



## Full wwPDB EM Validation Report ⓘ

Jan 16, 2025 – 12:34 am GMT

PDB ID : 9H3O  
EMDB ID : EMD-51832  
Title : 50S subunit precursor C\_(L22)-\_GAC  
Authors : Lauer, S.; Nikolay, R.; Spahn, C.M.T.  
Deposited on : 2024-10-17  
Resolution : 4.54 Å (reported)  
Based on initial model : 8RPY

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:

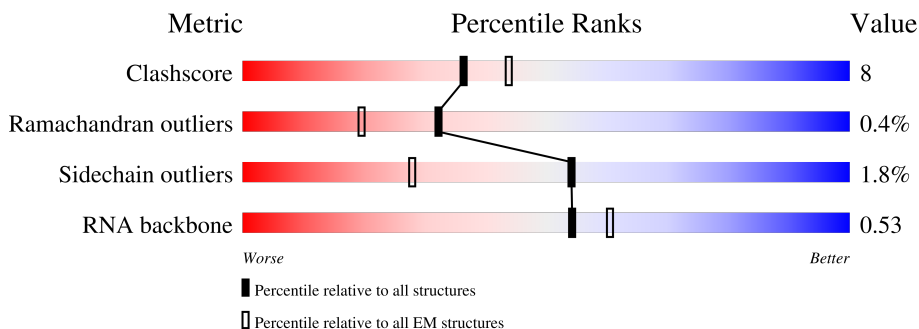
EMDB validation analysis : 0.0.1.dev113  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.40

# 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 4.54 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.










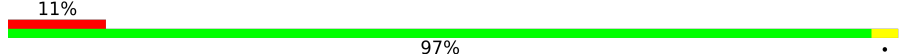


Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	2	46	63% (green), 20% (yellow), 15% (grey)
2	A	2904	47% (green), 23% (yellow), 25% (grey)
3	D	209	71% (green), 13% (yellow), 16% (grey)
4	E	201	72% (green), 10% (yellow), 18% (grey)
5	J	142	80% (green), 20% (yellow)
6	K	122	29% (red), 81% (green), 19% (yellow)
7	L	143	19% (red), 66% (green), 10% (yellow), 24% (grey)

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Mol	Chain	Length	Quality of chain
8	N	120	 87% 13%
9	P	114	 89% 11% 31%
10	Q	117	 82% 18%
11	R	103	 87% 13% 6%
12	T	93	 86% 14%
13	U	102	 86% 14%
14	Y	63	 87% 13%
15	4	38	 97% 11%
16	G	176	 59% 30% 11%
17	Z	58	 33% 48% 17%

## 2 Entry composition i

There are 17 unique types of molecules in this entry. The entry contains 60003 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 Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	2	39	312	187	77	47	1	0	0

- Molecule 2 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	A	2166	46524	20754	8595	15009	2166	0	0

- Molecule 3 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	175	1306	820	235	247	4	0	0

- Molecule 4 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	165	1282	809	225	243	5	0	0

- Molecule 5 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	J	142	1129	714	212	199	4	0	0

- Molecule 6 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	K	122	939	587	180	166	6	0	0

- Molecule 7 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
7	L	109	778	483	149	146	0	0

- Molecule 8 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	N	120	961	593	196	167	5	0	0

- Molecule 9 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	P	114	917	574	179	163	1	0	0

- Molecule 10 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	Q	117	947	604	192	151	0	0

- Molecule 11 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	R	103	816	516	153	145	2	0	0

- Molecule 12 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	T	93	739	466	139	132	2	0	0

- Molecule 13 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	U	102	780	492	146	142	0	0

- Molecule 14 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	Y	63	509	313	99	95	2	0	0

- Molecule 15 is a protein called Large ribosomal subunit protein bL36A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	4	38	302	185	65	48	4	0	0

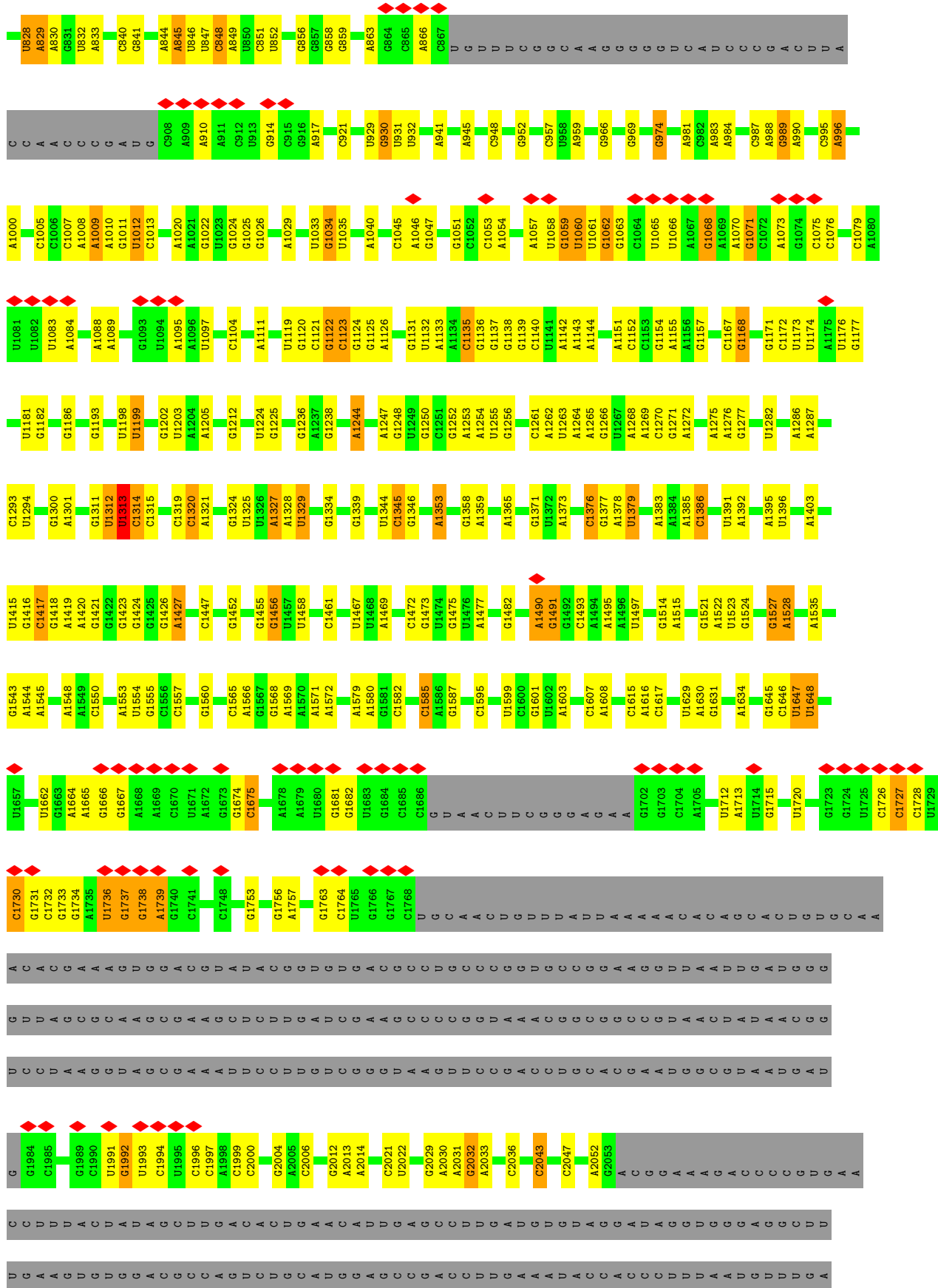
- Molecule 16 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	G	176	1323	832	243	246	2	0	0

- Molecule 17 is a protein called Large ribosomal subunit protein uL30.


Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Z	57	439	276	86	75	2	0	0








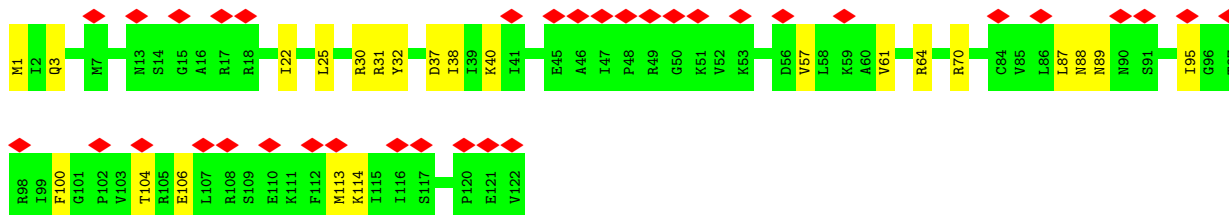


Chain J:  80% 20%



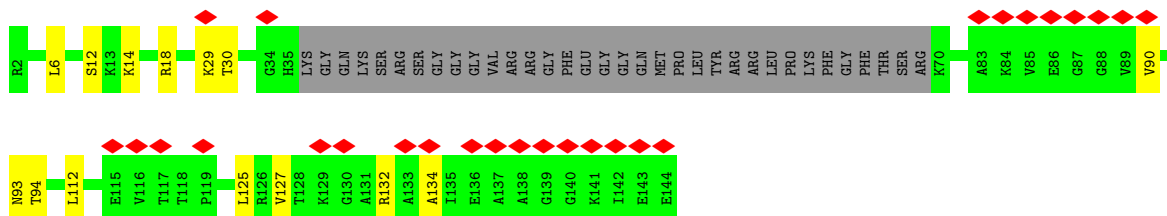
- Molecule 6: Large ribosomal subunit protein uL14

Chain K:  29% 81% 19%



- Molecule 7: Large ribosomal subunit protein uL15

Chain L:  19% 66% 10% 24%

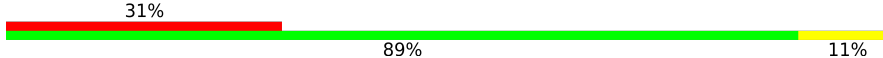


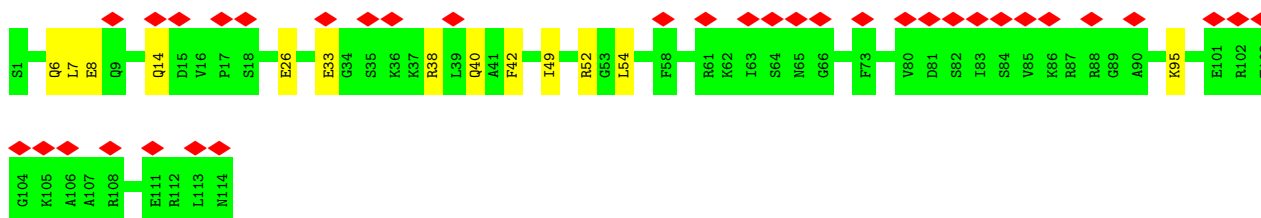
- Molecule 8: Large ribosomal subunit protein bL17

Chain N:  87% 13%




- Molecule 9: Large ribosomal subunit protein bL19

Chain P:  31% 89% 11%

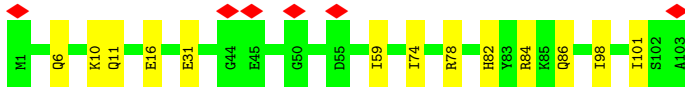
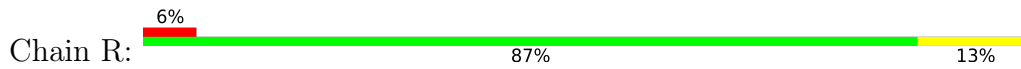


- Molecule 10: Large ribosomal subunit protein bL20

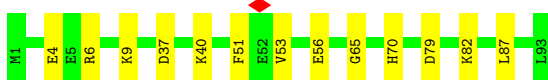
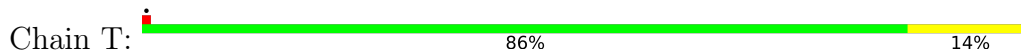
Chain Q:  82% 18%



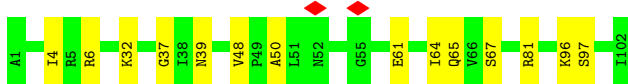
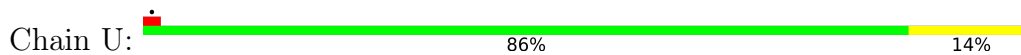
- Molecule 11: Large ribosomal subunit protein bL21



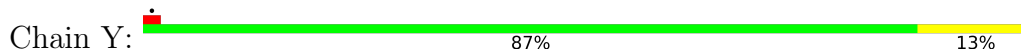
- Molecule 12: Large ribosomal subunit protein uL23



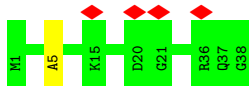
- Molecule 13: Large ribosomal subunit protein uL24



- Molecule 14: Large ribosomal subunit protein uL29



- Molecule 15: Large ribosomal subunit protein bL36A



- Molecule 16: Large ribosomal subunit protein uL6





• Molecule 17: Large ribosomal subunit protein uL30



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	9154	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	45	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.490	Depositor
Minimum map value	-0.285	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.075	Depositor
Recommended contour level	0.268	Depositor
Map size (Å)	424.0, 424.0, 424.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.4133333, 1.4133333, 1.4133333	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

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	2	0.23	0/314	0.65	0/413
2	A	0.50	7/52108 (0.0%)	0.76	29/81280 (0.0%)
3	D	0.24	0/1320	0.51	0/1776
4	E	0.24	0/1294	0.46	0/1741
5	J	0.24	0/1152	0.50	0/1551
6	K	0.24	0/948	0.54	0/1268
7	L	0.24	0/780	0.54	0/1041
8	N	0.24	0/974	0.58	0/1301
9	P	0.24	0/929	0.54	0/1242
10	Q	0.24	0/960	0.51	0/1278
11	R	0.25	0/829	0.52	0/1107
12	T	0.24	0/745	0.50	0/994
13	U	0.25	0/788	0.50	0/1051
14	Y	0.25	0/510	0.51	0/677
15	4	0.25	0/303	0.55	0/397
16	G	1.04	1/1343 (0.1%)	0.65	3/1816 (0.2%)
17	Z	0.80	0/443	0.88	1/593 (0.2%)
All	All	0.48	8/65740 (0.0%)	0.72	33/99526 (0.0%)

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
16	G	0	7
17	Z	0	3
All	All	0	10

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2657	A	N3-C4	52.27	1.66	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2657	A	C6-N1	51.56	1.71	1.35
2	A	2657	A	N1-C2	40.02	1.70	1.34
2	A	2657	A	C5-C4	37.45	1.65	1.38
2	A	2657	A	C2-N3	36.53	1.66	1.33
16	G	176	LYS	CA-C	36.07	2.46	1.52
2	A	2657	A	C5-C6	30.42	1.68	1.41
2	A	929	U	O3'-P	-10.25	1.48	1.61

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	2657	A	N1-C2-N3	-27.29	115.66	129.30
2	A	2657	A	C2-N3-C4	21.84	121.52	110.60
2	A	929	U	OP1-P-O3'	-13.80	74.84	105.20
2	A	929	U	O3'-P-O5'	10.84	124.59	104.00
2	A	2657	A	N7-C8-N9	9.62	118.61	113.80
2	A	2657	A	N3-C4-N9	9.39	134.91	127.40
2	A	2657	A	N9-C4-C5	-8.74	102.31	105.80
16	G	176	LYS	CB-CA-C	8.63	127.67	110.40
2	A	848	C	OP2-P-O3'	8.51	123.93	105.20
2	A	2657	A	C4-C5-N7	-8.50	106.45	110.70
2	A	2657	A	C6-N1-C2	8.34	123.60	118.60
2	A	848	C	O3'-P-O5'	-7.40	89.94	104.00
2	A	930	G	O5'-P-OP2	6.94	119.03	110.70
16	G	176	LYS	CA-C-O	6.77	134.31	120.10
2	A	929	U	C4'-C3'-O3'	-6.61	95.51	109.40
2	A	2772	C	N3-C2-O2	-6.56	117.31	121.90
2	A	269	C	N3-C2-O2	-6.55	117.32	121.90
2	A	1675	C	C2-N1-C1'	6.47	125.91	118.80
2	A	635	C	N3-C2-O2	-6.12	117.62	121.90
2	A	921	C	N3-C4-C5	-6.02	119.49	121.90
2	A	2657	A	N3-C4-C5	-5.82	122.73	126.80
2	A	2539	C	C2-N1-C1'	5.79	125.17	118.80
2	A	1313	U	C2-N1-C1'	5.75	124.60	117.70
2	A	2771	C	N3-C2-O2	-5.73	117.89	121.90
16	G	176	LYS	N-CA-CB	-5.66	100.42	110.60
17	Z	15	ARG	NE-CZ-NH1	-5.57	117.51	120.30
2	A	1734	G	N1-C2-N2	-5.55	111.21	116.20
2	A	1675	C	N1-C2-O2	5.27	122.06	118.90
2	A	863	A	C8-N9-C4	-5.26	103.70	105.80
2	A	259	G	N1-C2-N2	-5.12	111.59	116.20
2	A	848	C	P-O3'-C3'	-5.12	113.56	119.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	2474	U	C2-N1-C1'	5.06	123.77	117.70
2	A	424	G	N1-C2-N2	-5.02	111.68	116.20

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
16	G	131	VAL	Peptide
16	G	132	LEU	Peptide
16	G	161	VAL	Peptide
16	G	86	LEU	Peptide
16	G	88	LEU	Peptide
16	G	89	VAL	Peptide
16	G	90	GLY	Peptide
17	Z	15	ARG	Sidechain
17	Z	37	ARG	Sidechain
17	Z	44	ARG	Sidechain

## 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	2	312	0	344	10	0
2	A	46524	0	23411	443	0
3	D	1306	0	1355	24	0
4	E	1282	0	1336	14	0
5	J	1129	0	1162	23	0
6	K	939	0	1012	16	0
7	L	778	0	841	10	0
8	N	961	0	1000	15	0
9	P	917	0	965	10	0
10	Q	947	0	1022	20	0
11	R	816	0	839	14	0
12	T	739	0	807	10	0
13	U	780	0	834	9	0
14	Y	509	0	543	5	0
15	4	302	0	343	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
16	G	1323	0	1374	147	0
17	Z	439	0	485	55	0
All	All	60003	0	37673	701	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 8.

