Full wwPDB EM Validation Report (i)

Apr 20, 2024 – 09:29 pm BST

PDB ID	:	7BOE
EMDB ID	:	EMD-12240
Title	:	Bacterial 30S ribosomal subunit assembly complex state M (Consensus refinement)
Authors	:	Schedlbauer, A.; Iturrioz, I.; Ochoa-Lizarralde, B.; Diercks, T.; Lopez-Alonso, J.; Kaminishi, T.; Capuni, R.; Astigarraga, E.; Gil-Carton, D.; Fucini, P.; Connell, S.R.
Deposited on	:	2021-01-25
Resolution	:	2.90 Å(reported)
Based on initial model	:	4YBB

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

We welcome your comments at *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 (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

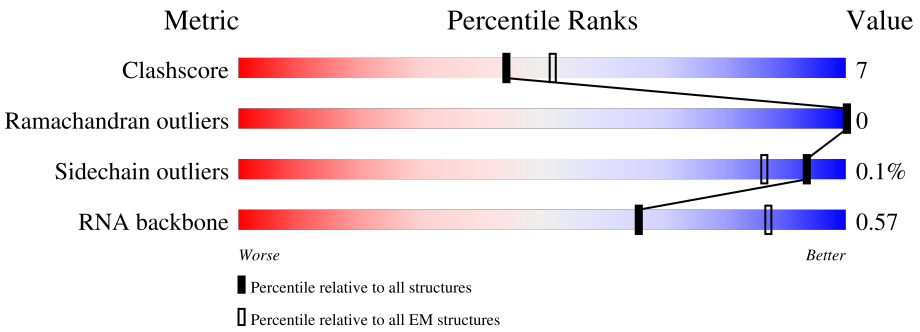
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.90 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=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 <=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	1542	20% 64% 30% 6% •
2	B	241	90% 78% 15% 7%
3	C	233	79% 69% 21% 9%
4	D	206	• 82% 18%
5	E	167	• 77% 16% 7%
6	F	135	11% 68% 10% 21%
7	G	179	84% 60% 24% 16%

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Mol	Chain	Length	Quality of chain
8	H	130	76% 23%
9	I	130	89% 74% 24%
10	J	103	96% 65% 32%
11	K	129	12% 64% 26% 9%
12	L	124	6% 85% 14%
13	M	118	97% 76% 21%
14	N	101	95% 86% 13%
15	O	89	76% 22%
16	P	82	87% 13%
17	Q	84	87% 8% 5%
18	R	75	11% 73% 13% 13%
19	S	92	88% 76% 14% 10%
20	T	87	85% 14%
21	U	71	31% 49% 24% 27%

2 Entry composition (i)

There are 23 unique types of molecules in this entry. The entry contains 51969 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	1534	32930	14694	6041	10661	1534	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	224	1753	1109	315	321	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	211	1653	1046	310	293	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	205	1643	1026	315	298	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	156	1152	717	217	212	6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	106	862	545	156	154	7	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G	151	1181	735	227	215	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	129	979	616	173	184	6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	I	127	1021	634	206	178	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	100	803	502	154	146	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	117	877	540	174	160	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	L	123	957	591	196	165	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	115	891	552	179	157	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	N	100	805	499	164	139	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	O	88	714	439	144	130	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	P	82	649	406	128	114	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Q	80	648	411	121	113	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	R	65	535	339	100	95	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	S	83	663	424	126	111	2	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	T	86	670	414	138	115	3	0	0

- Molecule 21 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	U	52	430	269	89	71	1	0	0

- Molecule 22 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
22	A	152	152	152	0

