS:CD2  | 2.53                     | 0.43              |
| 1:P:232:LEU:O    | 1:P:258:MET:N    | 2.32                     | 0.43              |
| 1:P:427:ARG:HB3  | 1:P:432:GLU:OE2  | 2.19                     | 0.43              |
| 1:S:126:ARG:NH1  | 1:S:297:PRO:O    | 2.51                     | 0.43              |
| 1:A:126:ARG:NH1  | 1:A:297:PRO:O    | 2.51                     | 0.43              |
| 1:G:136:PHE:HE2  | 1:G:312:LEU:HD13 | 1.83                     | 0.43              |
| 1:J:126:ARG:NH1  | 1:J:297:PRO:O    | 2.51                     | 0.43              |
| 2:K:94:VAL:HG22  | 2:K:106:CYS:HB2  | 2.01                     | 0.43              |
| 1:M:429:ILE:O    | 1:M:433:SER:OG   | 2.24                     | 0.43              |
| 1:P:136:PHE:HE2  | 1:P:312:LEU:HD13 | 1.83                     | 0.43              |
| 1:V:337:PHE:O    | 1:V:341:LEU:HD23 | 2.18                     | 0.43              |
| 1:J:427:ARG:HB3  | 1:J:432:GLU:OE2  | 2.19                     | 0.43              |
| 2:Q:94:VAL:HG22  | 2:Q:106:CYS:HB2  | 2.01                     | 0.43              |
| 1:V:131:ARG:HB2  | 1:V:356:PHE:CG   | 2.54                     | 0.43              |
| 1:D:131:ARG:HB2  | 1:D:356:PHE:CG   | 2.54                     | 0.43              |
| 1:P:126:ARG:NH1  | 1:P:297:PRO:O    | 2.51                     | 0.43              |
| 1:S:131:ARG:HB2  | 1:S:356:PHE:CG   | 2.54                     | 0.43              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:S:337:PHE:O    | 1:S:341:LEU:HD23 | 2.18                     | 0.43              |
| 1:V:429:ILE:O    | 1:V:433:SER:OG   | 2.24                     | 0.43              |
| 1:G:429:ILE:O    | 1:G:433:SER:OG   | 2.24                     | 0.43              |
| 2:N:17:GLU:O     | 2:N:18:THR:OG1   | 2.29                     | 0.43              |
| 1:P:163:GLY:O    | 1:P:393:GLN:HA   | 2.19                     | 0.43              |
| 1:A:131:ARG:HB2  | 1:A:356:PHE:CG   | 2.54                     | 0.43              |
| 1:D:421:LYS:HB2  | 2:E:19:PHE:CZ    | 2.54                     | 0.43              |
| 2:H:17:GLU:O     | 2:H:18:THR:OG1   | 2.29                     | 0.43              |
| 1:J:163:GLY:O    | 1:J:393:GLN:HA   | 2.19                     | 0.43              |
| 1:S:427:ARG:HB3  | 1:S:432:GLU:OE2  | 2.19                     | 0.43              |
| 1:G:131:ARG:HB2  | 1:G:356:PHE:CG   | 2.54                     | 0.42              |
| 1:J:131:ARG:HB2  | 1:J:356:PHE:CG   | 2.54                     | 0.42              |
| 1:J:221:GLN:HG3  | 1:J:226:GLU:O    | 2.19                     | 0.42              |
| 1:M:163:GLY:O    | 1:M:393:GLN:HA   | 2.19                     | 0.42              |
| 1:P:131:ARG:HB2  | 1:P:356:PHE:CG   | 2.54                     | 0.42              |
| 1:P:221:GLN:HG3  | 1:P:226:GLU:O    | 2.19                     | 0.42              |
| 2:W:72:LEU:O     | 2:W:76:VAL:HG23  | 2.19                     | 0.42              |
| 1:A:163:GLY:O    | 1:A:393:GLN:HA   | 2.19                     | 0.42              |
| 1:A:427:ARG:HB3  | 1:A:432:GLU:OE2  | 2.19                     | 0.42              |
| 2:E:72:LEU:O     | 2:E:76:VAL:HG23  | 2.19                     | 0.42              |
| 1:G:163:GLY:O    | 1:G:393:GLN:HA   | 2.19                     | 0.42              |
| 1:J:161:LEU:HD22 | 1:J:191:PHE:HE2  | 1.84                     | 0.42              |
| 1:M:126:ARG:NH1  | 1:M:297:PRO:O    | 2.51                     | 0.42              |
| 1:M:131:ARG:HB2  | 1:M:356:PHE:CG   | 2.54                     | 0.42              |
| 1:M:161:LEU:HD22 | 1:M:191:PHE:HE2  | 1.84                     | 0.42              |
| 1:M:221:GLN:HG3  | 1:M:226:GLU:O    | 2.19                     | 0.42              |
| 1:M:258:MET:HB2  | 1:M:284:HIS:HD2  | 1.84                     | 0.42              |
| 1:V:63:SER:HA    | 1:V:66:LEU:HD13  | 2.00                     | 0.42              |
| 2:W:94:VAL:HG22  | 2:W:106:CYS:HB2  | 2.01                     | 0.42              |
| 1:A:221:GLN:HG3  | 1:A:226:GLU:O    | 2.19                     | 0.42              |
| 1:D:221:GLN:HG3  | 1:D:226:GLU:O    | 2.19                     | 0.42              |
| 1:D:258:MET:HB2  | 1:D:284:HIS:HD2  | 1.84                     | 0.42              |
| 1:G:258:MET:HB2  | 1:G:284:HIS:HD2  | 1.85                     | 0.42              |
| 1:J:170:LEU:HD21 | 1:S:99:LEU:HD22  | 2.01                     | 0.42              |
| 1:J:232:LEU:O    | 1:J:258:MET:N    | 2.32                     | 0.42              |
| 1:J:258:MET:HB2  | 1:J:284:HIS:HD2  | 1.85                     | 0.42              |
| 1:V:161:LEU:HD22 | 1:V:191:PHE:HE2  | 1.84                     | 0.42              |
| 1:V:258:MET:HB2  | 1:V:284:HIS:HD2  | 1.84                     | 0.42              |
| 1:D:63:SER:HA    | 1:D:66:LEU:HD13  | 2.00                     | 0.42              |
| 2:E:94:VAL:HG22  | 2:E:106:CYS:HB2  | 2.01                     | 0.42              |
| 1:G:126:ARG:NH1  | 1:G:297:PRO:O    | 2.51                     | 0.42              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:G:161:LEU:HD22 | 1:G:191:PHE:HE2  | 1.84                     | 0.42              |
| 1:G:221:GLN:HG3  | 1:G:226:GLU:O    | 2.19                     | 0.42              |
| 1:P:161:LEU:HD22 | 1:P:191:PHE:HE2  | 1.84                     | 0.42              |
| 1:P:258:MET:HB2  | 1:P:284:HIS:HD2  | 1.85                     | 0.42              |
| 1:V:340:GLN:OE1  | 1:V:346:ILE:HG12 | 2.20                     | 0.42              |
| 1:A:63:SER:HA    | 1:A:66:LEU:HD13  | 2.00                     | 0.42              |
| 1:D:340:GLN:OE1  | 1:D:346:ILE:HG12 | 2.20                     | 0.42              |
| 1:G:337:PHE:O    | 1:G:341:LEU:HD23 | 2.18                     | 0.42              |
| 1:M:337:PHE:O    | 1:M:341:LEU:HD23 | 2.18                     | 0.42              |
| 1:M:427:ARG:HB3  | 1:M:432:GLU:OE2  | 2.19                     | 0.42              |
| 2:N:58:TYR:CZ    | 1:P:179:ARG:HB3  | 2.54                     | 0.42              |
| 1:S:163:GLY:O    | 1:S:393:GLN:HA   | 2.19                     | 0.42              |
| 1:V:221:GLN:HG3  | 1:V:226:GLU:O    | 2.19                     | 0.42              |
| 1:D:161:LEU:HD22 | 1:D:191:PHE:HE2  | 1.84                     | 0.42              |
| 1:D:188:GLY:O    | 1:D:413:ARG:NH1  | 2.53                     | 0.42              |
| 1:D:232:LEU:O    | 1:D:258:MET:N    | 2.32                     | 0.42              |
| 1:M:63:SER:HA    | 1:M:66:LEU:HD13  | 2.00                     | 0.42              |
| 1:M:340:GLN:OE1  | 1:M:346:ILE:HG12 | 2.20                     | 0.42              |
| 1:S:221:GLN:HG3  | 1:S:226:GLU:O    | 2.19                     | 0.42              |
| 2:T:72:LEU:O     | 2:T:76:VAL:HG23  | 2.19                     | 0.42              |
| 2:B:72:LEU:O     | 2:B:76:VAL:HG23  | 2.19                     | 0.42              |
| 1:D:143:PRO:HA   | 1:D:144:PRO:HD3  | 1.92                     | 0.42              |
| 1:D:427:ARG:HB3  | 1:D:432:GLU:OE2  | 2.19                     | 0.42              |
| 1:G:63:SER:HA    | 1:G:66:LEU:HD13  | 2.01                     | 0.42              |
| 1:G:340:GLN:OE1  | 1:G:346:ILE:HG12 | 2.20                     | 0.42              |
| 1:G:427:ARG:HB3  | 1:G:432:GLU:OE2  | 2.19                     | 0.42              |
| 2:H:72:LEU:O     | 2:H:76:VAL:HG23  | 2.19                     | 0.42              |
| 1:J:337:PHE:O    | 1:J:341:LEU:HD23 | 2.18                     | 0.42              |
| 2:N:72:LEU:O     | 2:N:76:VAL:HG23  | 2.19                     | 0.42              |
| 1:P:337:PHE:O    | 1:P:341:LEU:HD23 | 2.18                     | 0.42              |
| 2:Q:72:LEU:O     | 2:Q:76:VAL:HG23  | 2.19                     | 0.42              |
| 1:V:188:GLY:O    | 1:V:413:ARG:NH1  | 2.53                     | 0.42              |
| 1:A:295:ARG:HH22 | 1:P:120:LYS:HA   | 1.85                     | 0.42              |
| 1:D:163:GLY:O    | 1:D:393:GLN:HA   | 2.19                     | 0.42              |
| 1:J:168:PRO:HB3  | 1:S:64:GLU:CG    | 2.45                     | 0.42              |
| 1:S:63:SER:HA    | 1:S:66:LEU:HD13  | 2.00                     | 0.42              |
| 1:V:143:PRO:HA   | 1:V:144:PRO:HD3  | 1.92                     | 0.42              |
| 1:A:161:LEU:HD22 | 1:A:191:PHE:HE2  | 1.84                     | 0.42              |
| 2:K:72:LEU:O     | 2:K:76:VAL:HG23  | 2.19                     | 0.42              |
| 2:Q:88:ASP:OD1   | 2:Q:88:ASP:N     | 2.40                     | 0.42              |
| 2:T:16:LEU:HD23  | 2:T:16:LEU:HA    | 1.85                     | 0.42              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:V:163:GLY:O    | 1:V:393:GLN:HA   | 2.19                     | 0.42              |
| 1:V:427:ARG:HB3  | 1:V:432:GLU:OE2  | 2.19                     | 0.42              |
| 1:D:286:HIS:HA   | 1:D:319:HIS:ND1  | 2.35                     | 0.42              |
| 1:S:286:HIS:HA   | 1:S:319:HIS:ND1  | 2.35                     | 0.42              |
| 2:W:16:LEU:HD23  | 2:W:16:LEU:HA    | 1.85                     | 0.42              |
| 2:E:16:LEU:HD23  | 2:E:16:LEU:HA    | 1.85                     | 0.41              |
| 1:G:286:HIS:HA   | 1:G:319:HIS:ND1  | 2.35                     | 0.41              |
| 1:M:286:HIS:HA   | 1:M:319:HIS:ND1  | 2.35                     | 0.41              |
| 1:V:286:HIS:HA   | 1:V:319:HIS:ND1  | 2.35                     | 0.41              |
| 1:V:320:THR:OG1  | 1:V:321:GLY:O    | 2.31                     | 0.41              |
| 1:D:320:THR:OG1  | 1:D:321:GLY:O    | 2.31                     | 0.41              |
| 1:G:199:ASN:O    | 1:G:209:ARG:NH2  | 2.53                     | 0.41              |
| 1:J:340:GLN:OE1  | 1:J:346:ILE:HG12 | 2.20                     | 0.41              |
| 1:M:199:ASN:O    | 1:M:209:ARG:NH2  | 2.53                     | 0.41              |
| 1:A:286:HIS:HA   | 1:A:319:HIS:ND1  | 2.35                     | 0.41              |
| 1:A:363:MET:HE3  | 1:A:363:MET:HB3  | 1.99                     | 0.41              |
| 1:G:127:LEU:HB3  | 1:G:301:ILE:HG23 | 2.02                     | 0.41              |
| 1:G:233:ASN:HB2  | 1:G:258:MET:HE2  | 2.02                     | 0.41              |
| 1:J:127:LEU:HB3  | 1:J:301:ILE:HG23 | 2.02                     | 0.41              |
| 1:J:233:ASN:HB2  | 1:J:258:MET:HE2  | 2.02                     | 0.41              |
| 2:K:88:ASP:OD1   | 2:K:88:ASP:N     | 2.40                     | 0.41              |
| 1:M:127:LEU:HB3  | 1:M:301:ILE:HG23 | 2.02                     | 0.41              |
| 1:M:157:TYR:CG   | 2:N:103:GLN:HB2  | 2.55                     | 0.41              |
| 1:M:175:LYS:HG3  | 2:W:58:TYR:CE1   | 2.50                     | 0.41              |
| 1:M:233:ASN:HB2  | 1:M:258:MET:HE2  | 2.02                     | 0.41              |