All (701) 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)
2:A:2657:A:N1	2:A:2657:A:C6	1.71	1.55
2:A:2657:A:N1	2:A:2657:A:C2	1.70	1.53
2:A:2657:A:C2	16:G:176:LYS:C	1.92	1.42
2:A:2657:A:C2	16:G:176:LYS:CA	2.05	1.39
16:G:129:GLU:O	16:G:163:TYR:C	1.64	1.33
2:A:2657:A:C6	16:G:176:LYS:C	2.05	1.29
2:A:2657:A:N1	16:G:176:LYS:CA	1.97	1.28
2:A:2657:A:N1	16:G:176:LYS:C	1.88	1.26
2:A:2657:A:C4	16:G:176:LYS:C	2.08	1.26
16:G:129:GLU:O	16:G:164:ALA:N	1.68	1.26
2:A:2657:A:C6	16:G:176:LYS:CA	2.21	1.23
2:A:2657:A:N3	16:G:176:LYS:HA	1.52	1.23
2:A:2657:A:C5	16:G:176:LYS:C	2.11	1.22
2:A:2657:A:N1	16:G:176:LYS:N	1.90	1.20
2:A:2657:A:C4	16:G:176:LYS:CA	2.28	1.15
2:A:2657:A:N3	16:G:176:LYS:C	2.00	1.13
2:A:2657:A:C2	16:G:176:LYS:HA	1.80	1.12
16:G:90:GLY:N	16:G:164:ALA:N	1.99	1.11
16:G:90:GLY:H	16:G:163:TYR:C	1.52	1.10
2:A:2657:A:N3	16:G:176:LYS:CA	2.13	1.07
2:A:2657:A:C5	16:G:176:LYS:CA	2.37	1.06
2:A:852:U:C4'	17:Z:41:PRO:HB3	1.83	1.05
16:G:90:GLY:N	16:G:163:TYR:C	2.12	1.02
16:G:129:GLU:N	16:G:163:TYR:O	1.94	1.01
16:G:90:GLY:H	16:G:163:TYR:CA	1.76	0.98
2:A:852:U:H4'	17:Z:41:PRO:HB3	1.45	0.97
2:A:175:G:O2'	2:A:176:A:O5'	1.83	0.94
16:G:129:GLU:H	16:G:163:TYR:C	1.71	0.92
2:A:987:C:O3'	17:Z:10:ARG:NH1	2.04	0.91
2:A:1666:G:O2'	2:A:1667:G:O4'	1.89	0.91
2:A:2657:A:C5	16:G:176:LYS:CB	2.54	0.91