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

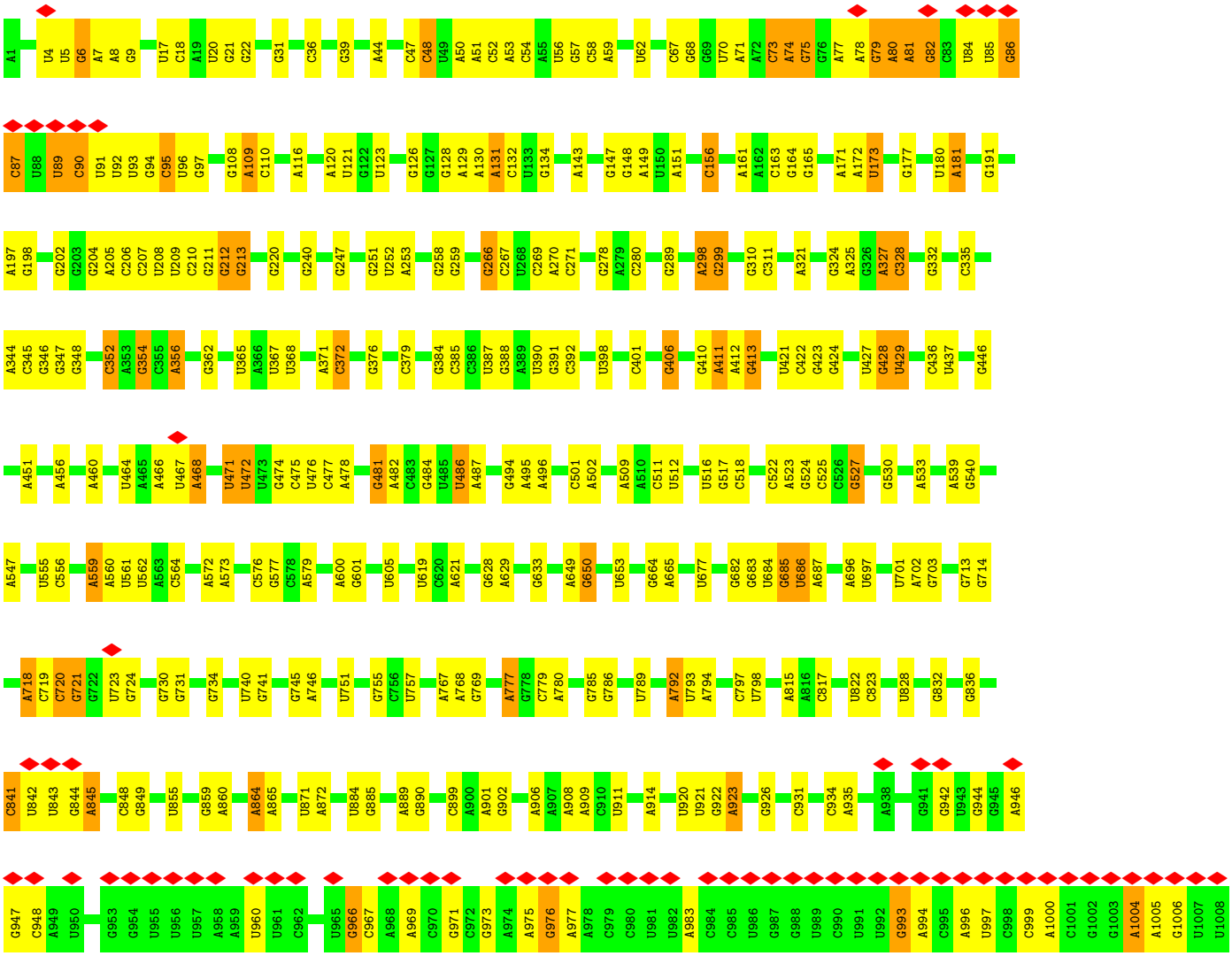
Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
23	B	1	1	1	0