| 1:S:340:GLN:OE1  | 1:S:346:ILE:HG12 | 2.20                     | 0.41              |
| 1:J:143:PRO:HA   | 1:J:144:PRO:HD3  | 1.92                     | 0.41              |
| 1:P:127:LEU:HB3  | 1:P:301:ILE:HG23 | 2.02                     | 0.41              |
| 1:P:233:ASN:HB2  | 1:P:258:MET:HE2  | 2.02                     | 0.41              |
| 1:P:340:GLN:OE1  | 1:P:346:ILE:HG12 | 2.20                     | 0.41              |
| 1:S:161:LEU:HD22 | 1:S:191:PHE:HE2  | 1.84                     | 0.41              |
| 1:S:424:ASN:HA   | 2:T:36:TYR:CE1   | 2.56                     | 0.41              |
| 1:A:143:PRO:HA   | 1:A:144:PRO:HD3  | 1.92                     | 0.41              |
| 1:A:258:MET:HB2  | 1:A:284:HIS:HD2  | 1.85                     | 0.41              |
| 1:A:340:GLN:OE1  | 1:A:346:ILE:HG12 | 2.20                     | 0.41              |
| 2:B:16:LEU:HD23  | 2:B:16:LEU:HA    | 1.85                     | 0.41              |
| 1:G:132:PHE:HE2  | 1:G:308:LYS:HB3  | 1.86                     | 0.41              |
| 1:G:188:GLY:O    | 1:G:413:ARG:NH1  | 2.53                     | 0.41              |
| 1:V:446:GLU:H    | 1:V:446:GLU:CD   | 2.29                     | 0.41              |
| 1:D:162:LEU:H    | 1:D:190:ASP:CG   | 2.29                     | 0.41              |
| 1:D:446:GLU:H    | 1:D:446:GLU:CD   | 2.29                     | 0.41              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:M:446:GLU:CD   | 1:M:446:GLU:H    | 2.29                     | 0.41              |
| 1:S:446:GLU:CD   | 1:S:446:GLU:H    | 2.29                     | 0.41              |
| 1:V:162:LEU:H    | 1:V:190:ASP:CG   | 2.29                     | 0.41              |
| 1:A:162:LEU:H    | 1:A:190:ASP:CG   | 2.29                     | 0.41              |
| 1:A:188:GLY:O    | 1:A:413:ARG:NH1  | 2.53                     | 0.41              |
| 1:D:199:ASN:O    | 1:D:209:ARG:NH2  | 2.53                     | 0.41              |
| 1:G:446:GLU:CD   | 1:G:446:GLU:H    | 2.29                     | 0.41              |
| 1:M:132:PHE:HE2  | 1:M:308:LYS:HB3  | 1.86                     | 0.41              |
| 1:P:143:PRO:HA   | 1:P:144:PRO:HD3  | 1.91                     | 0.41              |
| 1:P:286:HIS:HA   | 1:P:319:HIS:ND1  | 2.35                     | 0.41              |
| 1:A:446:GLU:CD   | 1:A:446:GLU:H    | 2.29                     | 0.41              |
| 1:J:286:HIS:HA   | 1:J:319:HIS:ND1  | 2.35                     | 0.41              |
| 1:M:188:GLY:O    | 1:M:413:ARG:NH1  | 2.53                     | 0.41              |
| 1:S:170:LEU:HB2  | 1:S:203:PHE:CZ   | 2.56                     | 0.41              |
| 1:S:424:ASN:O    | 2:T:36:TYR:HB2   | 2.20                     | 0.41              |
| 1:A:170:LEU:HB2  | 1:A:203:PHE:CZ   | 2.56                     | 0.41              |
| 1:A:190:ASP:HA   | 1:A:228:LYS:NZ   | 2.36                     | 0.41              |
| 1:D:132:PHE:HE2  | 1:D:308:LYS:HB3  | 1.86                     | 0.41              |
| 1:D:170:LEU:HB2  | 1:D:203:PHE:CZ   | 2.56                     | 0.41              |
| 1:D:193:LYS:HE2  | 1:D:193:LYS:HB2  | 1.94                     | 0.41              |
| 1:G:162:LEU:H    | 1:G:190:ASP:CG   | 2.29                     | 0.41              |
| 1:J:188:GLY:O    | 1:J:413:ARG:NH1  | 2.53                     | 0.41              |
| 1:J:446:GLU:H    | 1:J:446:GLU:CD   | 2.29                     | 0.41              |
| 2:K:31:TYR:CE1   | 2:K:76:VAL:HG21  | 2.56                     | 0.41              |
| 1:M:162:LEU:H    | 1:M:190:ASP:CG   | 2.29                     | 0.41              |
| 1:P:199:ASN:O    | 1:P:209:ARG:NH2  | 2.53                     | 0.41              |
| 1:P:446:GLU:H    | 1:P:446:GLU:CD   | 2.29                     | 0.41              |
| 1:S:162:LEU:H    | 1:S:190:ASP:CG   | 2.29                     | 0.41              |
| 1:S:190:ASP:HA   | 1:S:228:LYS:NZ   | 2.36                     | 0.41              |
| 1:V:78:ARG:HG2   | 1:V:80:GLU:HG2   | 2.03                     | 0.41              |
| 1:V:132:PHE:HE2  | 1:V:308:LYS:HB3  | 1.86                     | 0.41              |
| 1:V:199:ASN:O    | 1:V:209:ARG:NH2  | 2.53                     | 0.41              |
| 1:A:132:PHE:HE2  | 1:A:308:LYS:HB3  | 1.86                     | 0.41              |
| 1:G:170:LEU:HB2  | 1:G:203:PHE:CZ   | 2.56                     | 0.41              |
| 1:G:449:ILE:O    | 1:G:453:THR:HG23 | 2.21                     | 0.41              |
| 1:J:132:PHE:HE2  | 1:J:308:LYS:HB3  | 1.86                     | 0.41              |
| 1:J:162:LEU:HD11 | 1:J:394:PHE:HE2  | 1.86                     | 0.41              |
| 1:J:170:LEU:HD11 | 1:S:72:TYR:HB3   | 2.02                     | 0.41              |
| 1:J:199:ASN:O    | 1:J:209:ARG:NH2  | 2.53                     | 0.41              |
| 1:M:170:LEU:HB2  | 1:M:203:PHE:CZ   | 2.56                     | 0.41              |
| 1:M:449:ILE:O    | 1:M:453:THR:HG23 | 2.21                     | 0.41              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 2:N:31:TYR:CE1   | 2:N:76:VAL:HG21  | 2.56                     | 0.41              |
| 1:S:78:ARG:HG2   | 1:S:80:GLU:HG2   | 2.03                     | 0.41              |
| 1:V:170:LEU:HB2  | 1:V:203:PHE:CZ   | 2.56                     | 0.41              |
| 1:V:334:THR:HA   | 1:V:337:PHE:CD2  | 2.56                     | 0.41              |
| 1:A:78:ARG:HG2   | 1:A:80:GLU:HG2   | 2.03                     | 0.40              |
| 1:D:78:ARG:HG2   | 1:D:80:GLU:HG2   | 2.03                     | 0.40              |
| 1:D:127:LEU:HB3  | 1:D:301:ILE:HG23 | 2.02                     | 0.40              |
| 1:D:334:THR:HA   | 1:D:337:PHE:CD2  | 2.57                     | 0.40              |
| 1:G:138:LYS:HG3  | 1:S:97:LEU:HD21  | 2.02                     | 0.40              |
| 2:H:31:TYR:CE1   | 2:H:76:VAL:HG21  | 2.56                     | 0.40              |
| 1:J:334:THR:HA   | 1:J:337:PHE:CD2  | 2.56                     | 0.40              |
| 1:P:188:GLY:O    | 1:P:413:ARG:NH1  | 2.53                     | 0.40              |
| 1:P:334:THR:HA   | 1:P:337:PHE:CD2  | 2.56                     | 0.40              |
| 2:Q:31:TYR:CE1   | 2:Q:76:VAL:HG21  | 2.56                     | 0.40              |
| 1:S:29:LEU:HD12  | 1:S:131:ARG:HD3  | 2.03                     | 0.40              |
| 1:S:258:MET:HB2  | 1:S:284:HIS:HD2  | 1.85                     | 0.40              |
| 1:V:29:LEU:HD12  | 1:V:131:ARG:HD3  | 2.03                     | 0.40              |
| 1:V:127:LEU:HB3  | 1:V:301:ILE:HG23 | 2.02                     | 0.40              |
| 1:V:162:LEU:HD11 | 1:V:394:PHE:HE2  | 1.86                     | 0.40              |
| 1:V:193:LYS:HB3  | 1:V:231:TYR:CD2  | 2.57                     | 0.40              |
| 1:A:29:LEU:HD12  | 1:A:131:ARG:HD3  | 2.03                     | 0.40              |
| 1:A:199:ASN:O    | 1:A:209:ARG:NH2  | 2.53                     | 0.40              |
| 2:B:31:TYR:CE1   | 2:B:76:VAL:HG21  | 2.56                     | 0.40              |
| 1:D:29:LEU:HD12  | 1:D:131:ARG:HD3  | 2.03                     | 0.40              |
| 1:D:233:ASN:HB2  | 1:D:258:MET:HE2  | 2.02                     | 0.40              |
| 1:J:162:LEU:H    | 1:J:190:ASP:CG   | 2.29                     | 0.40              |
| 1:J:337:PHE:C    | 1:J:337:PHE:CD1  | 3.00                     | 0.40              |
| 1:J:449:ILE:O    | 1:J:453:THR:HG23 | 2.22                     | 0.40              |
| 1:P:132:PHE:HE2  | 1:P:308:LYS:HB3  | 1.86                     | 0.40              |
| 1:P:162:LEU:H    | 1:P:190:ASP:CG   | 2.29                     | 0.40              |
| 1:P:162:LEU:HD11 | 1:P:394:PHE:HE2  | 1.87                     | 0.40              |
| 1:P:170:LEU:HB2  | 1:P:203:PHE:CZ   | 2.56                     | 0.40              |
| 1:P:337:PHE:C    | 1:P:337:PHE:CD1  | 2.99                     | 0.40              |
| 1:P:449:ILE:O    | 1:P:453:THR:HG23 | 2.22                     | 0.40              |
| 1:S:132:PHE:HE2  | 1:S:308:LYS:HB3  | 1.86                     | 0.40              |
| 1:A:119:PHE:O    | 1:P:295:ARG:NH2  | 2.54                     | 0.40              |
| 1:A:127:LEU:HB3  | 1:A:301:ILE:HG23 | 2.02                     | 0.40              |
| 1:D:162:LEU:HD11 | 1:D:394:PHE:HE2  | 1.87                     | 0.40              |
| 2:E:31:TYR:CE1   | 2:E:76:VAL:HG21  | 2.56                     | 0.40              |
| 1:G:337:PHE:CD1  | 1:G:337:PHE:C    | 3.00                     | 0.40              |
| 1:J:263:THR:HG21 | 1:S:110:THR:HG22 | 2.03                     | 0.40              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 2:K:17:GLU:O     | 2:K:18:THR:OG1   | 2.29                     | 0.40              |
| 1:S:199:ASN:O    | 1:S:209:ARG:NH2  | 2.53                     | 0.40              |
| 2:T:31:TYR:CE1   | 2:T:76:VAL:HG21  | 2.56                     | 0.40              |
| 1:A:381:ALA:O    | 1:A:385:ILE:HG12 | 2.22                     | 0.40              |
| 1:G:190:ASP:HA   | 1:G:228:LYS:NZ   | 2.36                     | 0.40              |
| 1:G:334:THR:HA   | 1:G:337:PHE:CD2  | 2.56                     | 0.40              |
| 1:J:170:LEU:HB2  | 1:J:203:PHE:CZ   | 2.56                     | 0.40              |
| 1:J:190:ASP:HA   | 1:J:228:LYS:NZ   | 2.36                     | 0.40              |
| 1:M:190:ASP:HA   | 1:M:228:LYS:NZ   | 2.36                     | 0.40              |
| 1:M:334:THR:HA   | 1:M:337:PHE:CD2  | 2.57                     | 0.40              |
| 1:M:337:PHE:CD1  | 1:M:337:PHE:C    | 3.00                     | 0.40              |
| 1:S:127:LEU:HB3  | 1:S:301:ILE:HG23 | 2.02                     | 0.40              |
| 1:S:449:ILE:O    | 1:S:453:THR:HG23 | 2.22                     | 0.40              |
| 1:V:233:ASN:HB2  | 1:V:258:MET:HE2  | 2.02                     | 0.40              |
| 1:A:380:PRO:HA   | 1:A:419:CYS:SG   | 2.62                     | 0.40              |
| 1:A:449:ILE:O    | 1:A:453:THR:HG23 | 2.22                     | 0.40              |
| 1:D:127:LEU:HG   | 1:D:305:VAL:HG21 | 2.03                     | 0.40              |
| 1:D:190:ASP:HA   | 1:D:228:LYS:NZ   | 2.36                     | 0.40              |
| 1:J:381:ALA:O    | 1:J:385:ILE:HG12 | 2.22                     | 0.40              |
| 1:P:381:ALA:O    | 1:P:385:ILE:HG12 | 2.22                     | 0.40              |
| 1:S:162:LEU:HD11 | 1:S:394:PHE:HE2  | 1.86                     | 0.40              |
| 2:W:31:TYR:CE1   | 2:W:76:VAL:HG21  | 2.56                     | 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 |    |
|-----|-------|---------------|-----------|---------|----------|-------------|----|
| 1   | A     | 443/470 (94%) | 424 (96%) | 18 (4%) | 1 (0%)   | 44          | 74 |
| 1   | D     | 443/470 (94%) | 424 (96%) | 18 (4%) | 1 (0%)   | 44          | 74 |
| 1   | G     | 443/470 (94%) | 424 (96%) | 18 (4%) | 1 (0%)   | 44          | 74 |