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:G:130:ILE:O	16:G:166:GLU:N	2.02	0.91
2:A:1068:G:N2	2:A:1095:A:O2'	2.04	0.90
2:A:571:U:O4	2:A:575:A:N7	2.04	0.90
2:A:1324:G:O2'	2:A:1327:A:N6	2.05	0.90
2:A:1000:A:O2'	17:Z:10:ARG:NH1	2.05	0.89
2:A:475:C:O2	2:A:479:A:N6	2.06	0.89
2:A:1034:G:O2'	2:A:1035:U:O4'	1.91	0.89
2:A:538:A:H62	2:A:555:G:H21	1.19	0.88
2:A:566:U:O2'	2:A:808:G:OP1	1.90	0.88
2:A:791:C:O2'	2:A:792:A:OP2	1.91	0.88
2:A:2657:A:C4	16:G:176:LYS:O	2.27	0.87
16:G:129:GLU:N	16:G:163:TYR:H	1.70	0.87
2:A:1168:G:O6	2:A:1181:U:O2	1.94	0.86
2:A:2581:G:N2	2:A:2581:G:OP2	2.08	0.86
1:2:11:LYS:NZ	2:A:770:G:OP1	2.08	0.86
2:A:1550:C:OP1	2:A:1720:U:O2'	1.94	0.86
2:A:2723:C:OP1	3:D:114:LYS:NZ	2.09	0.85
16:G:92:GLY:CA	16:G:161:VAL:O	2.26	0.84
16:G:176:LYS:C	16:G:176:LYS:CA	2.46	0.84
16:G:130:ILE:N	16:G:166:GLU:O	2.09	0.83
2:A:2730:C:O3'	3:D:174:SER:OG	1.97	0.83
2:A:988:A:C8	17:Z:13:ILE:HG13	2.13	0.83
2:A:1447:C:O2'	2:A:1544:A:N3	2.10	0.83
2:A:378:C:O2	2:A:396:G:N2	2.10	0.82
2:A:2657:A:C6	16:G:176:LYS:OXT	2.30	0.82
1:2:34:ARG:NH1	1:2:42:LEU:O	2.13	0.81
2:A:2744:G:OP1	16:G:148:ARG:NH1	2.13	0.81
2:A:2745:C:OP1	16:G:148:ARG:NH1	2.14	0.81
2:A:214:G:O2'	2:A:215:G:O4'	1.99	0.81
2:A:335:C:O2	13:U:67:SER:OG	1.99	0.81
2:A:526:A:O2'	2:A:2043:C:O2	1.98	0.81
16:G:77:GLY:O	16:G:81:GLY:N	2.13	0.81
2:A:135:U:O4	2:A:136:G:O6	1.98	0.81
2:A:2898:U:O2'	5:J:134:ALA:O	1.97	0.81
2:A:124:G:OP1	2:A:1376:C:O2'	1.99	0.80
2:A:2479:U:OP1	2:A:2537:U:O2'	1.97	0.80
2:A:308:G:O2'	2:A:329:G:N2	2.14	0.80
4:E:3:LEU:HD12	4:E:120:VAL:HG21	1.64	0.80
2:A:1151:A:O2'	10:Q:80:ASN:OD1	2.00	0.80
2:A:541:A:N6	2:A:553:G:O6	2.15	0.80
2:A:1009:A:O2'	2:A:1010:A:O4'	1.99	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:P:38:ARG:NH1	9:P:40:GLN:OE1	2.15	0.80
17:Z:35:VAL:HB	17:Z:37:ARG:HH12	1.47	0.80
16:G:88:LEU:O	16:G:163:TYR:HB3	1.82	0.80
2:A:2657:A:N1	16:G:176:LYS:OXT	2.15	0.79
10:Q:49:ARG:O	10:Q:53:LYS:NZ	2.13	0.79
2:A:948:C:O2	2:A:984:A:O2'	1.99	0.79
16:G:150:TYR:O	16:G:151:ARG:NH1	2.16	0.79
2:A:1415:U:O2	2:A:1587:G:O6	1.99	0.79
2:A:2657:A:C4	16:G:176:LYS:HB3	2.18	0.79
2:A:2528:U:O2'	2:A:2530:A:OP1	2.01	0.78
16:G:92:GLY:HA3	16:G:161:VAL:O	1.83	0.78
2:A:2469:A:N6	2:A:2481:G:O2'	2.16	0.78
2:A:630:G:O2'	2:A:640:C:O2'	2.00	0.78
2:A:2552:U:O2'	2:A:2553:G:N7	2.15	0.78
2:A:1475:G:O2'	2:A:1514:G:O6	2.01	0.78
2:A:1521:G:OP2	2:A:1522:A:O2'	2.02	0.78
2:A:2657:A:C6	16:G:176:LYS:N	2.50	0.78
2:A:2657:A:C5	16:G:176:LYS:HB3	2.19	0.78
16:G:90:GLY:H	16:G:164:ALA:N	1.66	0.78
16:G:91:VAL:HG11	16:G:104:LEU:HD22	1.66	0.78
2:A:2651:C:C4	2:A:2652:C:N4	2.52	0.78
2:A:2595:G:N2	2:A:2598:A:OP2	2.15	0.77
2:A:247:G:O2'	2:A:250:G:O6	2.01	0.77
16:G:92:GLY:H	16:G:128:THR:HG22	1.50	0.77
2:A:2657:A:C4	16:G:176:LYS:CB	2.67	0.77
16:G:34:ARG:NH1	16:G:35:THR:O	2.17	0.77
2:A:83:A:O2'	2:A:103:A:N6	2.17	0.77
2:A:161:A:N6	2:A:166:U:O2	2.18	0.76
2:A:246:C:OP2	2:A:249:C:N4	2.18	0.76
2:A:1738:G:O2'	2:A:1739:A:O5'	2.01	0.76
2:A:59:U:O2	2:A:68:G:O6	2.03	0.76
2:A:2532:G:N7	16:G:174:LYS:NZ	2.32	0.76
2:A:2763:G:O2'	2:A:2764:A:OP1	2.02	0.76
2:A:2564:A:O2'	2:A:2565:A:O4'	2.02	0.75
2:A:2657:A:N3	16:G:176:LYS:O	2.19	0.75
16:G:136:ASP:O	16:G:139:VAL:HG12	1.87	0.75
2:A:987:C:O2'	2:A:1000:A:N3	2.18	0.75
2:A:1477:A:N1	2:A:1557:C:O2'	2.19	0.75
2:A:301:G:OP2	13:U:81:ARG:NH1	2.20	0.75
2:A:261:G:HO2'	2:A:610:C:HO2'	1.24	0.75
2:A:2683:C:O2	6:K:70:ARG:NH2	2.20	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:135:U:C4	2:A:136:G:O6	2.41	0.74
16:G:130:ILE:C	16:G:166:GLU:H	1.91	0.74
2:A:244:A:N6	2:A:254:G:N2	2.35	0.74
2:A:1007:C:OP2	2:A:1008:A:O2'	2.02	0.73
17:Z:10:ARG:HE	17:Z:10:ARG:HA	1.52	0.73
16:G:129:GLU:CA	16:G:163:TYR:H	2.01	0.73
2:A:2776:A:O2'	2:A:2782:G:N7	2.20	0.73
2:A:2645:G:OP2	2:A:2645:G:N2	2.21	0.72
16:G:129:GLU:O	16:G:163:TYR:CA	2.37	0.72
2:A:1007:C:OP1	5:J:39:LYS:NZ	2.16	0.72
2:A:1315:C:O2'	2:A:1392:A:N3	2.20	0.72
2:A:72:U:OP2	12:T:9:LYS:NZ	2.23	0.72
2:A:1198:U:O2'	2:A:1199:U:O5'	2.07	0.72
16:G:116:LEU:HD23	16:G:120:ILE:HG21	1.70	0.72
16:G:174:LYS:O	16:G:176:LYS:NZ	2.17	0.72
2:A:1472:C:N4	2:A:1473:G:O6	2.22	0.72
3:D:99:GLU:N	3:D:99:GLU:OE1	2.23	0.72
2:A:65:U:O2'	2:A:456:C:N3	2.23	0.71
2:A:538:A:H62	2:A:555:G:N2	1.88	0.71
2:A:1629:U:O4	2:A:1630:A:N6	2.24	0.71
2:A:1202:G:O6	2:A:1244:A:N6	2.23	0.71
2:A:2851:A:O2'	8:N:64:ARG:NH1	2.24	0.71
2:A:2647:U:O2	2:A:2673:G:O6	2.07	0.70
2:A:1327:A:O2'	2:A:1328:A:O4'	2.05	0.70
16:G:90:GLY:C	16:G:163:TYR:HA	2.12	0.70
2:A:1125:G:OP2	2:A:1126:A:O2'	2.03	0.70
16:G:90:GLY:O	16:G:163:TYR:HA	1.92	0.70
2:A:191:A:O2'	2:A:678:C:O2	2.09	0.70
2:A:2657:A:C2	16:G:176:LYS:N	2.60	0.69
1:2:37:LYS:NZ	2:A:469:G:O6	2.25	0.69
2:A:301:G:O2'	2:A:302:C:OP2	2.07	0.69
2:A:2831:G:OP1	3:D:56:LYS:NZ	2.25	0.69
1:2:34:ARG:NH2	2:A:467:G:OP2	2.25	0.69
2:A:244:A:N6	2:A:254:G:H21	1.91	0.69
2:A:2013:A:O2'	2:A:2014:A:O4'	2.06	0.69
16:G:90:GLY:O	16:G:163:TYR:CA	2.41	0.69
2:A:2651:C:N4	2:A:2652:C:N4	2.40	0.69
16:G:46:ASP:O	16:G:47:ASN:ND2	2.25	0.69
2:A:244:A:H62	2:A:254:G:N2	1.91	0.69
2:A:1135:C:N4	2:A:1138:G:OP2	2.25	0.69
17:Z:6:ILE:HD13	17:Z:26:LEU:HD11	1.75	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:858:G:O2'	2:A:859:G:O4'	2.10	0.69
2:A:1385:A:O2'	2:A:1396:U:O2	2.08	0.68
2:A:1060:U:O2'	2:A:1071:G:OP1	2.11	0.68
2:A:2659:G:N2	2:A:2662:A:OP2	2.22	0.68
2:A:931:U:O2	2:A:1167:C:O2'	2.11	0.68
13:U:32:LYS:NZ	13:U:65:GLN:OE1	2.25	0.68
2:A:370:G:O2'	2:A:424:G:O4'	2.10	0.68
2:A:2816:G:N3	2:A:2883:A:O2'	2.24	0.68
2:A:505:A:O2'	2:A:509:C:O2'	2.10	0.68
2:A:989:G:OP2	17:Z:11:SER:OG	2.11	0.68
9:P:33:GLU:N	9:P:33:GLU:OE1	2.26	0.68
2:A:1681:G:N2	2:A:1763:G:OP2	2.27	0.67
2:A:2524:G:O2'	2:A:2525:G:O4'	2.12	0.67
2:A:2523:G:HO2'	2:A:2765:A:N6	1.92	0.67
2:A:117:G:OP2	2:A:119:A:O2'	2.05	0.66
2:A:852:U:O4'	17:Z:41:PRO:HB3	1.95	0.66
2:A:1286:A:N6	2:A:1329:U:O2	2.29	0.66
2:A:1662:U:O2'	2:A:2687:U:OP1	2.14	0.66
2:A:235:U:O4	2:A:263:G:N2	2.28	0.65
2:A:2572:A:OP1	2:A:2574:G:O2'	2.08	0.65
2:A:175:G:HO2'	2:A:176:A:P	2.18	0.65
2:A:785:G:O5'	2:A:792:A:N6	2.29	0.65
2:A:1528:A:N6	2:A:1543:G:O2'	2.29	0.65
2:A:996:A:OP2	11:R:10:LYS:NZ	2.30	0.65
6:K:30:ARG:NE	6:K:32:TYR:O	2.30	0.65
2:A:228:C:O2	2:A:417:C:O2'	2.14	0.65
2:A:1000:A:HI1'	17:Z:10:ARG:NH1	2.12	0.65
6:K:30:ARG:NH1	6:K:37:ASP:OD2	2.30	0.65
2:A:2821:A:OP2	3:D:115:GLY:N	2.30	0.64
2:A:243:U:O2	2:A:255:A:N7	2.31	0.64
2:A:782:A:OP1	2:A:783:A:N6	2.31	0.64
11:R:11:GLN:N	11:R:11:GLN:OE1	2.31	0.64
2:A:2898:U:O2'	5:J:136:GLN:OE1	2.14	0.64
2:A:780:G:O2'	2:A:782:A:OP1	2.15	0.63
2:A:69:C:O2	2:A:73:A:O2'	2.17	0.63
2:A:261:G:O2'	2:A:610:C:O2'	2.02	0.63
2:A:1736:U:O2'	2:A:1737:G:OP1	2.15	0.63
7:L:29:LYS:O	7:L:30:THR:OG1	2.16	0.63
16:G:128:THR:HB	16:G:161:VAL:HG13	1.81	0.63
2:A:1615:C:OP2	2:A:1617:C:N4	2.29	0.63
2:A:2657:A:C4	16:G:176:LYS:HA	2.19	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:G:129:GLU:O	16:G:164:ALA:CA	2.46	0.63
2:A:1738:G:HO2'	2:A:1739:A:P	2.22	0.63
2:A:2657:A:N3	16:G:159:LYS:NZ	2.33	0.63
2:A:987:C:O2'	17:Z:10:ARG:NH1	2.30	0.63
2:A:1996:C:OP2	6:K:31:ARG:NH1	2.32	0.63
1:2:39:ARG:NH2	2:A:468:G:N7	2.47	0.63
2:A:988:A:N7	17:Z:13:ILE:HG13	2.14	0.63
2:A:2522:U:O2'	2:A:2647:U:OP1	2.17	0.63
6:K:37:ASP:OD1	6:K:38:ILE:N	2.32	0.63
2:A:1250:G:N7	7:L:18:ARG:NH2	2.47	0.62
2:A:680:C:N4	2:A:681:G:O6	2.32	0.62
2:A:1730:C:O2	2:A:1731:G:N1	2.33	0.62
16:G:89:VAL:C	16:G:164:ALA:N	2.53	0.62
3:D:89:GLU:OE1	3:D:89:GLU:N	2.32	0.62
5:J:135:GLN:N	5:J:135:GLN:OE1	2.33	0.62
16:G:92:GLY:HA2	16:G:161:VAL:O	2.00	0.62
16:G:129:GLU:N	16:G:163:TYR:N	2.45	0.62
2:A:560:C:O2'	10:Q:47:ARG:NH1	2.32	0.62
2:A:1269:A:OP1	2:A:2004:G:O2'	2.15	0.62
16:G:98:LYS:NZ	16:G:103:ASN:OD1	2.33	0.62
16:G:128:THR:CB	16:G:161:VAL:HG13	2.30	0.62
2:A:1268:A:N6	2:A:2013:A:N1	2.48	0.61
17:Z:29:ARG:HG3	17:Z:30:ARG:HG2	1.82	0.61
2:A:345:A:N3	2:A:347:A:N6	2.49	0.61
2:A:1140:C:OP2	5:J:68:LYS:NZ	2.32	0.61
16:G:91:VAL:CG1	16:G:104:LEU:HD22	2.31	0.61
17:Z:40:THR:HG22	17:Z:43:ILE:HG23	1.81	0.61
2:A:981:A:HO2'	2:A:2036:C:HO2'	1.43	0.61
2:A:2469:A:N6	2:A:2481:G:HO2'	1.98	0.61
17:Z:40:THR:H	17:Z:43:ILE:HG12	1.66	0.61
16:G:90:GLY:N	16:G:163:TYR:CA	2.57	0.60
16:G:90:GLY:CA	16:G:163:TYR:C	2.69	0.60
2:A:2653:U:H5	2:A:2654:A:HO2'	1.49	0.60
10:Q:46:TYR:HD1	11:R:74:ILE:HD11	1.66	0.60
17:Z:10:ARG:HA	17:Z:10:ARG:NE	2.13	0.60
2:A:465:G:N2	2:A:684:G:O2'	2.35	0.60
16:G:86:LEU:O	16:G:133:LYS:O	2.20	0.60
2:A:585:G:H21	2:A:1254:A:H62	1.50	0.59
2:A:1277:G:O2'	8:N:24:MET:SD	2.60	0.59
2:A:2523:G:O2'	2:A:2765:A:N6	2.35	0.59
5:J:99:ARG:NE	5:J:102:GLU:OE2	2.35	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:K:64:ARG:NH1	6:K:100:PHE:O	2.35	0.59
2:A:685:A:O2'	2:A:773:U:O4	2.06	0.59
3:D:184:ARG:NH1	9:P:6:GLN:OE1	2.34	0.59
2:A:1154:G:OP2	10:Q:57:ARG:NE	2.33	0.59
2:A:2865:U:OP2	2:A:2866:U:O2'	2.11	0.59
2:A:1527:G:H21	2:A:1545:A:H62	1.49	0.59
2:A:1346:G:N1	2:A:1601:G:O6	2.36	0.59
2:A:226:A:N6	2:A:230:G:C6	2.69	0.59
2:A:779:U:O2	2:A:785:G:O6	2.19	0.59
14:Y:25:GLN:OE1	14:Y:29:ARG:NH2	2.36	0.59
5:J:43:GLU:N	5:J:43:GLU:OE1	2.36	0.58
2:A:538:A:N6	2:A:555:G:H21	1.95	0.58
2:A:677:A:N6	2:A:802:A:N1	2.50	0.58
7:L:127:VAL:O	7:L:132:ARG:NH1	2.35	0.58
2:A:514:A:N3	2:A:581:C:O2'	2.36	0.58
16:G:130:ILE:C	16:G:165:ASP:H	2.07	0.58
11:R:6:GLN:OE1	11:R:11:GLN:NE2	2.37	0.58
8:N:19:ALA:O	8:N:23:ASN:ND2	2.36	0.58
10:Q:36:GLN:OE1	10:Q:36:GLN:N	2.36	0.58
2:A:1992:G:N2	2:A:1996:C:O2'	2.35	0.58
3:D:124:ARG:NH1	3:D:161:MET:O	2.36	0.58
12:T:65:GLY:N	12:T:79:ASP:OD1	2.37	0.58
5:J:129:GLU:N	5:J:129:GLU:OE1	2.35	0.57
17:Z:6:ILE:HA	17:Z:56:VAL:HG22	1.85	0.57
16:G:87:GLN:HB2	16:G:132:LEU:CB	2.34	0.57
2:A:176:A:O2'	2:A:177:G:O4'	2.23	0.57
2:A:48:G:N2	2:A:177:G:OP1	2.37	0.57
2:A:516:C:O2'	2:A:1262:A:OP1	2.18	0.57
2:A:395:U:O2'	2:A:396:G:N7	2.34	0.57
2:A:1313:U:O2'	2:A:1314:C:OP1	2.19	0.57
2:A:226:A:N6	2:A:230:G:N1	2.53	0.57
2:A:675:A:N7	2:A:803:U:O4	2.37	0.57
16:G:87:GLN:O	16:G:88:LEU:HD12	2.05	0.57
17:Z:39:ASP:HA	17:Z:43:ILE:HG12	1.87	0.57
17:Z:43:ILE:O	17:Z:47:ILE:HB	2.04	0.57
16:G:87:GLN:O	16:G:132:LEU:N	2.38	0.56
16:G:90:GLY:N	16:G:164:ALA:H	1.98	0.56
16:G:91:VAL:HG23	16:G:163:TYR:CE1	2.40	0.56
2:A:453:A:N3	2:A:457:A:O2'	2.38	0.56
2:A:2662:A:N6	16:G:174:LYS:O	2.37	0.56
2:A:243:U:C2	2:A:255:A:N7	2.74	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2705:A:O2'	2:A:2852:G:OP1	2.22	0.56
16:G:90:GLY:O	16:G:163:TYR:O	2.23	0.56
2:A:1155:A:O3'	10:Q:54:ARG:NH2	2.39	0.56
2:A:1999:C:HO2'	2:A:2687:U:C2'	2.19	0.56
12:T:70:HIS:ND1	12:T:70:HIS:O	2.39	0.55
2:A:974:G:O2'	2:A:989:G:N2	2.38	0.55
2:A:1252:G:N2	10:Q:32:ARG:O	2.40	0.55
2:A:2047:C:O2'	2:A:2823:A:N1	2.40	0.55
2:A:2637:U:O4	2:A:2776:A:N7	2.40	0.55
2:A:1062:G:O2'	2:A:1063:G:O4'	2.12	0.55
2:A:1152:C:H5''	10:Q:79:ILE:HG21	1.88	0.55
2:A:1268:A:H62	2:A:2012:G:H21	1.55	0.55
10:Q:46:TYR:CD1	11:R:74:ILE:HD11	2.41	0.55
2:A:1024:G:O2'	2:A:1144:A:O2'	2.24	0.55
9:P:14:GLN:OE1	9:P:14:GLN:N	2.40	0.55
10:Q:88:GLU:N	10:Q:88:GLU:OE1	2.40	0.55
2:A:26:G:H1'	2:A:515:A:H61	1.72	0.55
16:G:102:ILE:CG2	16:G:104:LEU:HD21	2.37	0.55
16:G:128:THR:HA	16:G:163:TYR:O	2.06	0.55
2:A:573:U:O4	2:A:2029:G:O2'	2.17	0.55
11:R:31:GLU:N	11:R:31:GLU:OE1	2.40	0.55
16:G:87:GLN:HB2	16:G:132:LEU:HB2	1.88	0.55
5:J:23:LYS:NZ	5:J:142:ILE:OXT	2.32	0.54
8:N:97:ILE:HG12	8:N:113:ILE:HG22	1.89	0.54
16:G:100:ASN:ND2	16:G:115:GLN:OE1	2.40	0.54
16:G:130:ILE:H	16:G:166:GLU:C	2.06	0.54
2:A:533:G:O5'	10:Q:27:ARG:NH2	2.41	0.54
2:A:1629:U:O2'	2:A:2698:U:OP1	2.17	0.54
12:T:56:GLU:OE1	12:T:56:GLU:N	2.38	0.54
16:G:38:ASP:O	16:G:54:ARG:NH1	2.40	0.54
16:G:102:ILE:HG22	16:G:104:LEU:HD21	1.90	0.54
12:T:4:GLU:N	12:T:4:GLU:OE1	2.40	0.54
16:G:92:GLY:H	16:G:128:THR:CG2	2.18	0.54
2:A:463:G:N2	2:A:466:A:OP2	2.40	0.54
2:A:1193:G:OP1	7:L:14:LYS:NZ	2.41	0.54
3:D:173:GLN:O	3:D:174:SER:OG	2.26	0.54
13:U:48:VAL:HG23	13:U:50:ALA:O	2.07	0.54
2:A:776:G:N7	2:A:793:A:N6	2.56	0.54
6:K:40:LYS:HE2	6:K:57:VAL:HG12	1.90	0.53
2:A:930:G:C5'	17:Z:29:ARG:HH22	2.21	0.53
2:A:969:G:H4'	17:Z:14:GLY:HA2	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1264:A:OP2	2:A:1265:A:O2'	2.16	0.53
2:A:2468:A:P	2:A:2476:A:H61	2.31	0.53
6:K:88:ASN:OD1	6:K:89:ASN:N	2.42	0.53
2:A:238:C:H2'	2:A:239:C:C1'	2.38	0.53
2:A:1138:G:N2	5:J:108:MET:SD	2.81	0.53
3:D:16:THR:OG1	3:D:18:ASP:OD1	2.15	0.53
2:A:540:C:N4	2:A:541:A:H62	2.07	0.53
2:A:1312:U:O2	2:A:1339:G:N1	2.37	0.53
11:R:16:GLU:OE1	11:R:16:GLU:N	2.39	0.53
2:A:930:G:H5'	17:Z:29:ARG:HH22	1.73	0.53
2:A:988:A:OP1	17:Z:10:ARG:NE	2.42	0.53
17:Z:6:ILE:HG21	17:Z:26:LEU:HD11	1.91	0.53
2:A:1224:U:O2	2:A:1225:G:N2	2.42	0.53
13:U:96:LYS:O	13:U:97:SER:OG	2.18	0.53
17:Z:22:THR:HG22	17:Z:46:MET:HG2	1.90	0.53
2:A:268:C:H2'	2:A:269:C:C1'	2.40	0.52
2:A:451:U:O2	2:A:453:A:N6	2.41	0.52
2:A:532:A:OP1	2:A:561:G:N2	2.42	0.52
2:A:597:G:N2	7:L:12:SER:O	2.33	0.52
4:E:21:ARG:NH2	4:E:103:GLY:O	2.42	0.52
2:A:51:G:O2'	2:A:52:A:OP2	2.26	0.52
2:A:271:G:O4'	2:A:367:G:N2	2.42	0.52
2:A:988:A:OP1	17:Z:10:ARG:CZ	2.58	0.52
2:A:2740:A:OP2	2:A:2763:G:N1	2.38	0.52
17:Z:23:LEU:HA	17:Z:26:LEU:HB3	1.91	0.52
2:A:462:C:N4	2:A:463:G:O6	2.43	0.52
2:A:627:A:N6	7:L:112:LEU:O	2.39	0.52
2:A:1009:A:O5'	10:Q:58:GLN:NE2	2.42	0.52
2:A:2840:C:C5'	8:N:53:THR:HG21	2.40	0.52
14:Y:24:GLU:N	14:Y:24:GLU:OE1	2.43	0.52
5:J:32:LEU:CD2	5:J:54:ILE:HG21	2.39	0.52
9:P:8:GLU:HA	9:P:54:LEU:HD23	1.92	0.52
3:D:26:VAL:HG13	3:D:186:LEU:HD11	1.92	0.52
16:G:95:ALA:HB1	16:G:104:LEU:HD23	1.92	0.52
17:Z:42:ALA:O	17:Z:46:MET:N	2.40	0.52
2:A:989:G:P	17:Z:11:SER:OG	2.68	0.52
2:A:1319:C:H2'	2:A:1320:C:O4'	2.10	0.52
2:A:1418:G:N2	2:A:1580:A:H62	2.08	0.51
2:A:1418:G:H21	2:A:1580:A:N6	2.08	0.51
8:N:26:GLY:CA	8:N:75:ILE:HD13	2.41	0.51
17:Z:43:ILE:HG13	17:Z:44:ARG:N	2.25	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1139:G:OP2	5:J:72:LYS:NZ	2.41	0.51
2:A:1311:G:O2'	2:A:1312:U:OP2	2.27	0.51
2:A:1667:G:H22	2:A:1994:C:H42	1.58	0.51
2:A:988:A:N7	17:Z:13:ILE:HG21	2.25	0.51
2:A:2730:C:O2'	3:D:173:GLN:O	2.27	0.51
14:Y:16:THR:O	14:Y:20:ASN:ND2	2.42	0.51
16:G:88:LEU:O	16:G:130:ILE:HA	2.11	0.51
2:A:1359:A:OP2	2:A:1371:G:N2	2.43	0.51
16:G:106:LEU:HD22	16:G:151:ARG:HB3	1.93	0.51
2:A:2553:G:O4'	2:A:2582:G:O2'	2.15	0.51
16:G:90:GLY:H	16:G:163:TYR:CB	2.24	0.51
16:G:90:GLY:H	16:G:163:TYR:HA	1.70	0.51
2:A:2478:A:O2'	2:A:2536:G:N2	2.44	0.50
17:Z:42:ALA:O	17:Z:43:ILE:C	2.49	0.50
2:A:323:C:O2'	2:A:1205:A:N1	2.43	0.50
2:A:695:G:N1	2:A:768:G:N7	2.60	0.50
16:G:140:ILE:O	16:G:140:ILE:HG23	2.10	0.50
2:A:1726:C:H2'	2:A:1727:C:C1'	2.41	0.50