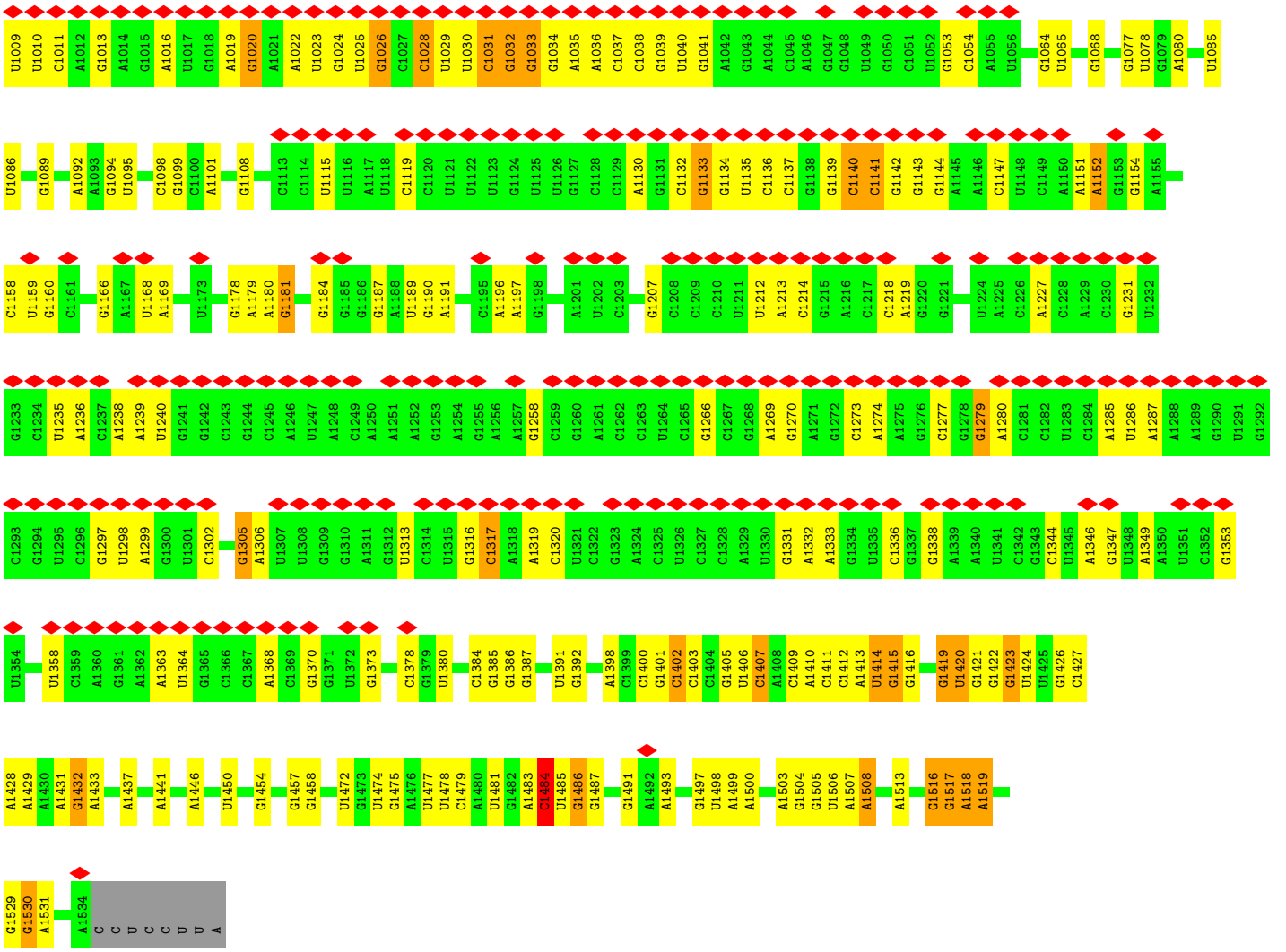
3 Residue-property plots (i)