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| Mol | Chain | Analysed        | Favoured   | Allowed  | Outliers | Percentiles |     |
|-----|-------|-----------------|------------|----------|----------|-------------|-----|
| 1   | J     | 443/470 (94%)   | 425 (96%)  | 17 (4%)  | 1 (0%)   | 44          | 74  |
| 1   | M     | 443/470 (94%)   | 424 (96%)  | 18 (4%)  | 1 (0%)   | 44          | 74  |
| 1   | P     | 443/470 (94%)   | 424 (96%)  | 18 (4%)  | 1 (0%)   | 44          | 74  |
| 1   | S     | 443/470 (94%)   | 424 (96%)  | 18 (4%)  | 1 (0%)   | 44          | 74  |
| 1   | V     | 443/470 (94%)   | 424 (96%)  | 18 (4%)  | 1 (0%)   | 44          | 74  |
| 2   | B     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | E     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | H     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | K     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | N     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | Q     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | T     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| 2   | W     | 105/113 (93%)   | 98 (93%)   | 7 (7%)   | 0        | 100         | 100 |
| All | All   | 4384/4664 (94%) | 4177 (95%) | 199 (4%) | 8 (0%)   | 45          | 74  |

All (8) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 323 | VAL  |
| 1   | D     | 323 | VAL  |
| 1   | G     | 323 | VAL  |
| 1   | J     | 323 | VAL  |
| 1   | M     | 323 | VAL  |
| 1   | P     | 323 | VAL  |
| 1   | S     | 323 | VAL  |
| 1   | V     | 323 | VAL  |

### 5.3.2 Protein sidechains ⓘ

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 |     |
|-----|-------|-----------------|------------|----------|-------------|-----|
| 1   | A     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | D     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | G     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | J     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | M     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | P     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | S     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 1   | V     | 361/384 (94%)   | 353 (98%)  | 8 (2%)   | 47          | 64  |
| 2   | B     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | E     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | H     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | K     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | N     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | Q     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | T     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| 2   | W     | 91/97 (94%)     | 91 (100%)  | 0        | 100         | 100 |
| All | All   | 3616/3848 (94%) | 3552 (98%) | 64 (2%)  | 54          | 71  |