4:E:31:VAL:HG21	4:E:104:ALA:HB2	1.93	0.50
8:N:107:ASN:O	8:N:107:ASN:ND2	2.44	0.50
2:A:1012:U:O2	5:J:27:ARG:NH1	2.44	0.50
2:A:513:A:HO2'	2:A:514:A:C5'	2.25	0.50
2:A:2642:G:H2'	2:A:2643:G:C8	2.47	0.50
4:E:31:VAL:HG21	4:E:104:ALA:CB	2.41	0.50
16:G:128:THR:OG1	16:G:161:VAL:HG13	2.11	0.50
16:G:139:VAL:O	16:G:139:VAL:HG22	2.12	0.50
2:A:1000:A:H1'	17:Z:10:ARG:CZ	2.42	0.50
16:G:130:ILE:N	16:G:166:GLU:N	2.59	0.50
2:A:1344:U:H3'	2:A:1345:C:H5'	1.94	0.50
2:A:1736:U:HO2'	2:A:1737:G:P	2.34	0.50
16:G:86:LEU:O	16:G:87:GLN:CG	2.60	0.50
16:G:90:GLY:O	16:G:163:TYR:C	2.51	0.50
2:A:1565:C:O2'	2:A:1566:A:O5'	2.26	0.50
2:A:2657:A:C6	16:G:176:LYS:CB	2.90	0.50
13:U:39:ASN:HB3	13:U:64:ILE:HD11	1.94	0.50
2:A:852:U:O4'	17:Z:41:PRO:CB	2.59	0.49
2:A:2747:G:N2	2:A:2756:U:OP1	2.44	0.49
2:A:561:G:HO2'	10:Q:44:TYR:HH	1.60	0.49
2:A:423:A:H3'	2:A:424:G:C5'	2.43	0.49
11:R:86:GLN:N	11:R:86:GLN:OE1	2.45	0.49
2:A:2845:U:O3'	9:P:52:ARG:NH1	2.45	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1319:C:O2'	2:A:1320:C:O4'	2.30	0.49
17:Z:39:ASP:HB3	17:Z:44:ARG:HH22	1.78	0.49
2:A:2718:G:O2'	2:A:2847:U:OP1	2.31	0.49
2:A:1469:A:OP2	2:A:1522:A:N6	2.45	0.48
5:J:7:LYS:O	5:J:11:VAL:HG13	2.13	0.48
5:J:32:LEU:HD22	5:J:54:ILE:HG21	1.95	0.48
17:Z:6:ILE:O	17:Z:34:THR:HA	2.13	0.48
2:A:1024:G:OP2	2:A:1025:G:O2'	2.19	0.48
2:A:1140:C:O2	2:A:1143:A:O2'	2.31	0.48
2:A:1319:C:C2'	2:A:1320:C:O4'	2.61	0.48
8:N:74:GLU:OE1	8:N:74:GLU:N	2.43	0.48
16:G:168:VAL:HG12	16:G:169:ARG:N	2.28	0.48
2:A:194:G:N1	2:A:202:U:O4	2.46	0.48
2:A:988:A:H5'	17:Z:10:ARG:NH1	2.27	0.48
2:A:1728:C:N4	2:A:1731:G:H22	2.10	0.48
16:G:161:VAL:HG22	16:G:162:ARG:H	1.79	0.48
2:A:1599:U:OP2	12:T:40:LYS:NZ	2.47	0.48
2:A:2655:G:O2'	2:A:2664:G:O6	2.22	0.48
2:A:1490:A:O2'	2:A:1491:G:OP1	2.29	0.48
2:A:2519:U:O2'	2:A:2541:A:N6	2.46	0.48
2:A:240:C:OP2	2:A:241:A:O2'	2.20	0.48
2:A:1325:U:OP1	2:A:1647:U:O2'	2.27	0.48
7:L:93:ASN:O	7:L:94:THR:OG1	2.27	0.48
8:N:26:GLY:HA2	8:N:75:ILE:HD13	1.94	0.48
11:R:98:ILE:HG21	11:R:101:ILE:HD11	1.95	0.48
2:A:282:A:N6	2:A:359:G:O6	2.46	0.48
2:A:2840:C:H5'	8:N:53:THR:HG21	1.96	0.48
2:A:68:G:N2	2:A:74:A:O4'	2.47	0.47
2:A:311:A:N6	2:A:329:G:OP1	2.47	0.47
16:G:152:ARG:O	16:G:153:PRO:C	2.51	0.47
2:A:513:A:O2'	2:A:514:A:O5'	2.33	0.47
2:A:1386:C:OP2	2:A:1396:U:N3	2.47	0.47
3:D:186:LEU:HD21	9:P:7:LEU:HD11	1.95	0.47
4:E:118:LEU:HD11	4:E:188:MET:SD	2.55	0.47
16:G:76:ILE:HA	16:G:79:THR:HG22	1.96	0.47
16:G:89:VAL:C	16:G:164:ALA:H	2.17	0.47
2:A:151:C:N4	2:A:152:A:N6	2.62	0.47
2:A:1753:G:N2	2:A:1756:G:O5'	2.47	0.47
16:G:90:GLY:O	16:G:128:THR:HA	2.15	0.47
2:A:516:C:O4'	2:A:1261:C:O2'	2.33	0.47
2:A:1566:A:O2'	2:A:1568:G:N2	2.47	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2853:C:N4	2:A:2854:G:O6	2.47	0.47
2:A:214:G:O2'	2:A:216:A:O2'	2.32	0.47
2:A:224:U:O4	2:A:232:G:N2	2.48	0.47
2:A:1418:G:N2	2:A:1580:A:N6	2.63	0.47
2:A:2474:U:O2	2:A:2474:U:H2'	2.14	0.47
10:Q:27:ARG:HA	10:Q:33:VAL:HG23	1.96	0.47
16:G:35:THR:O	16:G:35:THR:HG23	2.14	0.47
16:G:91:VAL:HG22	16:G:91:VAL:O	2.15	0.47
16:G:82:PHE:CG	16:G:85:LYS:HB2	2.50	0.47
17:Z:16:LEU:HD22	17:Z:16:LEU:H	1.80	0.47
2:A:482:A:O2'	2:A:497:A:N1	2.48	0.47
2:A:584:C:OP1	10:Q:4:LYS:NZ	2.42	0.47
6:K:113:MET:SD	6:K:114:LYS:N	2.87	0.47
2:A:259:G:N3	2:A:621:A:O2'	2.46	0.46
2:A:1029:A:N6	2:A:1125:G:O2'	2.46	0.46
2:A:2531:A:N3	16:G:174:LYS:HE2	2.29	0.46
17:Z:40:THR:OG1	17:Z:41:PRO:HD2	2.14	0.46
16:G:129:GLU:O	16:G:164:ALA:C	2.54	0.46
16:G:131:VAL:N	16:G:164:ALA:HB3	2.29	0.46
17:Z:20:LYS:O	17:Z:23:LEU:HG	2.16	0.46
2:A:1427:A:N6	2:A:1571:A:OP2	2.44	0.46
2:A:2822:G:O2'	2:A:2824:C:OP2	2.24	0.46
4:E:168:ASP:OD1	4:E:169:VAL:N	2.48	0.46
5:J:58:ASN:ND2	5:J:128:ASN:OD1	2.45	0.46
2:A:2538:C:O2	2:A:2539:C:C5	2.69	0.46
2:A:2583:G:H2'	2:A:2584:U:O4'	2.15	0.46
3:D:184:ARG:NH2	3:D:186:LEU:HD22	2.30	0.46
16:G:88:LEU:O	16:G:163:TYR:CB	2.60	0.46
12:T:51:PHE:O	12:T:53:VAL:HG13	2.16	0.46
16:G:129:GLU:HG2	16:G:166:GLU:O	2.15	0.46
2:A:1122:G:H2'	2:A:1123:C:C5'	2.46	0.46
3:D:187:LEU:HD23	3:D:188:LEU:N	2.30	0.46
2:A:1666:G:HO2'	2:A:1667:G:C1'	2.18	0.46
3:D:56:LYS:O	3:D:60:VAL:HG23	2.16	0.46
5:J:46:PRO:HD3	10:Q:59:LEU:HD11	1.98	0.46
17:Z:40:THR:O	17:Z:41:PRO:C	2.54	0.46
2:A:298:G:N1	2:A:339:U:OP2	2.41	0.45
2:A:791:C:C2'	2:A:792:A:OP2	2.64	0.45
2:A:1712:U:OP2	2:A:1713:A:O2'	2.13	0.45
2:A:2525:G:H4'	2:A:2741:A:N3	2.32	0.45
3:D:77:ARG:NH2	3:D:200:ASP:OD1	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:122:GLU:OE1	4:E:122:GLU:N	2.42	0.45
17:Z:21:ALA:HA	17:Z:24:LEU:HB2	1.98	0.45
2:A:603:A:N6	2:A:655:A:O4'	2.49	0.45
2:A:840:C:N4	2:A:841:G:O6	2.50	0.45
6:K:104:THR:HG23	6:K:106:GLU:HG3	1.98	0.45
13:U:4:ILE:N	13:U:4:ILE:HD12	2.31	0.45
13:U:37:GLY:N	13:U:61:GLU:OE2	2.45	0.45
16:G:129:GLU:HB3	16:G:165:ASP:C	2.36	0.45
16:G:142:GLN:O	16:G:144:ALA:N	2.49	0.45
2:A:302:C:H2'	2:A:303:G:H8	1.81	0.45
16:G:55:ASP:OD1	16:G:56:GLY:N	2.49	0.45
16:G:129:GLU:N	16:G:163:TYR:C	2.54	0.45
16:G:136:ASP:HB3	16:G:139:VAL:HG13	1.98	0.45
2:A:1282:U:O4	2:A:1286:A:N7	2.49	0.45
2:A:2689:U:OP2	2:A:2873:A:N6	2.49	0.45
2:A:2780:G:OP2	5:J:120:ARG:NE	2.50	0.45
16:G:89:VAL:HA	16:G:163:TYR:CD1	2.51	0.45
11:R:59:ILE:N	11:R:59:ILE:HD12	2.32	0.45
17:Z:3:THR:HG23	17:Z:36:GLU:HB2	1.98	0.45
2:A:2481:G:HO2'	2:A:2482:A:H8	1.63	0.45
2:A:2777:G:OP2	2:A:2781:A:O2'	2.33	0.45
2:A:773:U:O2'	2:A:778:G:O3'	2.21	0.45
2:A:1726:C:H2'	2:A:1727:C:O4'	2.17	0.45
4:E:7:ASP:OD1	4:E:8:ALA:N	2.50	0.45
10:Q:16:ILE:HD11	10:Q:38:VAL:HG11	1.98	0.45
16:G:103:ASN:O	16:G:104:LEU:HD23	2.17	0.45
16:G:130:ILE:N	16:G:166:GLU:H	2.15	0.45
16:G:137:LYS:HG3	16:G:138:GLN:N	2.32	0.45
17:Z:6:ILE:HG21	17:Z:26:LEU:HD21	1.98	0.45
2:A:791:C:H1'	2:A:792:A:P	2.57	0.45
2:A:2812:G:H2'	2:A:2813:A:O4'	2.17	0.45
5:J:98:GLU:OE1	5:J:98:GLU:N	2.47	0.45
2:A:2617:U:C2	2:A:2618:G:C8	3.04	0.45
2:A:1058:U:H2'	2:A:1059:G:C4	2.52	0.44
2:A:2635:A:O2'	3:D:81:GLU:OE2	2.34	0.44
16:G:89:VAL:O	16:G:164:ALA:HB2	2.18	0.44
2:A:4:U:O4	2:A:5:A:N6	2.50	0.44
2:A:513:A:H2'	2:A:514:A:C8	2.53	0.44
2:A:566:U:OP1	11:R:82:HIS:NE2	2.49	0.44
2:A:2509:G:N1	2:A:2580:U:O4	2.50	0.44
17:Z:22:THR:CG2	17:Z:46:MET:HG2	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:284:U:O2	2:A:356:G:O6	2.35	0.44
2:A:1034:G:H2'	2:A:1035:U:C6	2.52	0.44
4:E:3:LEU:HD23	4:E:3:LEU:H	1.82	0.44
6:K:61:VAL:HG12	6:K:87:LEU:HD23	1.99	0.44
2:A:142:A:O2'	2:A:143:C:O4'	2.34	0.44
2:A:1665:A:O2'	6:K:1:MET:O	2.35	0.44
2:A:2552:U:H3'	2:A:2552:U:O2	2.17	0.44
6:K:3:GLN:OE1	6:K:3:GLN:N	2.50	0.44
17:Z:37:ARG:HB2	17:Z:38:GLU:H	1.51	0.44
2:A:72:U:OP1	14:Y:54:LYS:NZ	2.50	0.44
2:A:988:A:OP1	17:Z:10:ARG:HD3	2.17	0.44
2:A:1168:G:O6	2:A:1181:U:C2	2.67	0.44
2:A:2523:G:O3'	2:A:2765:A:N6	2.49	0.44
7:L:112:LEU:HD22	7:L:134:ALA:CB	2.47	0.44
10:Q:97:ILE:O	10:Q:101:ASP:N	2.41	0.44
17:Z:18:LYS:HB3	17:Z:18:LYS:HE2	1.79	0.44
2:A:2524:G:O2'	2:A:2525:G:C5'	2.65	0.44
2:A:2725:A:O2'	2:A:2726:A:OP2	2.28	0.44
1:2:21:ARG:O	1:2:24:THR:HG22	2.18	0.44
2:A:990:A:N1	11:R:78:ARG:NH2	2.66	0.44
2:A:1321:A:N6	2:A:1334:G:O4'	2.51	0.43
16:G:8:VAL:HG23	16:G:8:VAL:O	2.17	0.43
2:A:1415:U:O2	2:A:1587:G:C6	2.71	0.43
2:A:2527:C:C4	2:A:2528:U:C4	3.06	0.43
2:A:2530:A:OP2	2:A:2535:G:N2	2.51	0.43
4:E:150:THR:OG1	4:E:151:GLY:N	2.51	0.43
2:A:307:G:N1	2:A:309:A:O5'	2.51	0.43
2:A:2718:G:H2'	2:A:2719:G:O4'	2.18	0.43
3:D:201:LEU:N	3:D:201:LEU:HD23	2.33	0.43
16:G:87:GLN:CB	16:G:132:LEU:HB3	2.48	0.43
16:G:129:GLU:HB3	16:G:165:ASP:CA	2.47	0.43
1:2:35:ARG:NH1	2:A:54:G:O2'	2.47	0.43
2:A:52:A:N3	2:A:178:G:N2	2.56	0.43
2:A:108:G:P	2:A:293:U:HO2'	2.42	0.43
2:A:1553:A:HO2'	2:A:1554:U:H5	1.65	0.43
2:A:2537:U:C2	2:A:2538:C:C5	3.05	0.43
2:A:1358:G:O2'	2:A:1373:A:N6	2.39	0.43
2:A:1276:A:OP2	2:A:1645:G:O2'	2.33	0.43
2:A:2006:C:O2'	2:A:2823:A:N3	2.51	0.43
2:A:2524:G:HO2'	2:A:2525:G:H8	1.62	0.43
16:G:90:GLY:N	16:G:163:TYR:HA	2.32	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:442:G:HO2'	2:A:444:C:H6	1.63	0.43
2:A:792:A:C4	2:A:792:A:OP1	2.72	0.43
2:A:1198:U:HO2'	2:A:1199:U:C5'	2.23	0.43
2:A:2822:G:O2'	2:A:2825:G:N1	2.49	0.43
7:L:90:VAL:HG12	7:L:125:LEU:HD13	2.00	0.43
2:A:394:C:H2'	2:A:395:U:O4'	2.18	0.43
2:A:571:U:O4	2:A:575:A:C5	2.70	0.43
2:A:775:G:C6	2:A:794:A:C8	3.07	0.43
2:A:1353:A:OP2	2:A:1377:G:N1	2.42	0.43
2:A:2656:U:O2	2:A:2656:U:H2'	2.18	0.43
16:G:128:THR:OG1	16:G:161:VAL:CG1	2.66	0.43
2:A:969:G:H4'	17:Z:14:GLY:CA	2.49	0.43
2:A:988:A:H5'	17:Z:10:ARG:HH12	1.83	0.43
2:A:1456:G:N1	2:A:2704:C:N3	2.67	0.43
5:J:74:TYR:OH	5:J:100:VAL:HG13	2.19	0.43
2:A:629:G:N2	2:A:639:U:O2'	2.46	0.43
2:A:1423:G:H2'	2:A:1424:G:C8	2.54	0.43
16:G:8:VAL:HG11	16:G:72:ASN:HB2	2.01	0.43
16:G:130:ILE:CA	16:G:166:GLU:H	2.31	0.43
2:A:537:G:N2	2:A:555:G:O2'	2.49	0.42
2:A:1339:G:OP1	12:T:82:LYS:NZ	2.48	0.42
2:A:1738:G:O2'	2:A:1739:A:P	2.74	0.42
3:D:188:LEU:N	3:D:188:LEU:HD22	2.34	0.42
2:A:223:A:H2'	2:A:408:G:H21	1.84	0.42
2:A:1426:G:O2'	2:A:1572:A:N6	2.44	0.42
16:G:130:ILE:O	16:G:166:GLU:HB2	2.20	0.42
2:A:1319:C:H2'	2:A:1320:C:C6	2.54	0.42
2:A:2539:C:H2'	2:A:2540:C:C6	2.54	0.42
2:A:2840:C:H5''	8:N:53:THR:HG21	2.01	0.42
16:G:129:GLU:O	16:G:163:TYR:CB	2.67	0.42
1:2:13:ASN:ND2	2:A:125:A:O3'	2.51	0.42
2:A:2531:A:N3	2:A:2531:A:H2'	2.35	0.42
2:A:2719:G:H4'	2:A:2846:G:H4'	2.02	0.42
2:A:2847:U:OP1	9:P:95:LYS:NZ	2.47	0.42
9:P:26:GLU:OE2	9:P:42:PHE:N	2.52	0.42
17:Z:8:GLN:HB3	17:Z:31:ILE:HA	2.01	0.42
2:A:851:C:O2'	17:Z:42:ALA:HA	2.19	0.42
2:A:1124:G:O2'	15:4:5:ALA:O	2.37	0.42
2:A:2765:A:H3'	2:A:2765:A:N3	2.34	0.42
4:E:113:VAL:HG12	4:E:118:LEU:HD22	2.02	0.42
2:A:2043:C:OP1	2:A:2777:G:O2'	2.31	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2688:G:N1	2:A:2720:U:OP2	2.46	0.42
6:K:95:ILE:N	6:K:95:ILE:HD12	2.34	0.42
16:G:51:PHE:CE2	16:G:71:LEU:HD22	2.55	0.42
2:A:562:U:O2	2:A:572:A:N6	2.53	0.42
2:A:852:U:C5'	17:Z:41:PRO:HB3	2.46	0.42
2:A:1275:A:O2'	2:A:1645:G:N3	2.53	0.42
2:A:1737:G:O3'	2:A:1738:G:O4'	2.38	0.42
2:A:2882:A:OP1	8:N:96:ARG:NH1	2.51	0.42
2:A:28:A:H2'	2:A:29:U:O4'	2.19	0.42
2:A:1282:U:H3	2:A:1286:A:H62	1.66	0.42
2:A:2524:G:O2'	2:A:2525:G:O5'	2.38	0.42
6:K:22:ILE:HD11	6:K:57:VAL:HG13	2.02	0.42
16:G:88:LEU:HG	16:G:130:ILE:HG23	2.02	0.42
1:2:8:SER:HB3	1:2:11:LYS:HZ3	1.85	0.42
2:A:694:U:N3	2:A:695:G:N7	2.68	0.42
7:L:6:LEU:N	7:L:6:LEU:HD22	2.35	0.42
16:G:32:LEU:HD23	16:G:33:THR:N	2.34	0.42
2:A:828:U:O2'	2:A:829:A:OP1	2.38	0.41
2:A:1527:G:H21	2:A:1545:A:N6	2.17	0.41
16:G:76:ILE:O	16:G:76:ILE:HG22	2.20	0.41
2:A:100:U:O2	2:A:101:A:N6	2.53	0.41
2:A:244:A:C6	2:A:254:G:N2	2.88	0.41
2:A:844:A:N1	2:A:845:A:N6	2.68	0.41
2:A:848:C:H2'	2:A:849:A:O4'	2.20	0.41
3:D:79:LEU:N	3:D:79:LEU:HD22	2.35	0.41
4:E:4:VAL:HG22	4:E:6:LYS:H	1.85	0.41
2:A:523:C:H5''	2:A:540:C:O2'	2.21	0.41
2:A:2665:A:H2'	2:A:2666:C:O4'	2.20	0.41
2:A:2720:U:C2	2:A:2721:A:C8	3.08	0.41
5:J:46:PRO:CD	10:Q:59:LEU:HD11	2.50	0.41
16:G:162:ARG:HE	16:G:162:ARG:N	2.19	0.41
2:A:43:G:H2'	2:A:44:A:O4'	2.20	0.41
2:A:1202:G:H2'	2:A:1203:U:O4'	2.19	0.41
2:A:1293:C:C2	2:A:1294:U:C5	3.08	0.41
2:A:2523:G:O2'	2:A:2765:A:C6	2.70	0.41
2:A:2645:G:H3'	2:A:2646:C:C5'	2.51	0.41
4:E:5:LEU:N	4:E:5:LEU:HD12	2.35	0.41
5:J:50:THR:O	5:J:50:THR:HG22	2.19	0.41
6:K:25:LEU:N	6:K:25:LEU:HD22	2.35	0.41
2:A:1358:G:C2'	2:A:1373:A:H61	2.31	0.41
16:G:117:PRO:O	16:G:139:VAL:HG23	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:323:C:O2	2:A:323:C:O4'	2.39	0.41
12:T:87:LEU:HD12	12:T:87:LEU:N	2.36	0.41
16:G:91:VAL:HG22	16:G:106:LEU:HD21	2.02	0.41
16:G:162:ARG:H	16:G:162:ARG:HG2	1.61	0.41
2:A:1122:G:H2'	2:A:1123:C:H5''	2.02	0.41
2:A:1417:C:O2'	2:A:1418:G:O4'	2.39	0.41
2:A:2032:G:N1	2:A:2572:A:OP2	2.48	0.41
2:A:2531:A:H2'	16:G:174:LYS:HB2	2.02	0.41
2:A:2720:U:O2	2:A:2720:U:H2'	2.19	0.41
4:E:16:GLU:O	4:E:20:GLY:N	2.54	0.41
8:N:31:HIS:O	8:N:33:ILE:HG22	2.21	0.41
2:A:175:G:C2'	2:A:176:A:O5'	2.68	0.41
2:A:499:U:H2'	2:A:500:G:O4'	2.21	0.41
2:A:628:G:H2'	2:A:629:G:C1'	2.51	0.41
12:T:6:ARG:NH2	12:T:37:ASP:OD2	2.54	0.41
2:A:85:G:OP2	13:U:6:ARG:NE	2.54	0.41
2:A:231:A:H2'	2:A:232:G:O4'	2.20	0.41
2:A:791:C:HO2'	2:A:792:A:P	2.29	0.41
2:A:813:U:OP1	11:R:84:ARG:NH2	2.54	0.41
2:A:952:G:C6	2:A:966:G:C6	3.09	0.41
2:A:1527:G:N2	2:A:1545:A:H62	2.15	0.41
2:A:1675:C:H2'	2:A:1675:C:O2	2.20	0.41
2:A:2592:G:N1	2:A:2603:G:C6	2.89	0.41
3:D:1:MET:SD	3:D:1:MET:N	2.84	0.41
3:D:98:VAL:HG22	3:D:98:VAL:O	2.20	0.41
11:R:59:ILE:HG13	11:R:101:ILE:HD12	2.03	0.41
14:Y:50:VAL:HA	14:Y:53:VAL:HG22	2.02	0.41
2:A:644:A:HO2'	2:A:645:C:P	2.41	0.41
2:A:2562:U:H2'	2:A:2563:U:O4'	2.21	0.41
5:J:16:TYR:HB3	5:J:140:LEU:HD12	2.02	0.41
2:A:2902:C:H2'	2:A:2903:U:O4'	2.21	0.40
16:G:114:HIS:ND1	16:G:146:ASP:OD2	2.54	0.40
16:G:120:ILE:HD12	16:G:136:ASP:OD2	2.22	0.40
2:A:238:C:H2'	2:A:239:C:N1	2.36	0.40
2:A:1270:C:HO2'	2:A:1648:U:P	2.44	0.40
2:A:1582:C:O2'	2:A:1585:C:N3	2.44	0.40
2:A:2588:G:H2'	2:A:2589:A:O4'	2.21	0.40
2:A:2658:C:H1'	16:G:176:LYS:HG2	2.03	0.40
2:A:2659:G:H1'	16:G:176:LYS:HZ1	1.87	0.40
2:A:2692:G:O2'	2:A:2847:U:O2'	2.31	0.40
17:Z:53:MET:HB2	17:Z:53:MET:HE2	1.79	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:768:G:N2	2:A:1379:U:O2'	2.44	0.40
2:A:1262:A:C2	2:A:1263:U:C5	3.09	0.40
2:A:2577:A:O4'	2:A:2612:C:N4	2.55	0.40
1:2:42:LEU:N	1:2:42:LEU:HD22	2.37	0.40
2:A:226:A:C6	2:A:230:G:N1	2.89	0.40
2:A:1999:C:C2	2:A:2000:C:C5	3.10	0.40
8:N:28:LEU:O	8:N:28:LEU:HD23	2.21	0.40
8:N:49:GLU:O	8:N:53:THR:HG23	2.21	0.40
9:P:49:ILE:HD12	9:P:49:ILE:N	2.37	0.40
2:A:585:G:N2	2:A:1254:A:H62	2.16	0.40
2:A:1120:G:H2'	2:A:1121:C:O4'	2.21	0.40
2:A:1346:G:C6	2:A:1601:G:O6	2.74	0.40
2:A:2665:A:C6	16:G:176:LYS:O	2.75	0.40
3:D:109:VAL:HG11	3:D:193:VAL:HG12	2.02	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	2	37/46 (80%)	37 (100%)	0	0	100	100
3	D	171/209 (82%)	166 (97%)	5 (3%)	0	100	100
4	E	161/201 (80%)	156 (97%)	5 (3%)	0	100	100
5	J	140/142 (99%)	137 (98%)	3 (2%)	0	100	100
6	K	120/122 (98%)	115 (96%)	5 (4%)	0	100	100
7	L	105/143 (73%)	96 (91%)	9 (9%)	0	100	100
8	N	118/120 (98%)	110 (93%)	8 (7%)	0	100	100
9	P	112/114 (98%)	112 (100%)	0	0	100	100
10	Q	115/117 (98%)	112 (97%)	3 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	R	101/103 (98%)	100 (99%)	1 (1%)	0	100	100
12	T	91/93 (98%)	84 (92%)	7 (8%)	0	100	100
13	U	100/102 (98%)	94 (94%)	6 (6%)	0	100	100
14	Y	61/63 (97%)	56 (92%)	5 (8%)	0	100	100
15	4	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
16	G	174/176 (99%)	131 (75%)	39 (22%)	4 (2%)	5	29
17	Z	55/58 (95%)	47 (86%)	6 (11%)	2 (4%)	3	20
All	All	1697/1847 (92%)	1588 (94%)	103 (6%)	6 (0%)	32	68