All (64) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 22  | VAL  |
| 1   | A     | 98  | ASP  |
| 1   | A     | 122 | LEU  |
| 1   | A     | 226 | GLU  |
| 1   | A     | 324 | VAL  |
| 1   | A     | 333 | THR  |
| 1   | A     | 388 | ASP  |
| 1   | A     | 389 | ASP  |
| 1   | D     | 22  | VAL  |
| 1   | D     | 98  | ASP  |
| 1   | D     | 122 | LEU  |
| 1   | D     | 226 | GLU  |
| 1   | D     | 324 | VAL  |
| 1   | D     | 333 | THR  |
| 1   | D     | 388 | ASP  |
| 1   | D     | 389 | ASP  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | G     | 22  | VAL  |
| 1   | G     | 98  | ASP  |
| 1   | G     | 122 | LEU  |
| 1   | G     | 226 | GLU  |
| 1   | G     | 324 | VAL  |
| 1   | G     | 333 | THR  |
| 1   | G     | 388 | ASP  |
| 1   | G     | 389 | ASP  |
| 1   | J     | 22  | VAL  |
| 1   | J     | 98  | ASP  |
| 1   | J     | 122 | LEU  |
| 1   | J     | 226 | GLU  |
| 1   | J     | 324 | VAL  |
| 1   | J     | 333 | THR  |
| 1   | J     | 388 | ASP  |
| 1   | J     | 389 | ASP  |
| 1   | M     | 22  | VAL  |
| 1   | M     | 98  | ASP  |
| 1   | M     | 122 | LEU  |
| 1   | M     | 226 | GLU  |
| 1   | M     | 324 | VAL  |
| 1   | M     | 333 | THR  |
| 1   | M     | 388 | ASP  |
| 1   | M     | 389 | ASP  |
| 1   | P     | 22  | VAL  |
| 1   | P     | 98  | ASP  |
| 1   | P     | 122 | LEU  |
| 1   | P     | 226 | GLU  |
| 1   | P     | 324 | VAL  |
| 1   | P     | 333 | THR  |
| 1   | P     | 388 | ASP  |
| 1   | P     | 389 | ASP  |
| 1   | S     | 22  | VAL  |
| 1   | S     | 98  | ASP  |
| 1   | S     | 122 | LEU  |
| 1   | S     | 226 | GLU  |
| 1   | S     | 324 | VAL  |
| 1   | S     | 333 | THR  |
| 1   | S     | 388 | ASP  |
| 1   | S     | 389 | ASP  |
| 1   | V     | 22  | VAL  |
| 1   | V     | 98  | ASP  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | V     | 122 | LEU  |
| 1   | V     | 226 | GLU  |
| 1   | V     | 324 | VAL  |
| 1   | V     | 333 | THR  |
| 1   | V     | 388 | ASP  |
| 1   | V     | 389 | ASP  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (63) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 204 | GLN  |
| 1   | A     | 286 | HIS  |
| 1   | A     | 296 | HIS  |
| 1   | A     | 319 | HIS  |
| 1   | A     | 443 | HIS  |
| 2   | B     | 11  | GLN  |
| 2   | B     | 83  | HIS  |
| 1   | D     | 204 | GLN  |
| 1   | D     | 286 | HIS  |
| 1   | D     | 296 | HIS  |
| 1   | D     | 319 | HIS  |
| 1   | D     | 443 | HIS  |
| 2   | E     | 11  | GLN  |
| 2   | E     | 83  | HIS  |
| 1   | G     | 204 | GLN  |
| 1   | G     | 286 | HIS  |
| 1   | G     | 319 | HIS  |
| 1   | G     | 443 | HIS  |
| 2   | H     | 11  | GLN  |
| 2   | H     | 33  | GLN  |
| 2   | H     | 83  | HIS  |
| 1   | J     | 201 | GLN  |
| 1   | J     | 204 | GLN  |
| 1   | J     | 286 | HIS  |
| 1   | J     | 296 | HIS  |
| 1   | J     | 319 | HIS  |
| 1   | J     | 443 | HIS  |
| 2   | K     | 11  | GLN  |
| 2   | K     | 33  | GLN  |
| 2   | K     | 83  | HIS  |
| 2   | K     | 103 | GLN  |
| 1   | M     | 204 | GLN  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | M     | 286 | HIS  |
| 1   | M     | 319 | HIS  |
| 1   | M     | 443 | HIS  |
| 2   | N     | 11  | GLN  |
| 2   | N     | 33  | GLN  |
| 2   | N     | 83  | HIS  |
| 2   | N     | 103 | GLN  |
| 1   | P     | 201 | GLN  |
| 1   | P     | 204 | GLN  |
| 1   | P     | 286 | HIS  |
| 1   | P     | 319 | HIS  |
| 1   | P     | 443 | HIS  |
| 2   | Q     | 11  | GLN  |
| 2   | Q     | 33  | GLN  |
| 2   | Q     | 83  | HIS  |
| 1   | S     | 107 | ASN  |
| 1   | S     | 201 | GLN  |
| 1   | S     | 204 | GLN  |
| 1   | S     | 208 | ASN  |
| 1   | S     | 286 | HIS  |
| 1   | S     | 296 | HIS  |
| 1   | S     | 319 | HIS  |
| 1   | S     | 443 | HIS  |
| 2   | T     | 11  | GLN  |
| 2   | T     | 83  | HIS  |
| 1   | V     | 204 | GLN  |
| 1   | V     | 286 | HIS  |
| 1   | V     | 319 | HIS  |
| 1   | V     | 443 | HIS  |
| 2   | W     | 11  | GLN  |
| 2   | W     | 83  | HIS  |

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 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.

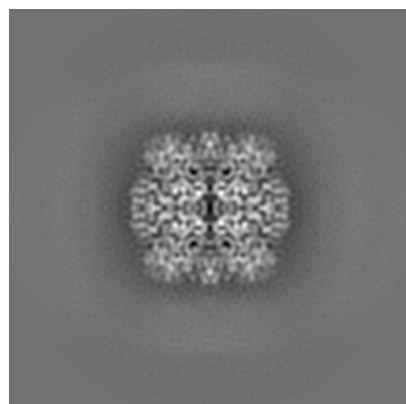
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14617. These allow visual inspection of the internal detail of the map and identification of artifacts.

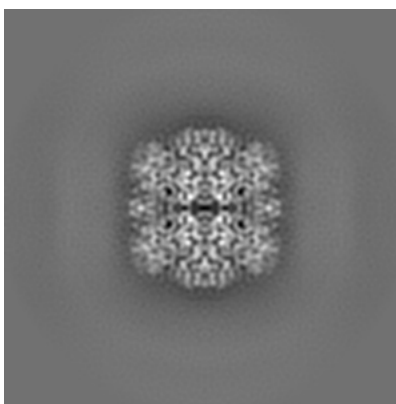
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

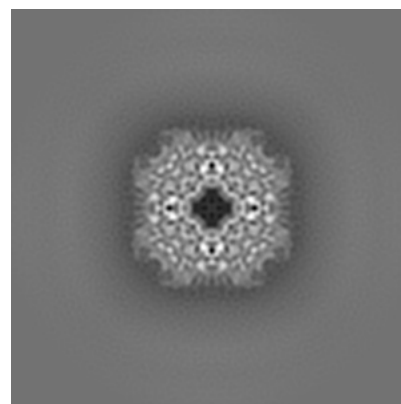
#### 6.1.1 Primary map



X

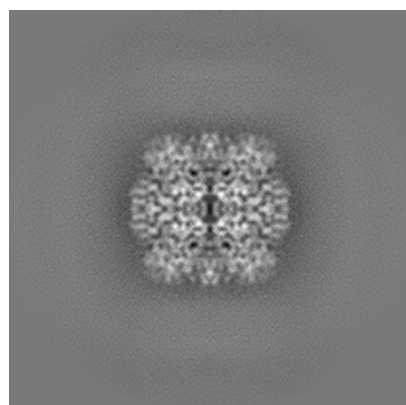


Y

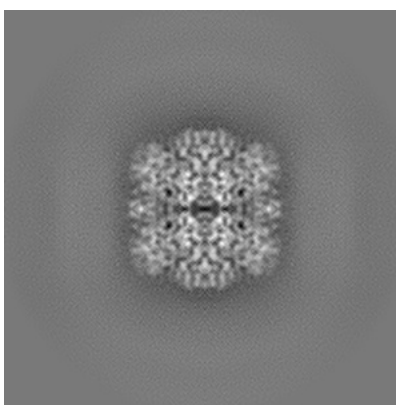


Z

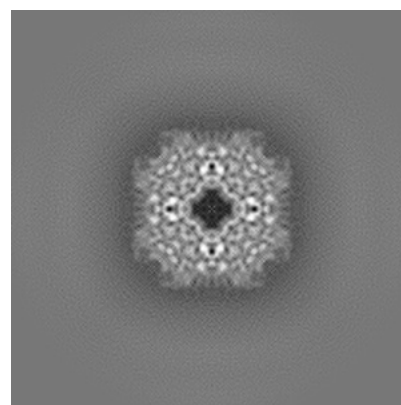
#### 6.1.2 Raw map



X



Y

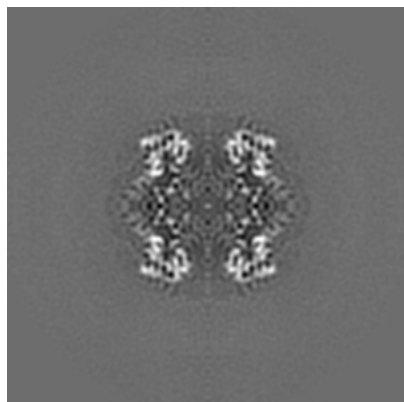


Z

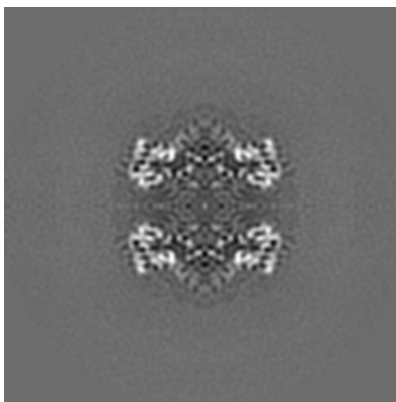
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