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
16	G	153	PRO
16	G	142	GLN
16	G	163	TYR
17	Z	13	ILE
17	Z	42	ALA
16	G	172	GLU

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	2	31/38 (82%)	30 (97%)	1 (3%)	34	55
3	D	136/164 (83%)	135 (99%)	1 (1%)	81	87
4	E	138/165 (84%)	138 (100%)	0	100	100
5	J	116/116 (100%)	115 (99%)	1 (1%)	75	83
6	K	103/103 (100%)	103 (100%)	0	100	100
7	L	76/102 (74%)	76 (100%)	0	100	100
8	N	100/100 (100%)	100 (100%)	0	100	100
9	P	99/99 (100%)	99 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
10	Q	89/89 (100%)	89 (100%)	0	100	100
11	R	84/84 (100%)	84 (100%)	0	100	100
12	T	80/80 (100%)	80 (100%)	0	100	100
13	U	83/83 (100%)	83 (100%)	0	100	100
14	Y	55/55 (100%)	55 (100%)	0	100	100
15	4	34/34 (100%)	34 (100%)	0	100	100
16	G	137/137 (100%)	123 (90%)	14 (10%)	6	21
17	Z	47/48 (98%)	38 (81%)	9 (19%)	1	7
All	All	1408/1497 (94%)	1382 (98%)	26 (2%)	54	71

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	2	13	ASN
3	D	125	TRP
5	J	96	ARG
16	G	34	ARG
16	G	47	ASN
16	G	70	LEU
16	G	82	PHE
16	G	83	THR
16	G	116	LEU
16	G	128	THR
16	G	132	LEU
16	G	133	LYS
16	G	138	GLN
16	G	140	ILE
16	G	151	ARG
16	G	157	LYS
16	G	162	ARG
17	Z	9	THR
17	Z	28	LEU
17	Z	30	ARG
17	Z	31	ILE
17	Z	38	GLU
17	Z	41	PRO
17	Z	43	ILE
17	Z	52	PHE
17	Z	57	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
3	D	164	GLN
5	J	136	GLN
8	N	107	ASN
11	R	43	ASN
15	4	35	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	A	2158/2904 (74%)	385 (17%)	11 (0%)

All (385) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	A	10	A
2	A	12	U
2	A	25	U
2	A	27	G
2	A	46	G
2	A	51	G
2	A	60	G
2	A	74	A
2	A	75	G
2	A	84	A
2	A	96	C
2	A	102	U
2	A	118	A
2	A	120	U
2	A	125	A
2	A	131	A
2	A	138	U
2	A	139	U
2	A	140	C
2	A	141	G
2	A	142	A
2	A	166	U
2	A	176	A
2	A	181	A
2	A	196	A
2	A	213	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	214	G
2	A	215	G
2	A	216	A
2	A	222	A
2	A	229	C
2	A	230	G
2	A	231	A
2	A	232	G
2	A	233	A
2	A	239	C
2	A	248	G
2	A	254	G
2	A	255	A
2	A	264	C
2	A	265	A
2	A	266	G
2	A	267	C
2	A	269	C
2	A	271	G
2	A	272	A
2	A	278	A
2	A	291	G
2	A	301	G
2	A	302	C
2	A	307	G
2	A	309	A
2	A	311	A
2	A	316	C
2	A	323	C
2	A	329	G
2	A	330	A
2	A	331	C
2	A	362	A
2	A	370	G
2	A	371	A
2	A	372	G
2	A	386	G
2	A	387	U
2	A	396	G
2	A	401	A
2	A	406	G
2	A	411	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	412	A
2	A	423	A
2	A	429	A
2	A	430	A
2	A	435	C
2	A	456	C
2	A	464	U
2	A	473	G
2	A	476	G
2	A	480	A
2	A	481	G
2	A	489	G
2	A	491	G
2	A	504	A
2	A	505	A
2	A	513	A
2	A	531	C
2	A	532	A
2	A	533	G
2	A	541	A
2	A	546	U
2	A	547	A
2	A	548	G
2	A	550	C
2	A	563	A
2	A	573	U
2	A	586	A
2	A	603	A
2	A	613	A
2	A	614	A
2	A	615	U
2	A	621	A
2	A	627	A
2	A	631	A
2	A	637	A
2	A	638	G
2	A	646	U
2	A	647	G
2	A	654	A
2	A	664	G
2	A	669	G
2	A	670	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	671	C
2	A	686	U
2	A	775	G
2	A	776	G
2	A	777	G
2	A	782	A
2	A	784	G
2	A	785	G
2	A	789	A
2	A	791	C
2	A	792	A
2	A	793	A
2	A	794	A
2	A	801	G
2	A	811	U
2	A	812	C
2	A	819	A
2	A	828	U
2	A	829	A
2	A	830	A
2	A	832	U
2	A	833	A
2	A	845	A
2	A	846	U
2	A	847	U
2	A	856	G
2	A	866	A
2	A	910	A
2	A	914	G
2	A	917	A
2	A	932	U
2	A	941	A
2	A	945	A
2	A	957	C
2	A	959	A
2	A	974	G
2	A	983	A
2	A	989	G
2	A	995	C
2	A	996	A
2	A	1005	C
2	A	1009	A