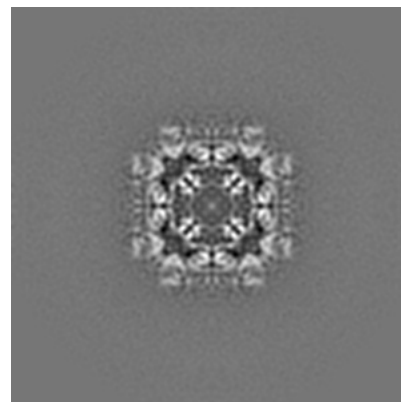
### 6.2.1 Primary map



X Index: 104

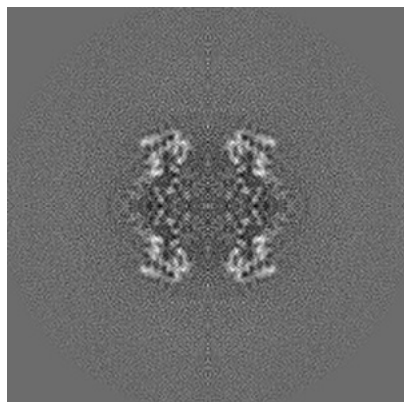


Y Index: 104

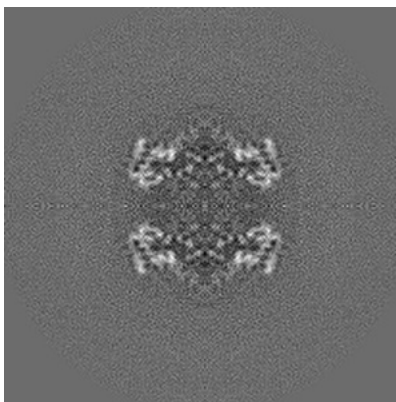


Z Index: 104

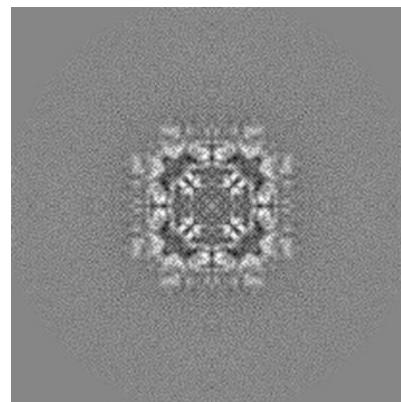
### 6.2.2 Raw map



X Index: 104



Y Index: 104

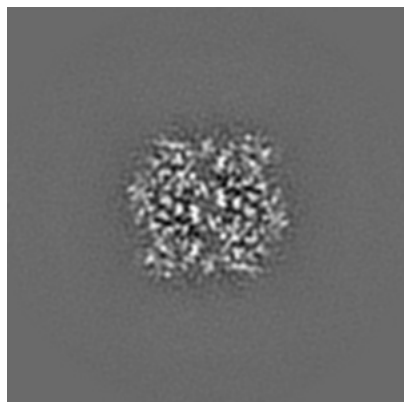


Z Index: 104

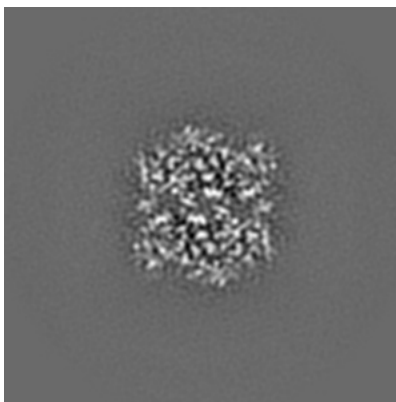
The images above show central slices of the map in three orthogonal directions.

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

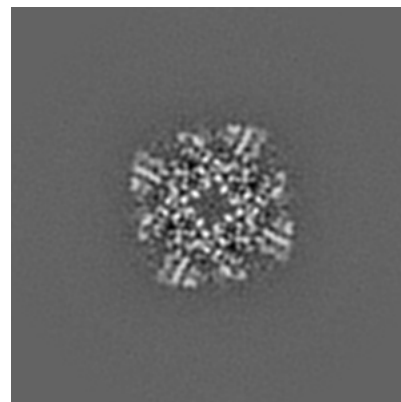
### 6.3.1 Primary map



X Index: 115

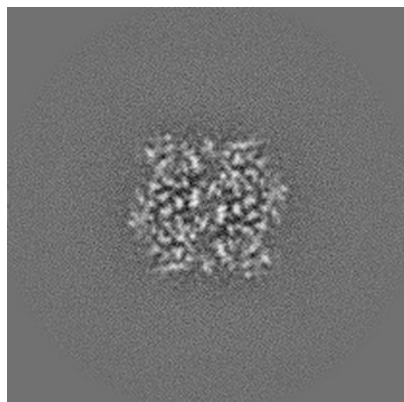


Y Index: 93

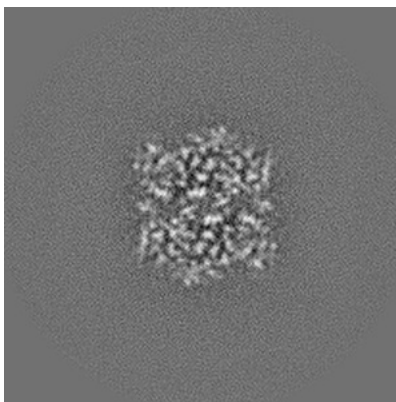


Z Index: 95

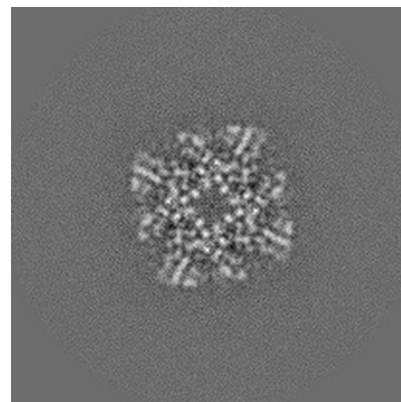
### 6.3.2 Raw map



X Index: 93



Y Index: 115

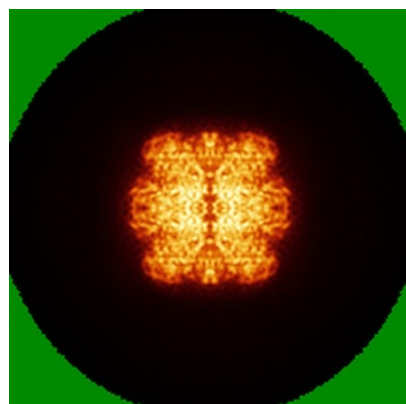


Z Index: 95

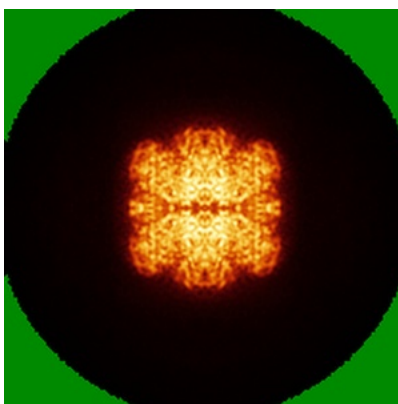
The images above show the largest variance slices of the map in three orthogonal directions.

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

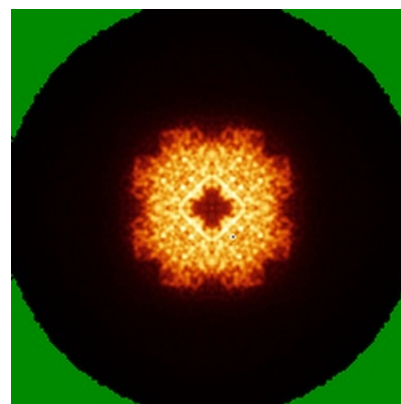
### 6.4.1 Primary map



X

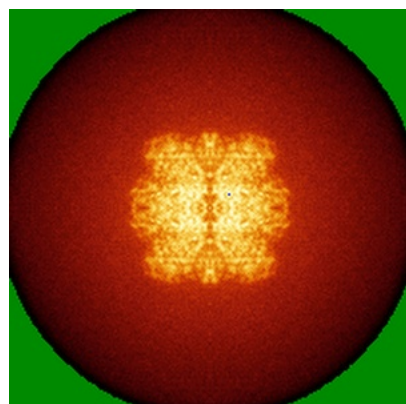


Y

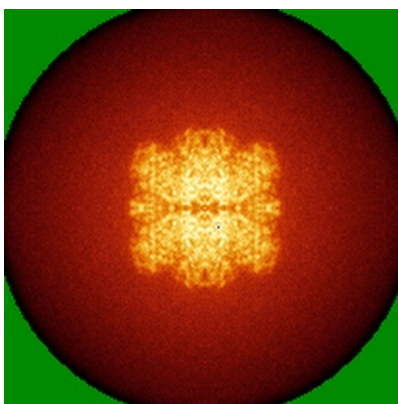


Z

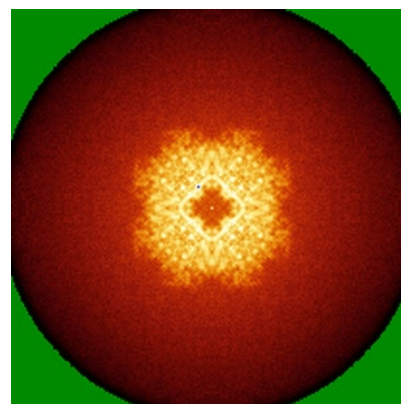
### 6.4.2 Raw map



X



Y

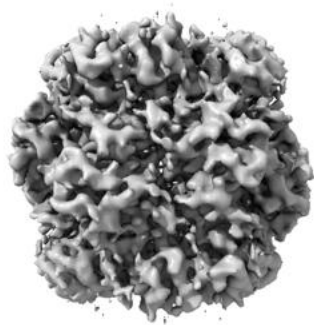


Z

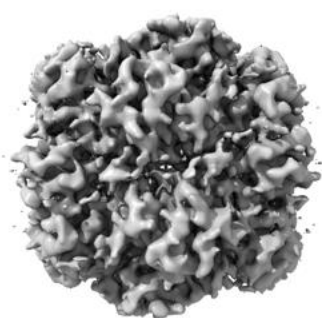
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