*Continued on next page...*



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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	1011	G
2	A	1012	U
2	A	1013	C
2	A	1020	A
2	A	1022	G
2	A	1026	G
2	A	1033	U
2	A	1034	G
2	A	1040	A
2	A	1045	C
2	A	1046	A
2	A	1047	G
2	A	1051	G
2	A	1053	C
2	A	1054	A
2	A	1057	A
2	A	1059	G
2	A	1060	U
2	A	1061	U
2	A	1062	G
2	A	1065	U
2	A	1066	U
2	A	1068	G
2	A	1070	A
2	A	1071	G
2	A	1073	A
2	A	1075	C
2	A	1076	C
2	A	1079	C
2	A	1083	U
2	A	1084	A
2	A	1088	A
2	A	1089	A
2	A	1097	U
2	A	1104	C
2	A	1111	A
2	A	1119	U
2	A	1122	G
2	A	1123	C
2	A	1131	G
2	A	1132	U
2	A	1133	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	1135	C
2	A	1136	G
2	A	1137	G
2	A	1142	A
2	A	1157	G
2	A	1168	G
2	A	1171	G
2	A	1172	C
2	A	1173	U
2	A	1174	U
2	A	1176	U
2	A	1177	G
2	A	1182	G
2	A	1186	G
2	A	1199	U
2	A	1212	G
2	A	1236	G
2	A	1238	G
2	A	1244	A
2	A	1247	A
2	A	1248	G
2	A	1253	A
2	A	1255	U
2	A	1256	G
2	A	1266	G
2	A	1271	G
2	A	1272	A
2	A	1287	A
2	A	1300	G
2	A	1301	A
2	A	1312	U
2	A	1314	C
2	A	1320	C
2	A	1327	A
2	A	1329	U
2	A	1345	C
2	A	1353	A
2	A	1365	A
2	A	1376	C
2	A	1378	A
2	A	1379	U
2	A	1383	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	1386	C
2	A	1391	U
2	A	1395	A
2	A	1403	A
2	A	1416	G
2	A	1417	C
2	A	1419	A
2	A	1421	G
2	A	1427	A
2	A	1452	G
2	A	1455	G
2	A	1456	G
2	A	1458	U
2	A	1461	C
2	A	1467	U
2	A	1482	G
2	A	1490	A
2	A	1491	G
2	A	1493	C
2	A	1495	A
2	A	1497	U
2	A	1515	A
2	A	1523	U
2	A	1524	G
2	A	1527	G
2	A	1528	A
2	A	1535	A
2	A	1548	A
2	A	1555	G
2	A	1560	G
2	A	1569	A
2	A	1579	A
2	A	1585	C
2	A	1595	C
2	A	1603	A
2	A	1607	C
2	A	1608	A
2	A	1616	A
2	A	1631	G
2	A	1634	A
2	A	1646	C
2	A	1647	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	1648	U
2	A	1664	A
2	A	1674	G
2	A	1682	G
2	A	1715	G
2	A	1727	C
2	A	1730	C
2	A	1732	C
2	A	1733	G
2	A	1737	G
2	A	1738	G
2	A	1739	A
2	A	1757	A
2	A	1764	C
2	A	1991	U
2	A	1992	G
2	A	1993	U
2	A	1997	C
2	A	2021	C
2	A	2022	U
2	A	2030	A
2	A	2031	A
2	A	2032	G
2	A	2033	A
2	A	2043	C
2	A	2052	A
2	A	2466	C
2	A	2475	C
2	A	2476	A
2	A	2487	G
2	A	2490	G
2	A	2491	U
2	A	2492	U
2	A	2494	G
2	A	2504	U
2	A	2506	U
2	A	2507	C
2	A	2513	A
2	A	2518	A
2	A	2520	C
2	A	2523	G
2	A	2524	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	A	2525	G
2	A	2529	G
2	A	2530	A
2	A	2532	G
2	A	2534	A
2	A	2535	G
2	A	2547	A
2	A	2554	U
2	A	2564	A
2	A	2566	A
2	A	2567	G
2	A	2572	A
2	A	2573	C
2	A	2576	G
2	A	2582	G
2	A	2598	A
2	A	2602	A
2	A	2603	G
2	A	2609	U
2	A	2610	C
2	A	2611	C
2	A	2613	U
2	A	2614	A
2	A	2629	U
2	A	2630	G
2	A	2639	A
2	A	2646	C
2	A	2654	A
2	A	2658	C
2	A	2667	C
2	A	2669	G
2	A	2682	A
2	A	2685	G
2	A	2689	U
2	A	2690	U
2	A	2714	G
2	A	2725	A
2	A	2726	A
2	A	2729	G
2	A	2733	A
2	A	2739	U
2	A	2744	G

*Continued on next page...*

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Mol	Chain	Res	Type
2	A	2745	C
2	A	2748	A
2	A	2751	G
2	A	2764	A
2	A	2765	A
2	A	2766	A
2	A	2778	A
2	A	2780	G
2	A	2798	U
2	A	2801	G
2	A	2818	U
2	A	2820	A
2	A	2849	U
2	A	2850	A
2	A	2858	C
2	A	2859	G
2	A	2867	G
2	A	2873	A
2	A	2880	C
2	A	2883	A
2	A	2884	U
2	A	2886	A
2	A	2902	C

All (11) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	A	175	G
2	A	271	G
2	A	776	G
2	A	791	C
2	A	828	U
2	A	1313	U
2	A	1420	A
2	A	1736	U
2	A	1737	G
2	A	1738	G
2	A	2763	G

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

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

## 5.5 Carbohydrates [i](#)

There are no 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.

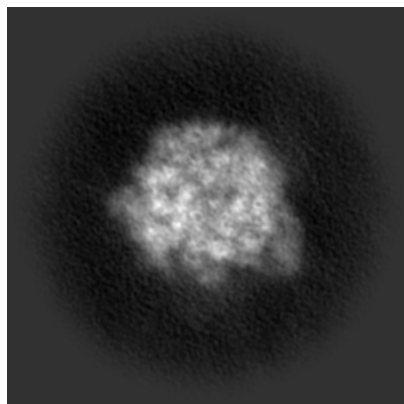
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-51832. These allow visual inspection of the internal detail of the map and identification of artifacts.

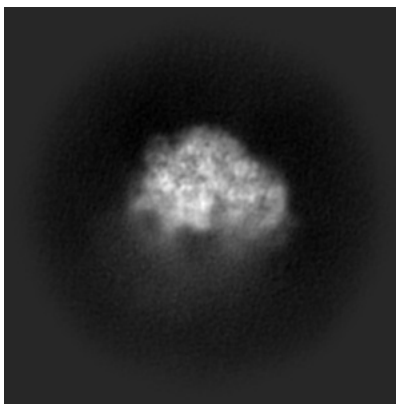
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

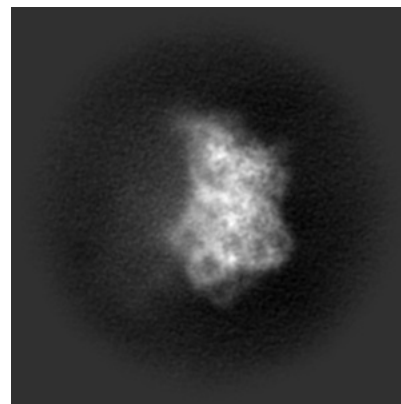
#### 6.1.1 Primary map



X

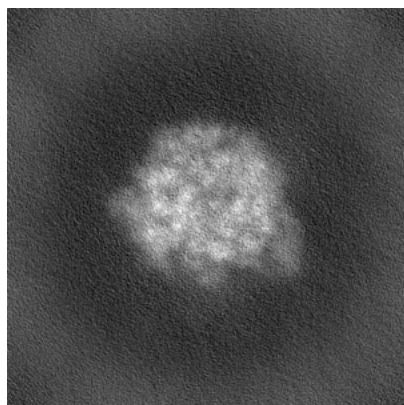


Y

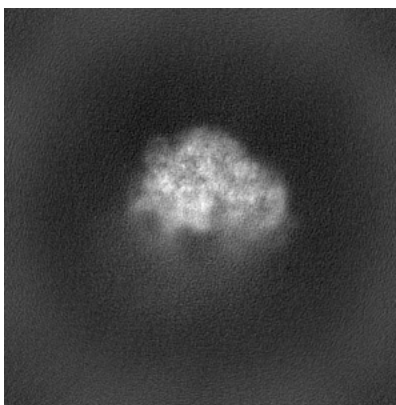


Z

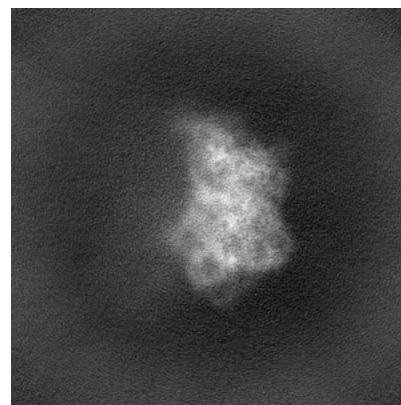
#### 6.1.2 Raw map



X



Y



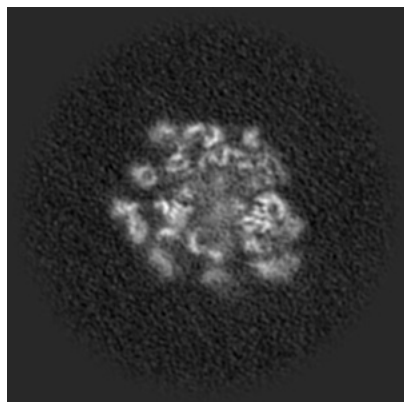
Z

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

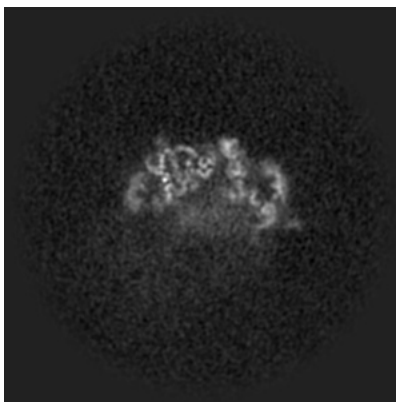


## 6.2 Central slices [i](#)

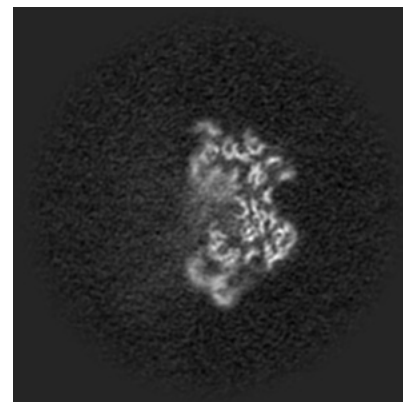
### 6.2.1 Primary map



X Index: 150

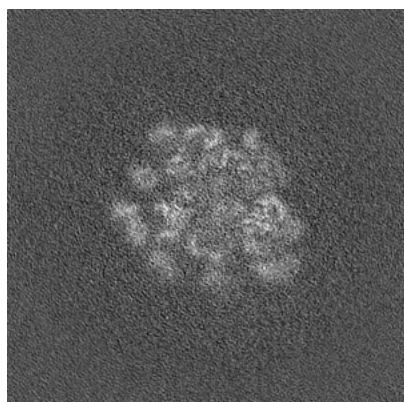


Y Index: 150

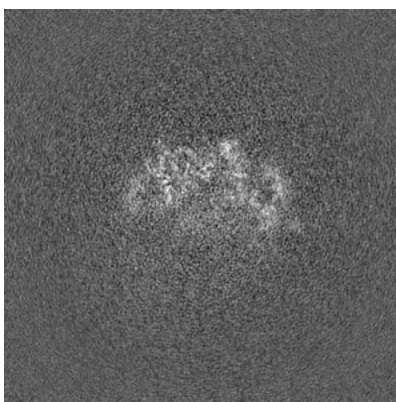


Z Index: 150

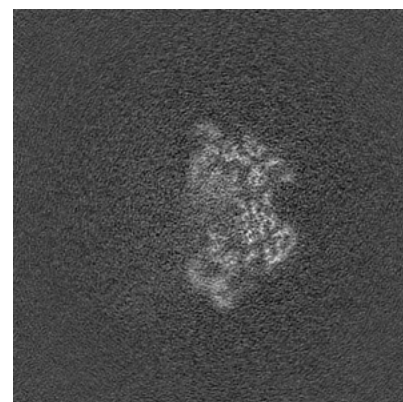
### 6.2.2 Raw map



X Index: 150



Y Index: 150

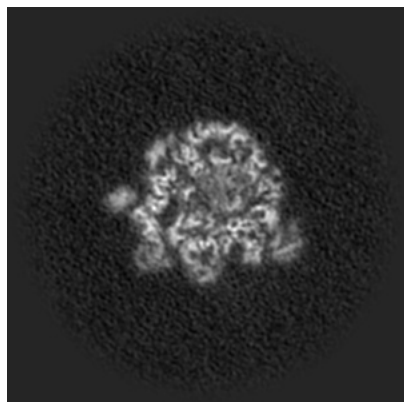


Z Index: 150

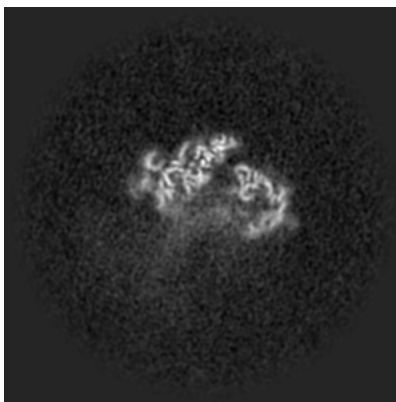
The images above show central slices of the map in three orthogonal directions.