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

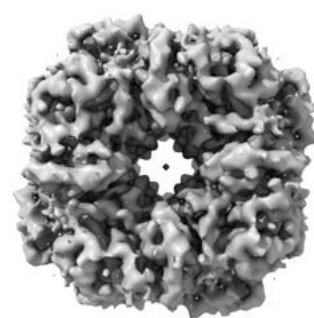
### 6.5.1 Primary map



X



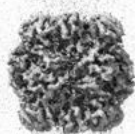
Y



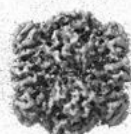
Z

The images above show the 3D surface view of the map at the recommended contour level 0.485. 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



X



Y



Z

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.

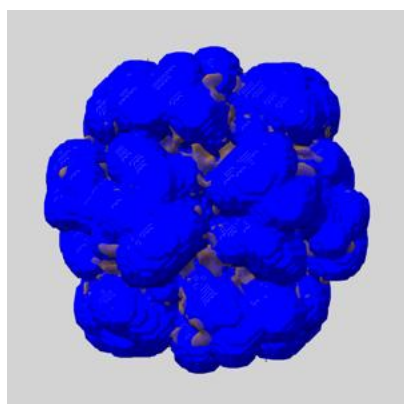
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

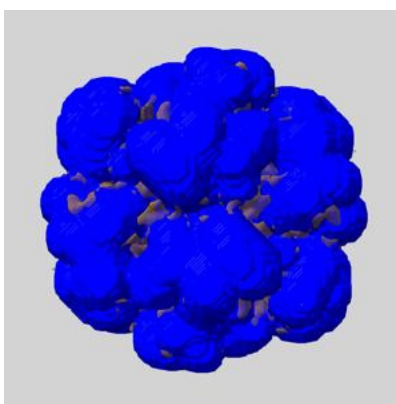
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

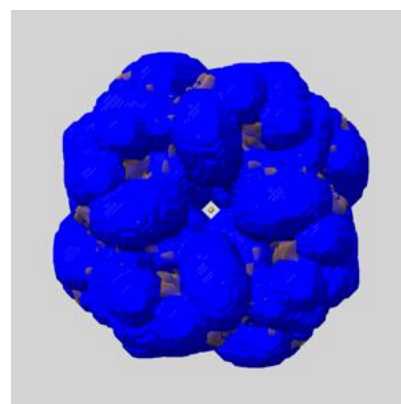
### 6.6.1 emd\_14617\_msk\_1.map [i](#)



X



Y

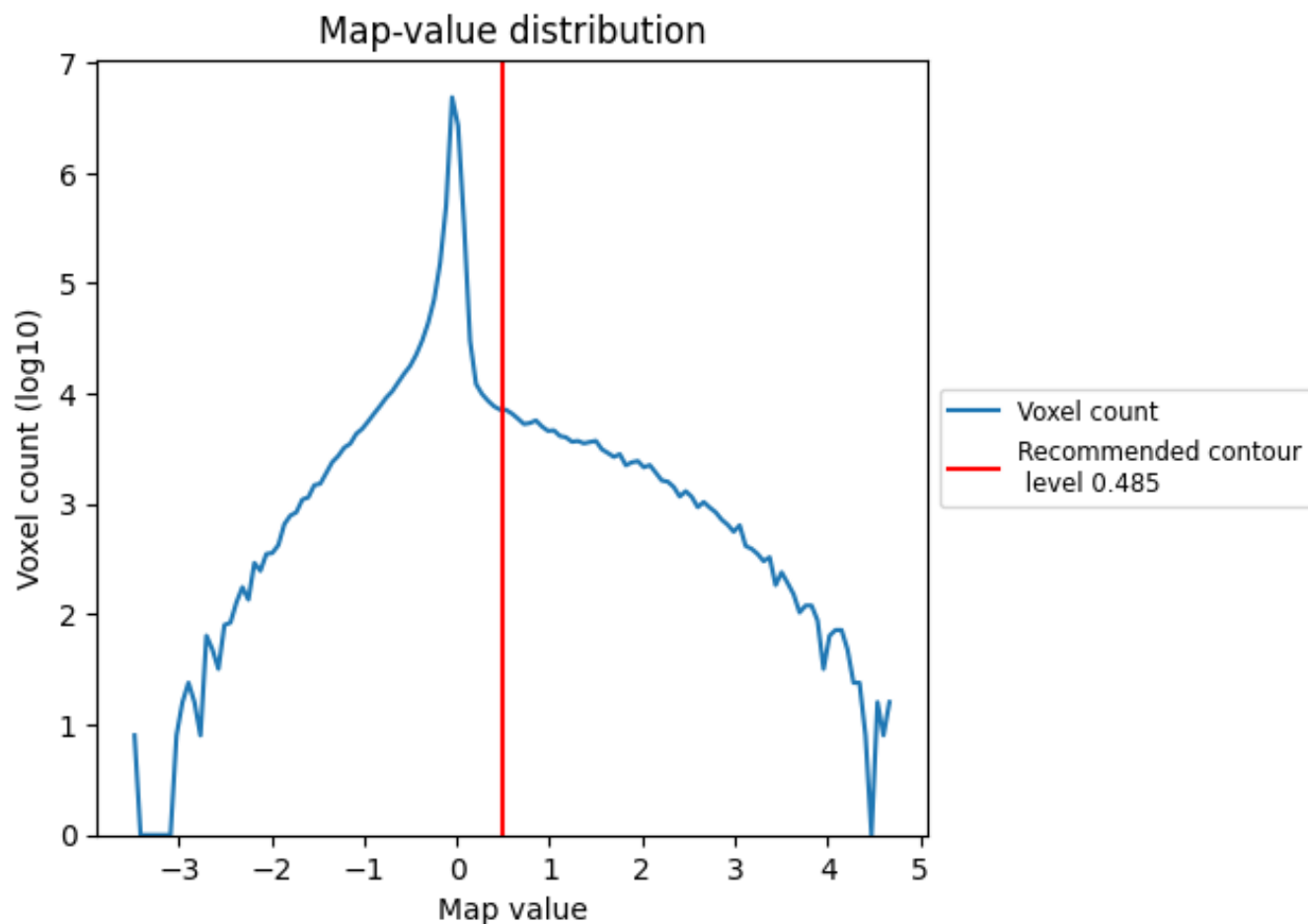


Z

## 7 Map analysis [i](#)

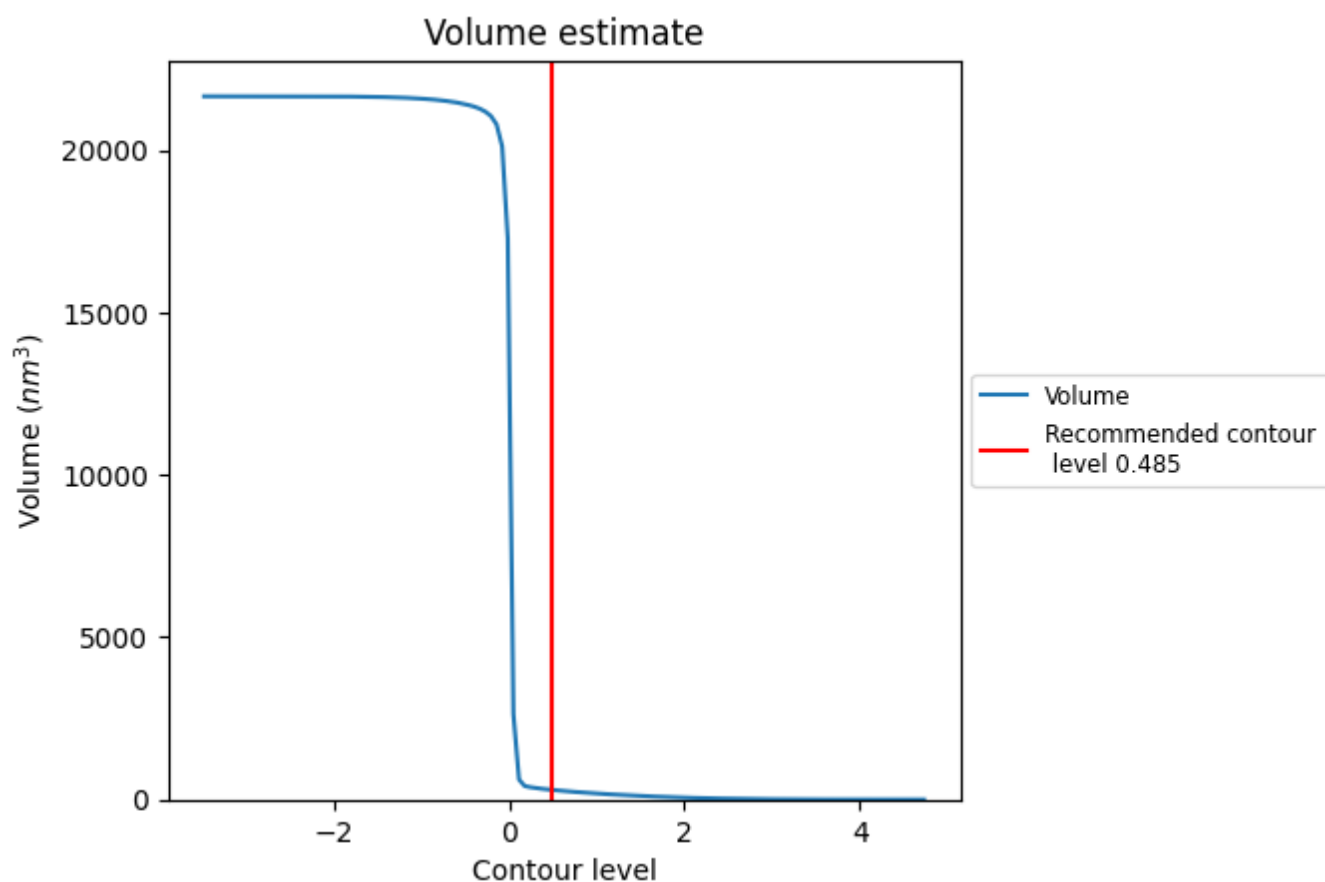
This section contains the results of statistical analysis of the map.