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

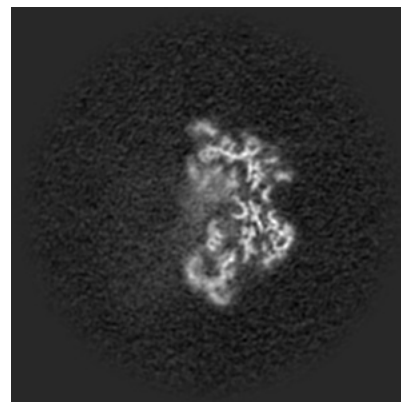
### 6.3.1 Primary map



X Index: 164

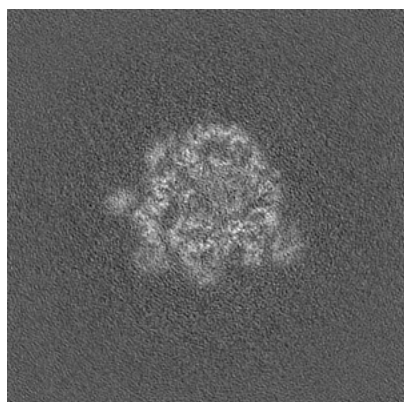


Y Index: 142

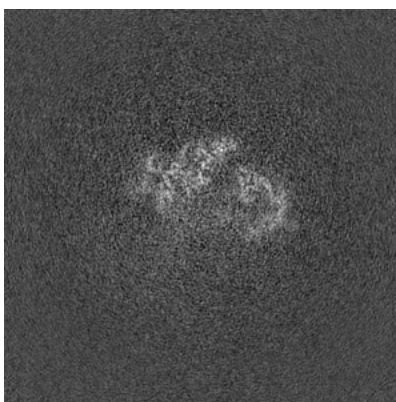


Z Index: 148

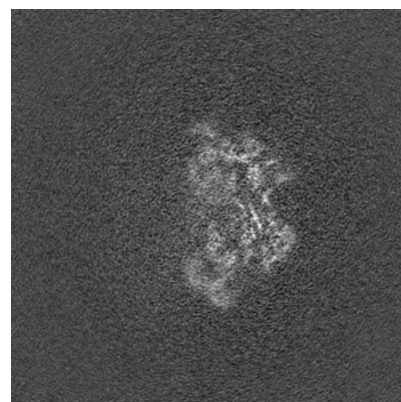
### 6.3.2 Raw map



X Index: 164



Y Index: 142

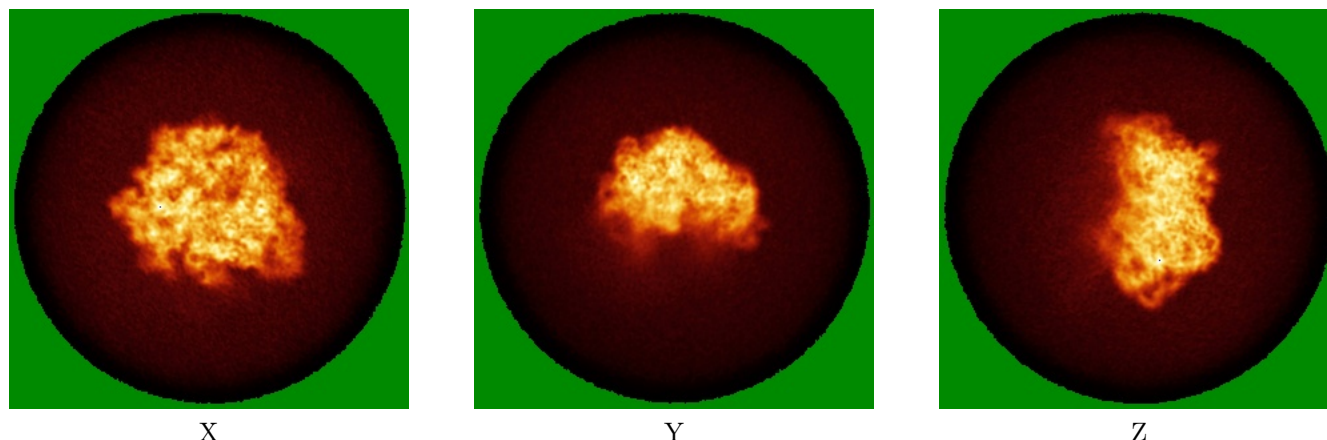


Z Index: 149

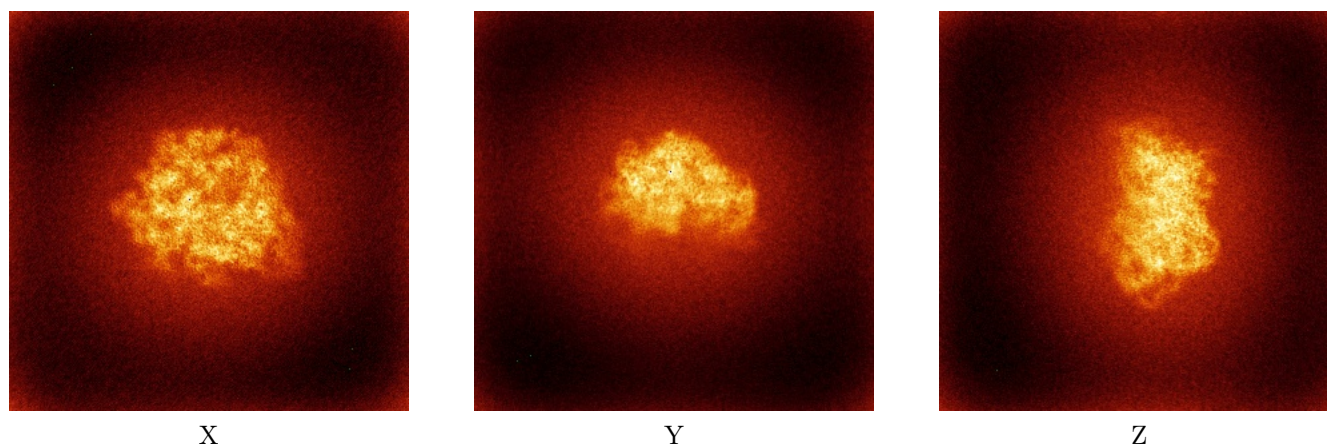
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



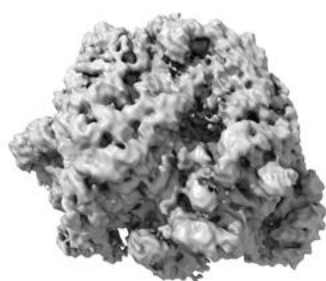
### 6.4.2 Raw map



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



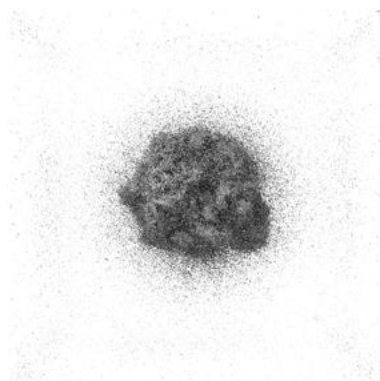
Y



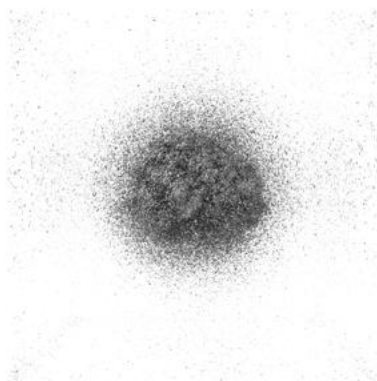
Z

The images above show the 3D surface view of the map at the recommended contour level 0.268. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

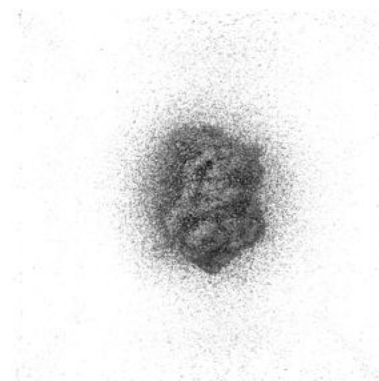
### 6.5.2 Raw map



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.



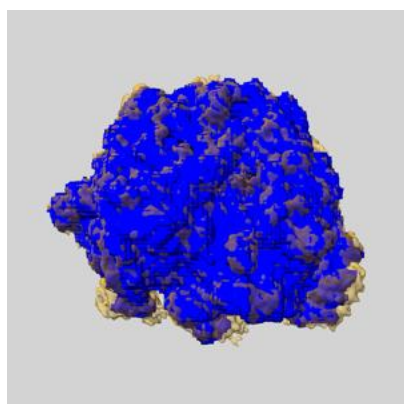
## 6.6 Mask visualisation [i](#)

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

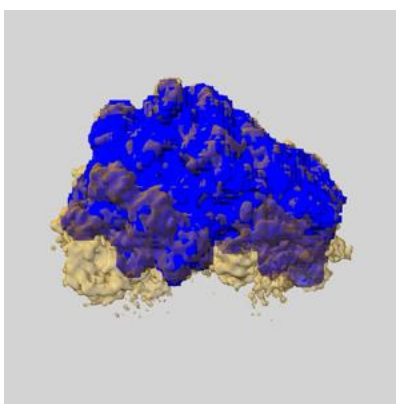
A mask typically either:

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

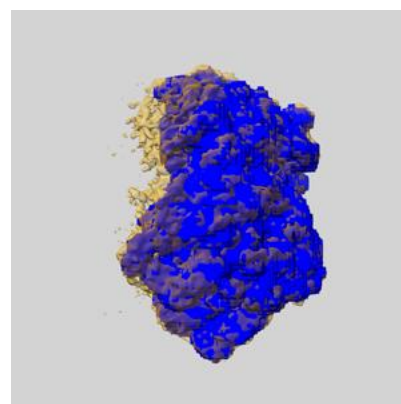
### 6.6.1 emd\_51832\_msk\_1.map [i](#)



X



Y

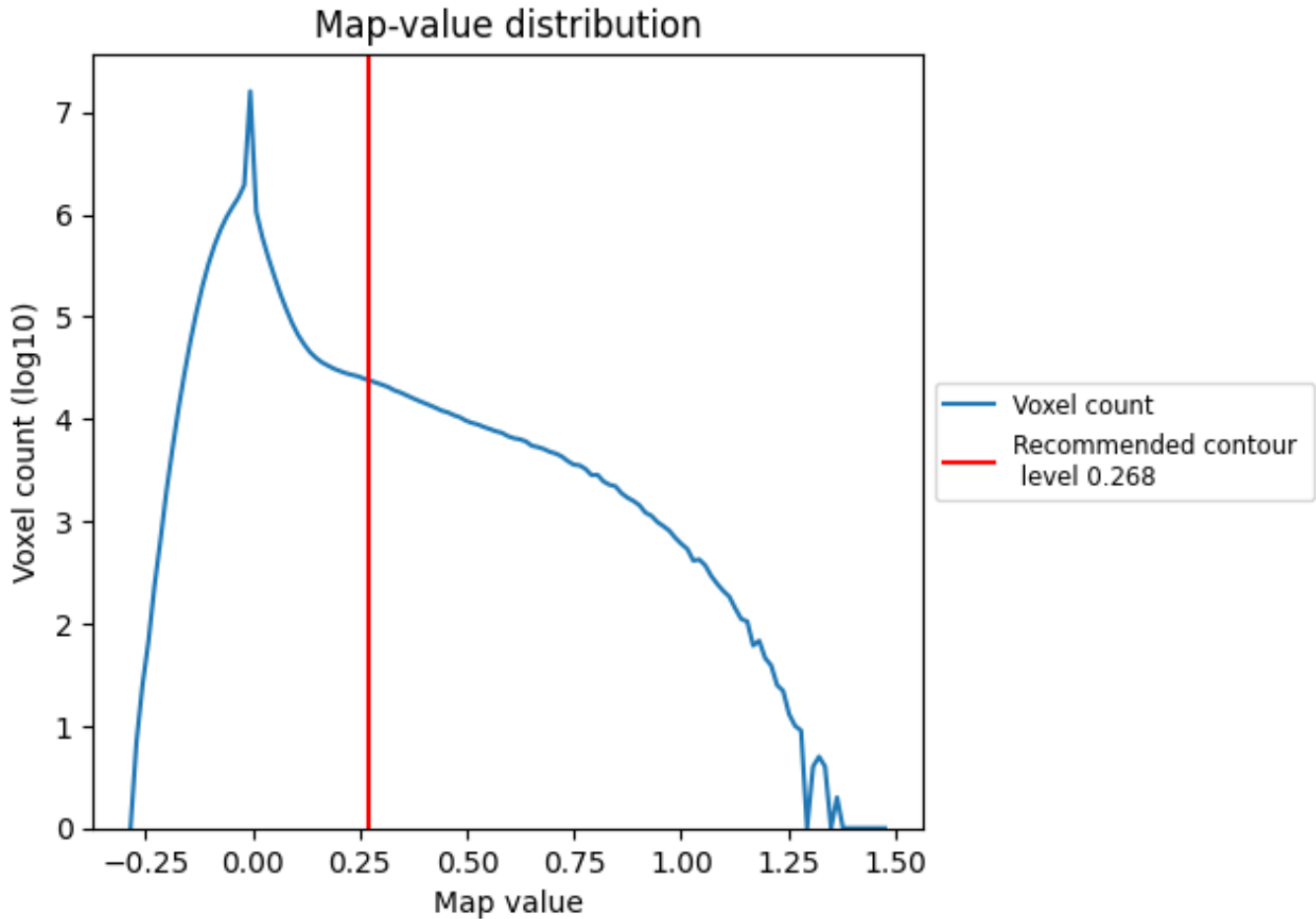


Z

## 7 Map analysis [i](#)

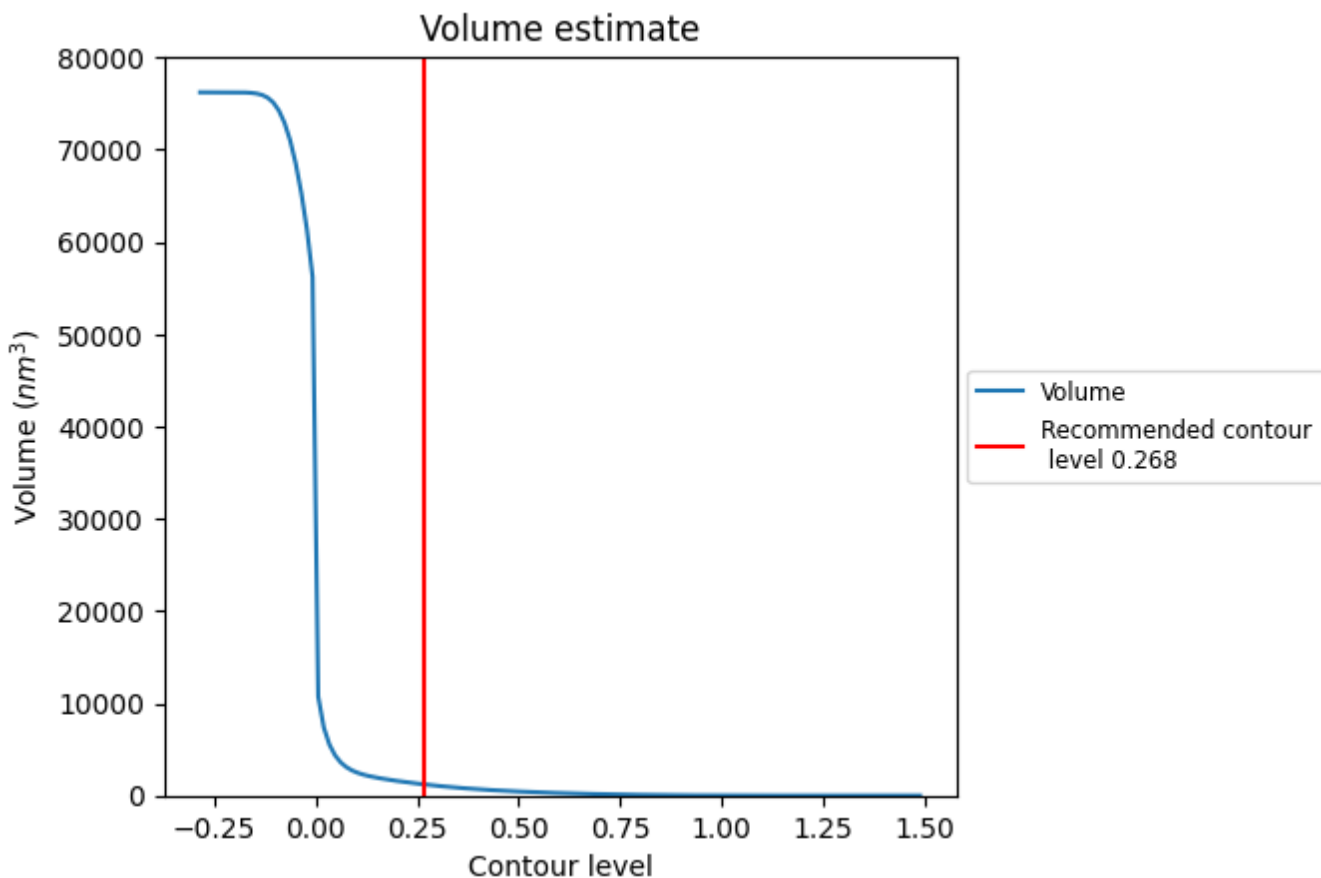
This section contains the results of statistical analysis of the map.

### 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.

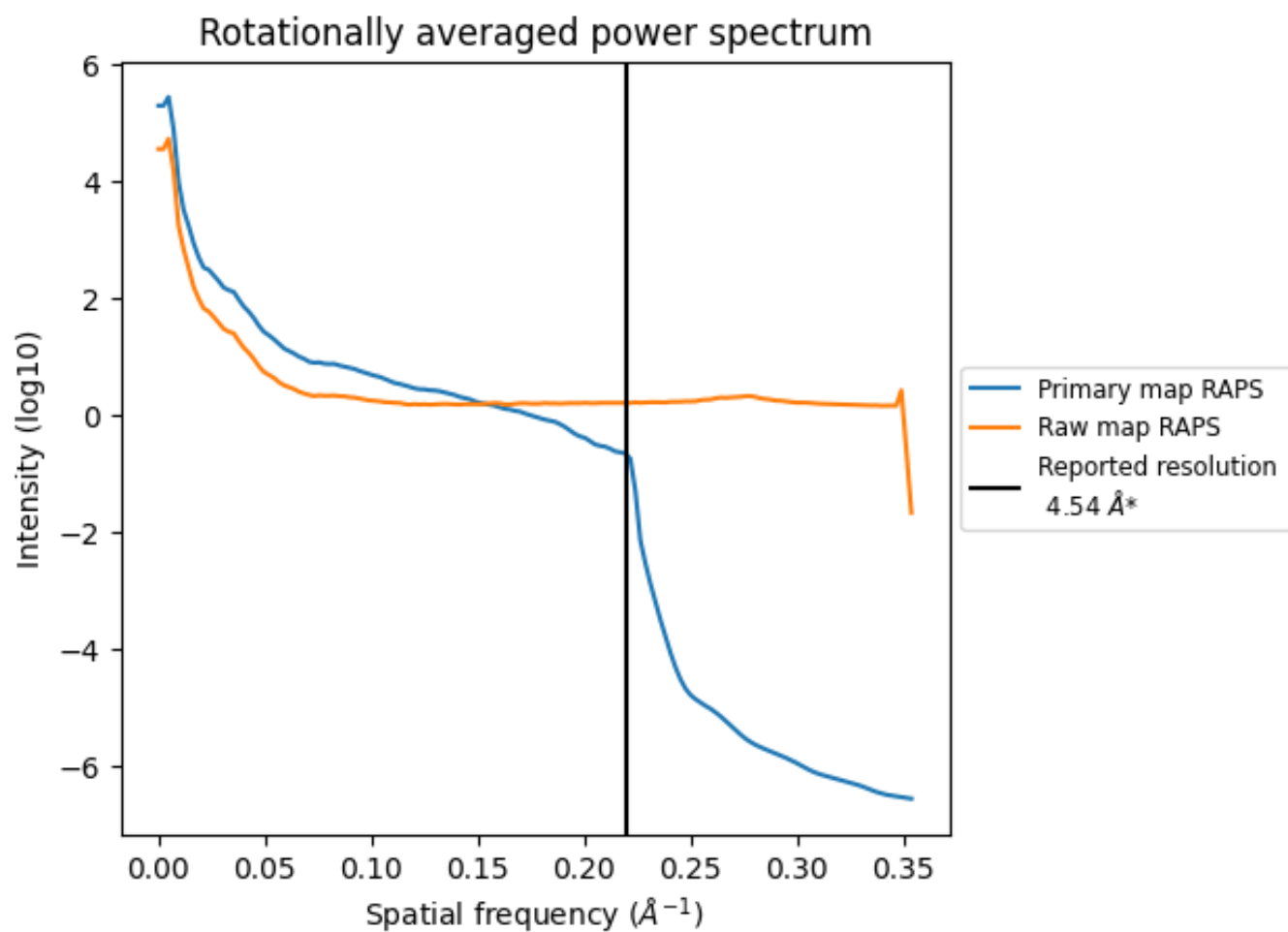
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1209 nm<sup>3</sup>; this corresponds to an approximate mass of 1092 kDa.

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

### 7.3 Rotationally averaged power spectrum i



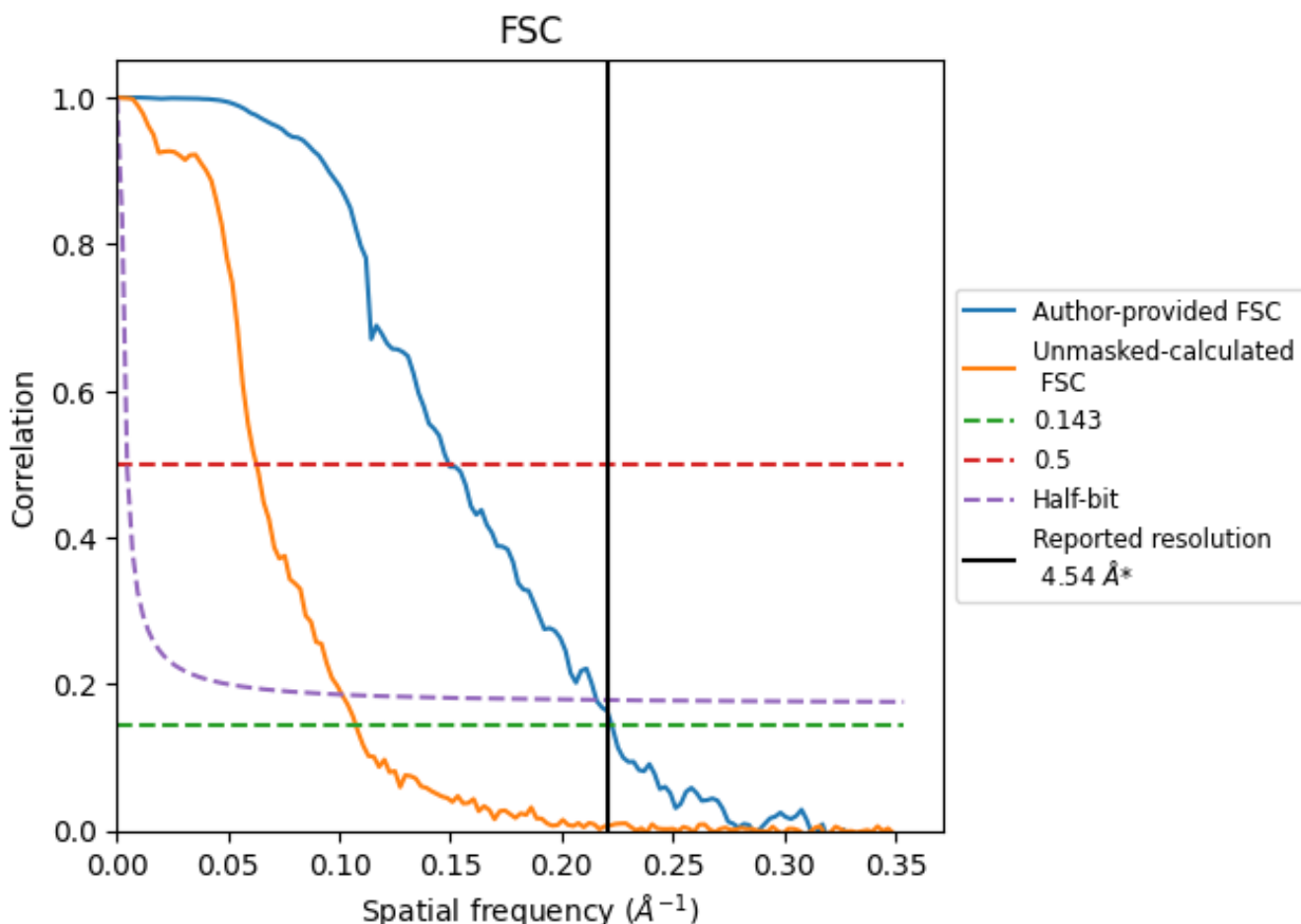
\*Reported resolution corresponds to spatial frequency of 0.220 Å<sup>-1</sup>



## 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 0.220 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

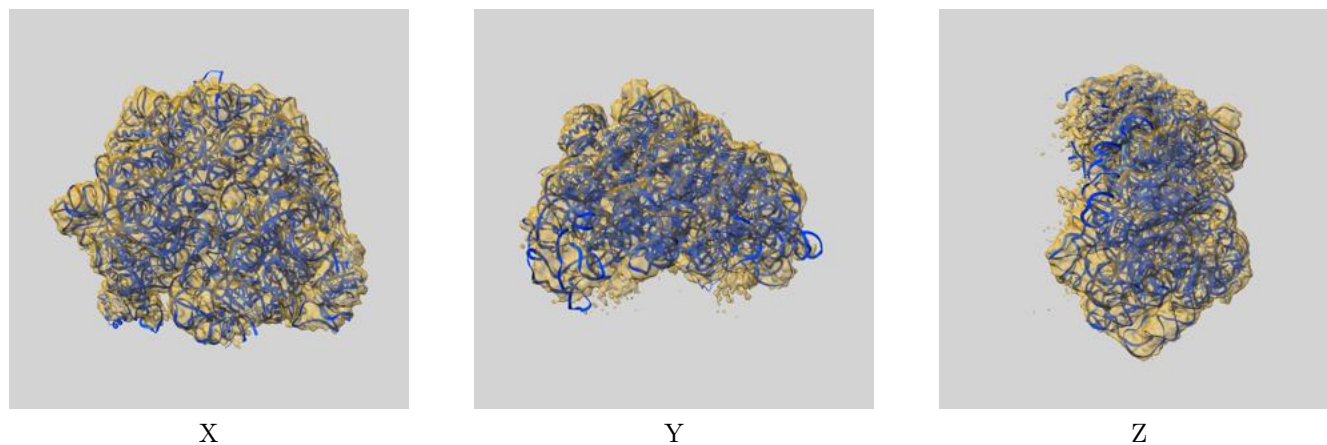
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.54	-	-
Author-provided FSC curve	4.49	6.70	4.64
Unmasked-calculated*	9.30	15.95	9.88

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 9.30 differs from the reported value 4.54 by more than 10 %

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

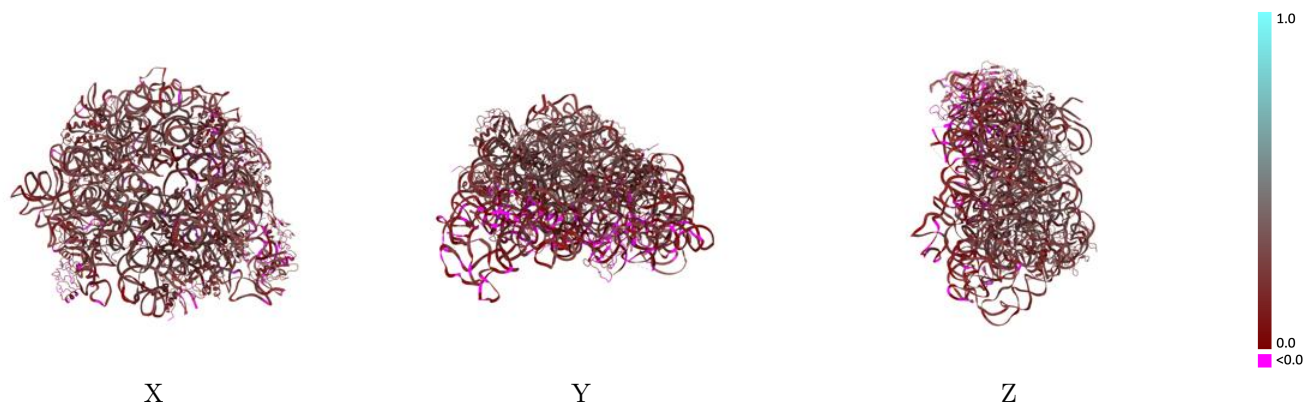
This section contains information regarding the fit between EMDB map EMD-51832 and PDB model 9H3O. Per-residue inclusion information can be found in section 3 on page 7.

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



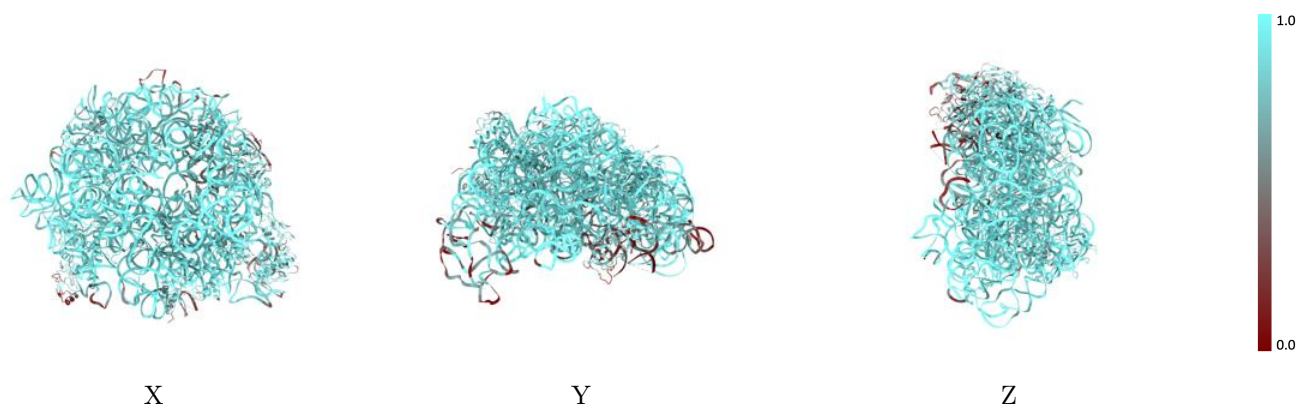
The images above show the 3D surface view of the map at the recommended contour level 0.268 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



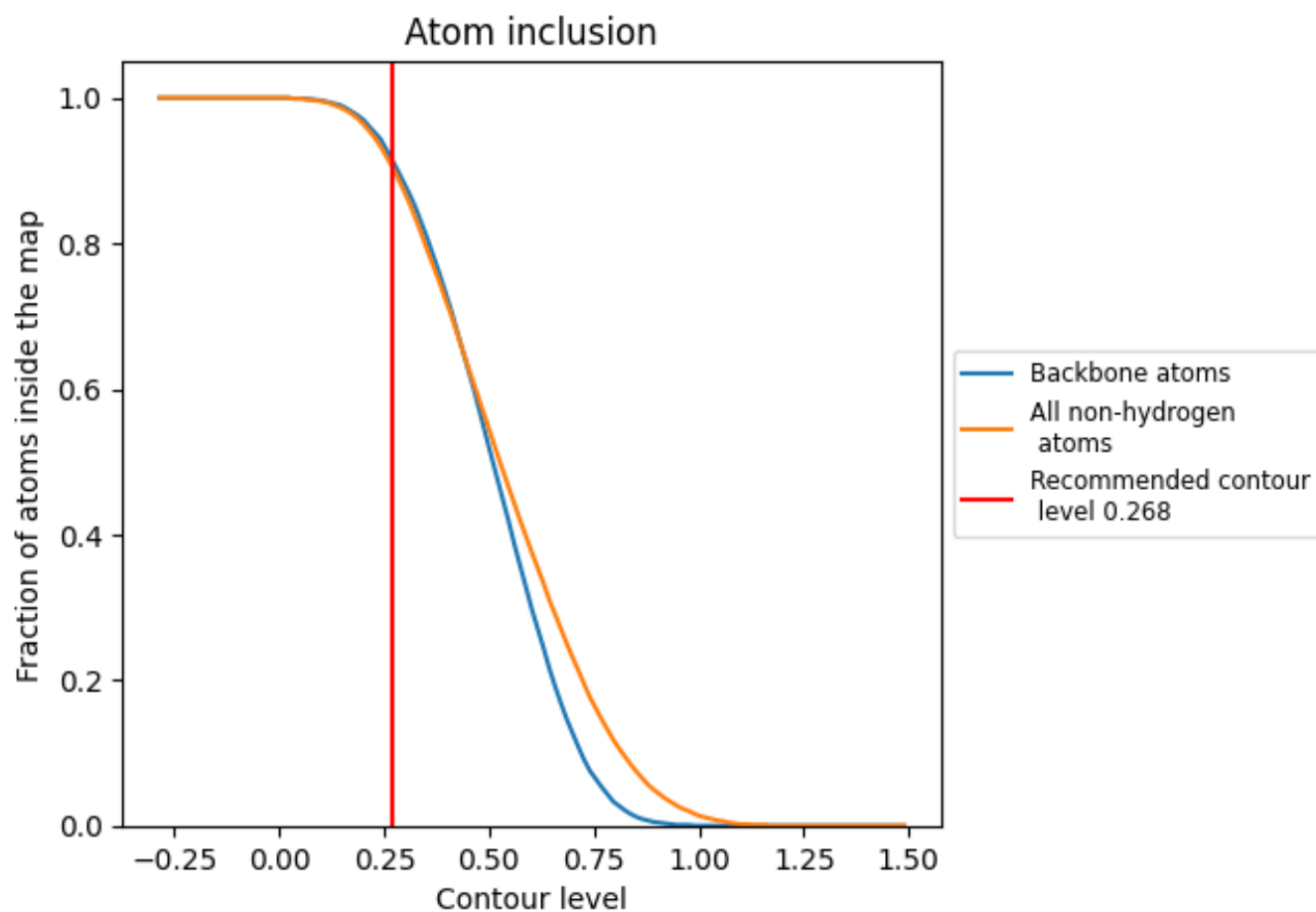
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.268).





































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 91% 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 (0.268) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9060	 0.1970
2	 0.9180	 0.1900
4	 0.8150	 0.1380
A	 0.9250	 0.2000
D	 0.8740	 0.2180
E	 0.8910	 0.2200
G	 0.8420	 0.1490
J	 0.9310	 0.2410
K	 0.6030	 0.0990
L	 0.6980	 0.1030
N	 0.9310	 0.1670
P	 0.6080	 0.1360
Q	 0.9470	 0.2320
R	 0.8900	 0.2160
T	 0.8910	 0.2350
U	 0.9220	 0.2420
Y	 0.8630	 0.1990
Z	 0.8060	 0.1890