### 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.

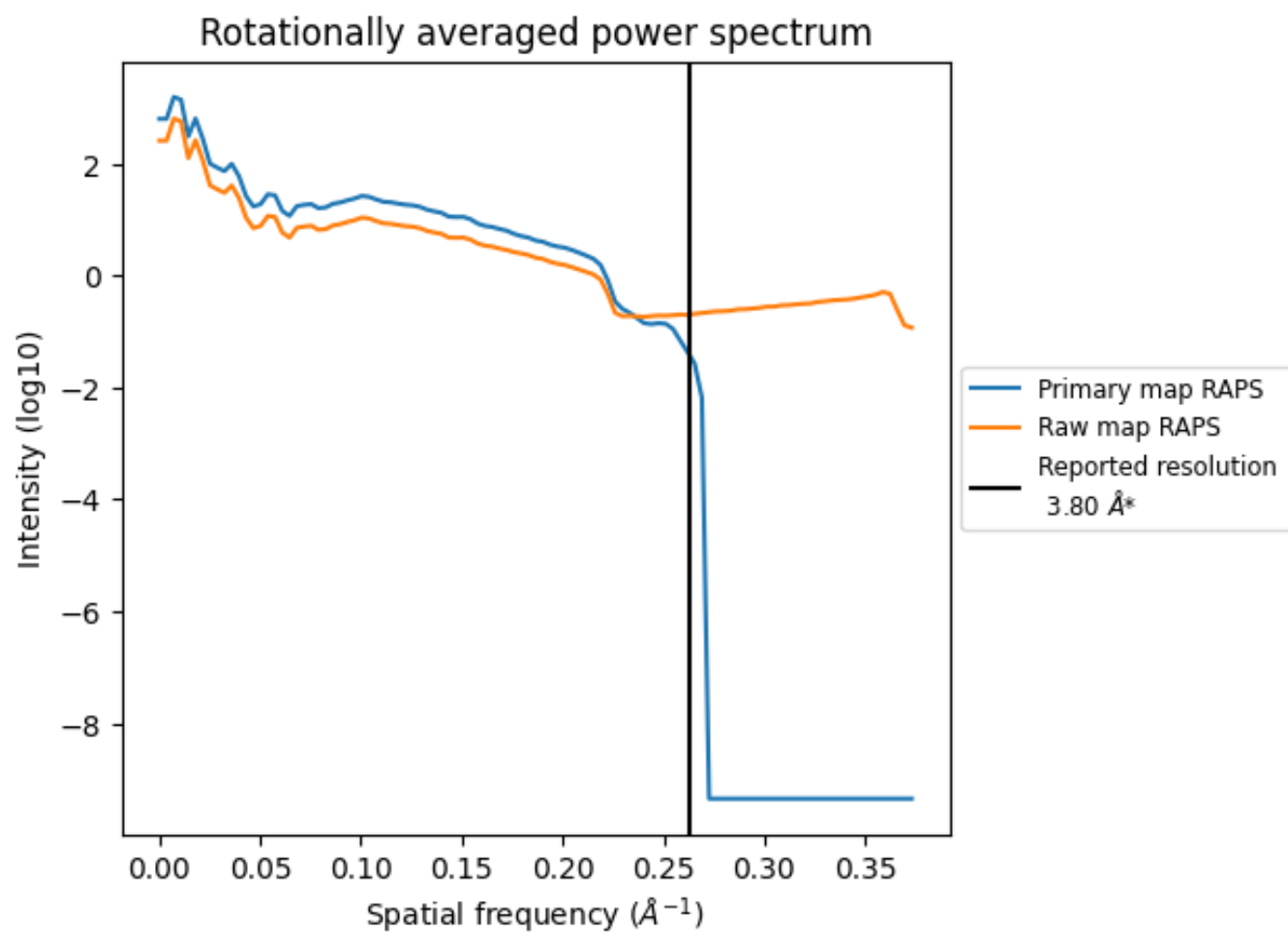
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 300 nm<sup>3</sup>; this corresponds to an approximate mass of 271 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 ⓘ

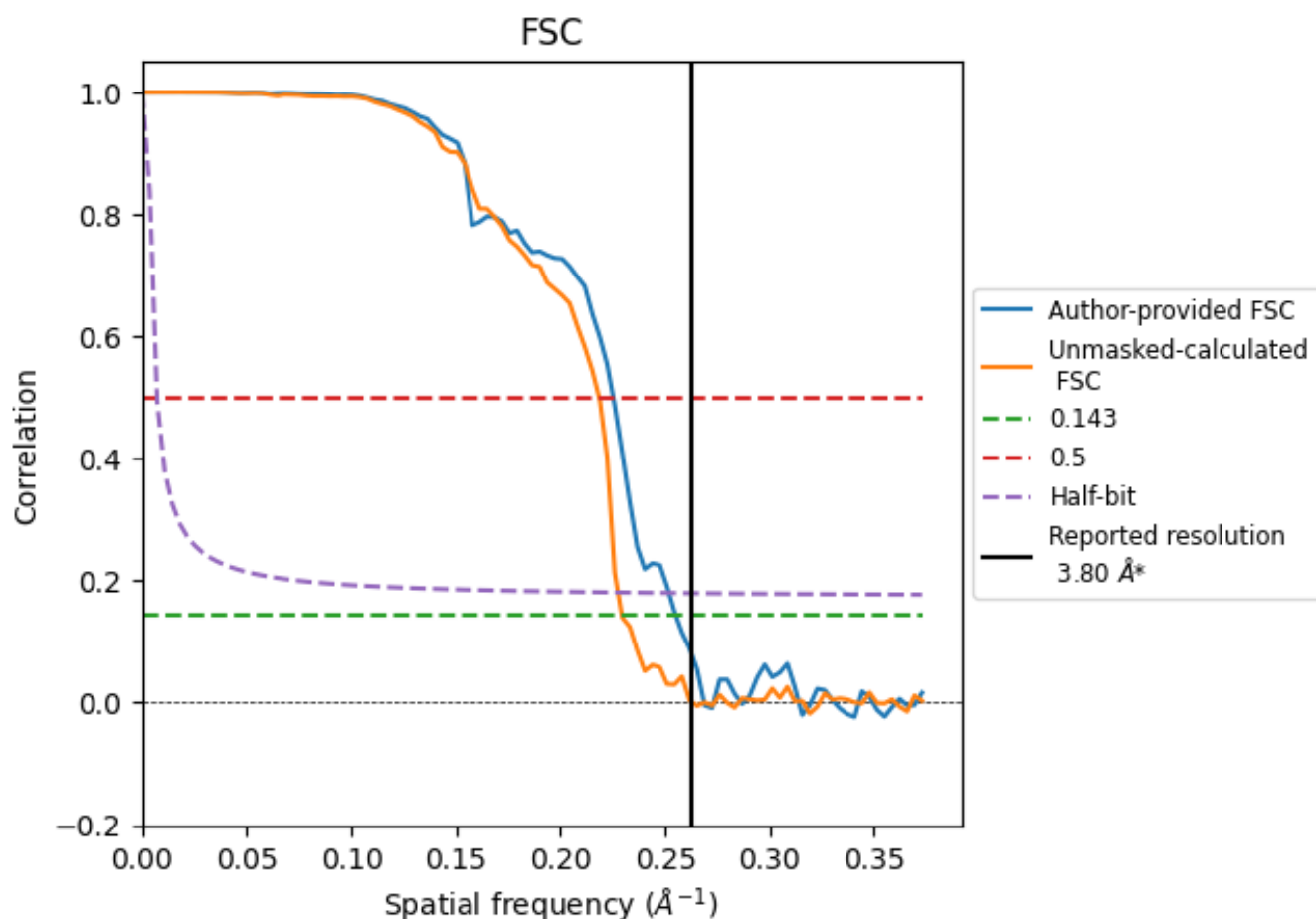


\*Reported resolution corresponds to spatial frequency of 0.263 Å<sup>-1</sup>

## 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 0.263  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

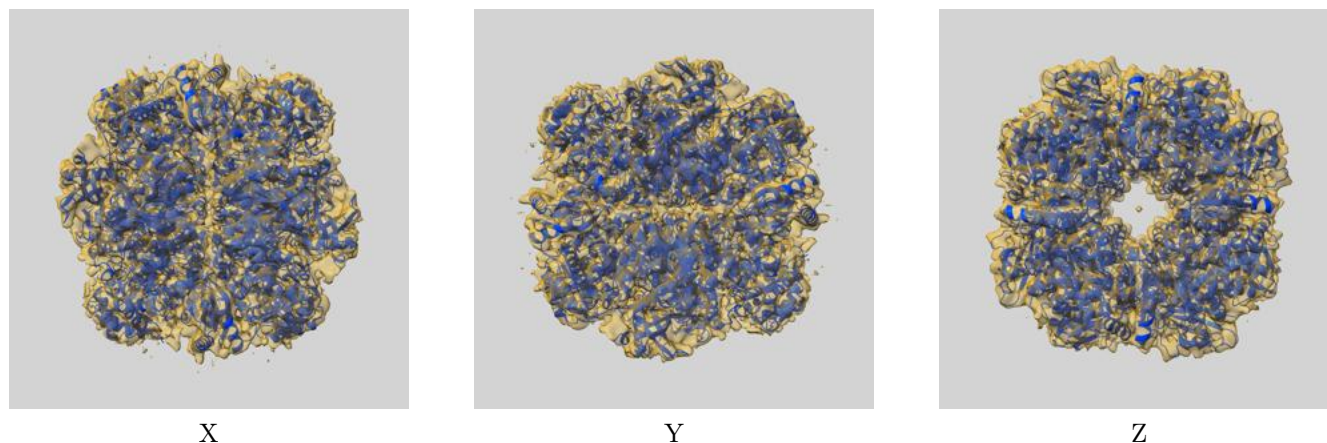
| Resolution estimate (Å)   | Estimation criterion (FSC cut-off) |      |          |
|---------------------------|------------------------------------|------|----------|
|                           | 0.143                              | 0.5  | Half-bit |
| Reported by author        | 3.80                               | -    | -        |
| Author-provided FSC curve | 3.92                               | 4.44 | 3.97     |
| Unmasked-calculated*      | 4.36                               | 4.58 | 4.39     |

\*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 4.36 differs from the reported value 3.8 by more than 10 %

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

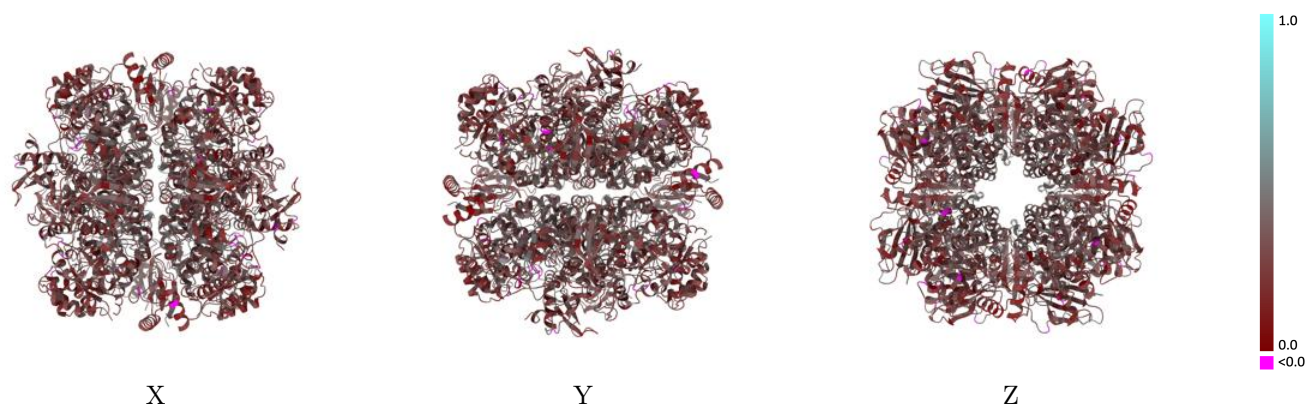
This section contains information regarding the fit between EMDB map EMD-14617 and PDB model 7ZC1. Per-residue inclusion information can be found in section [3](#) on page [6](#).

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



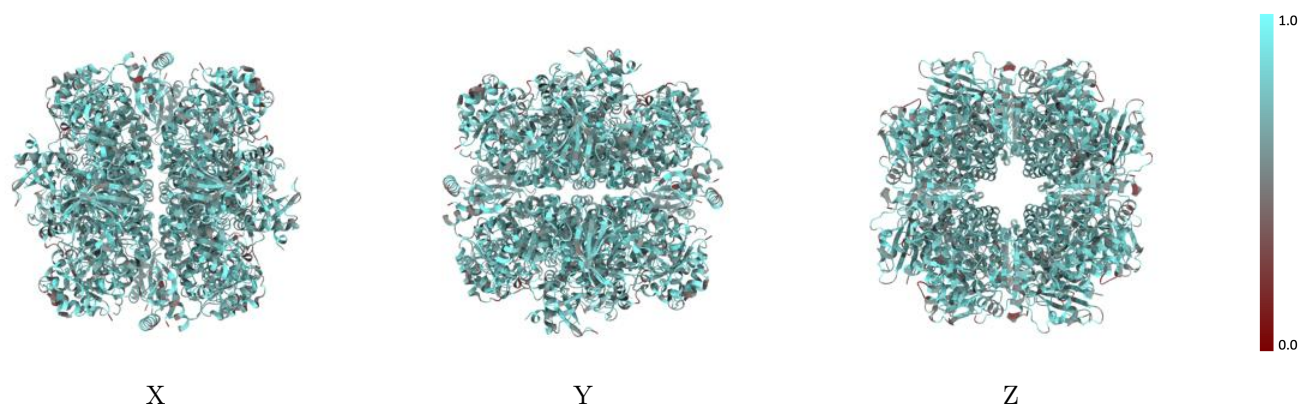
The images above show the 3D surface view of the map at the recommended contour level 0.485 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



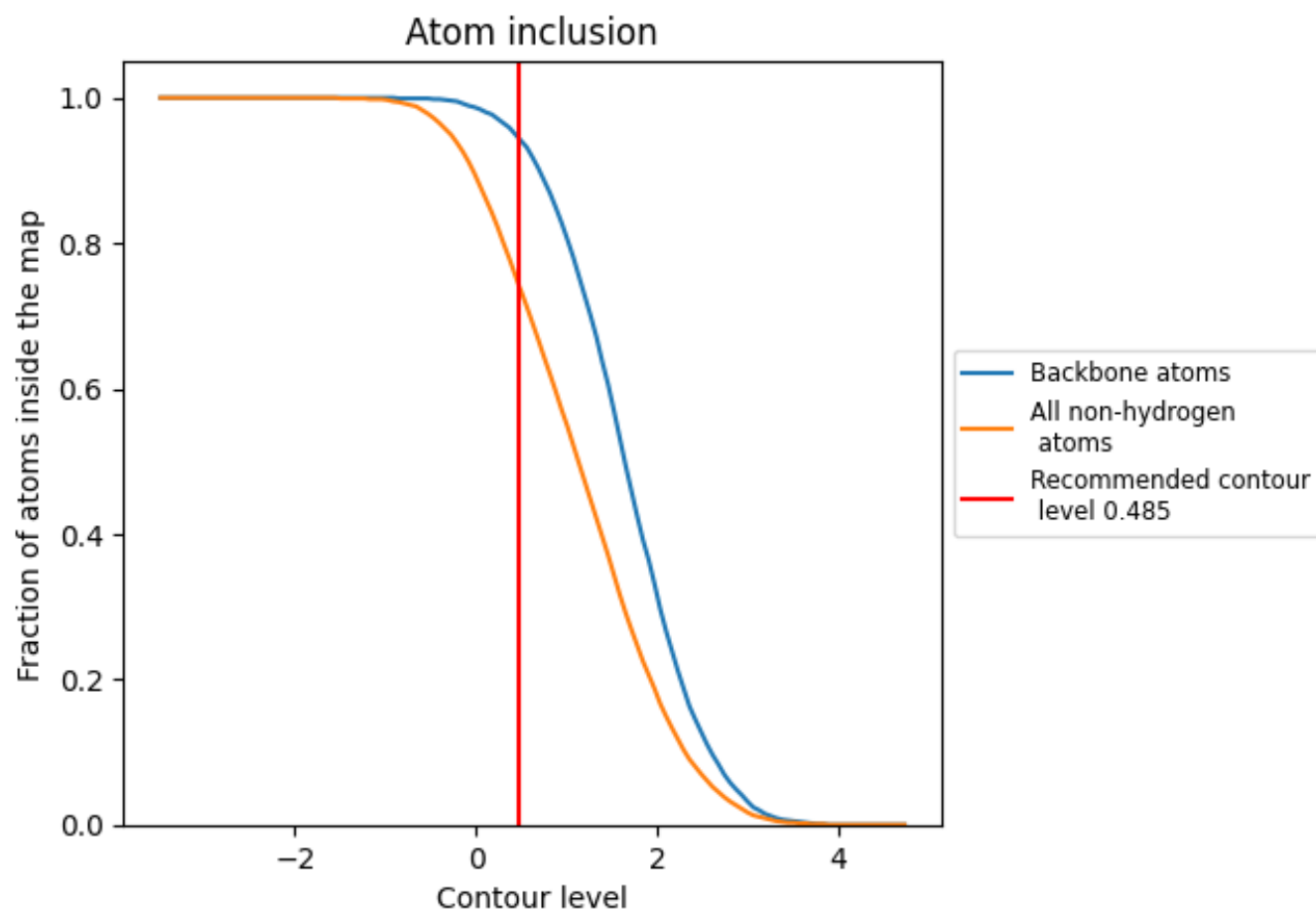
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.485).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 94% 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 (0.485) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion                                                                             | Q-score                                                                                    |
|-------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| All   |  0.7390   |  0.3000   |
| A     |  0.7410   |  0.2990   |
| B     |  0.7210   |  0.2810   |
| D     |  0.7550   |  0.3160   |
| E     |  0.7170   |  0.2760   |
| G     |  0.7450   |  0.3020   |
| H     |  0.7040   |  0.2690   |
| J     |  0.7420   |  0.3040   |
| K     |  0.7150   |  0.2900   |
| M     |  0.7440   |  0.3030   |
| N     |  0.7110   |  0.2650   |
| P     |  0.7510   |  0.3140   |
| Q     |  0.7140   |  0.2820   |
| S     |  0.7540   |  0.3210   |
| T     |  0.6810  |  0.2340  |
| V     |  0.7430 |  0.3000 |
| W     |  0.7150 |  0.2720 |