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

- Molecule 1: 16S rRNA

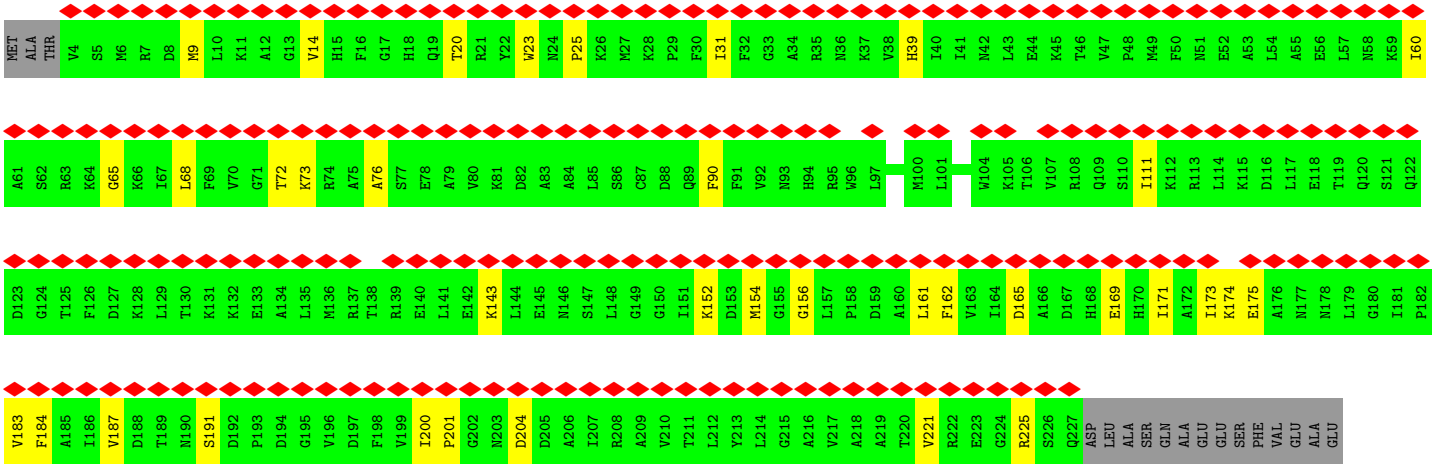
Chain A: 20% 64% 30% 6%





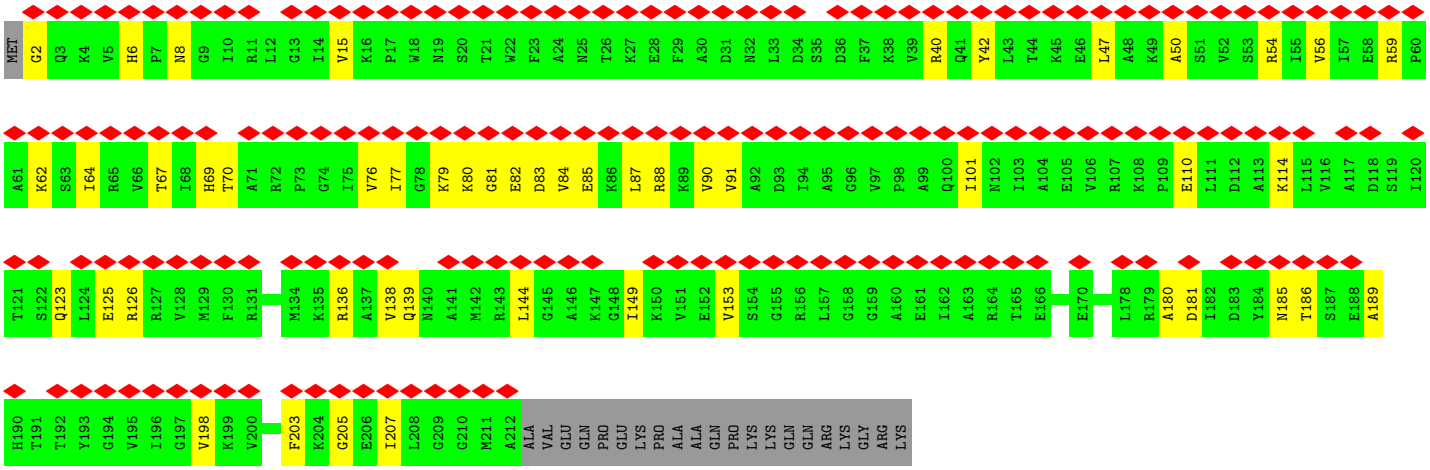
- Molecule 2: 30S ribosomal protein S2

Chain B:



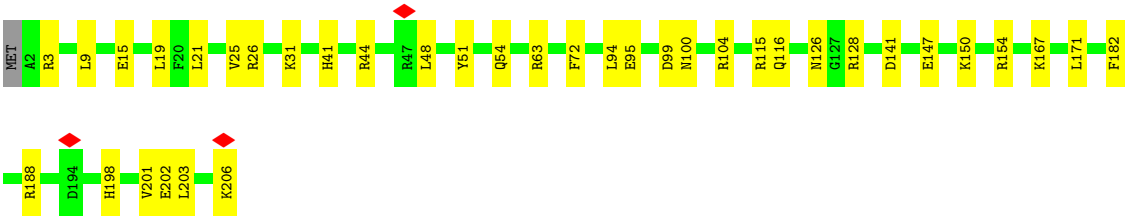
- Molecule 3: 30S ribosomal protein S3

Chain C:



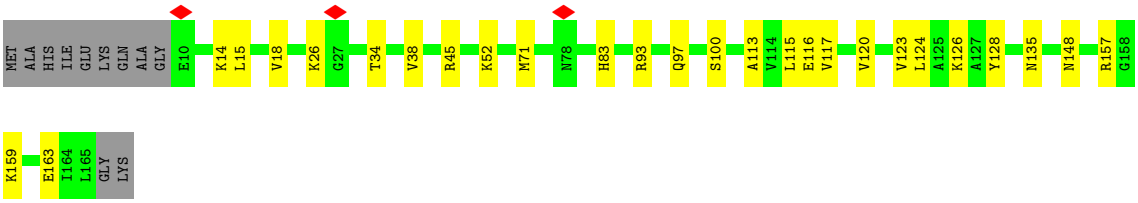
- Molecule 4: 30S ribosomal protein S4

Chain D:



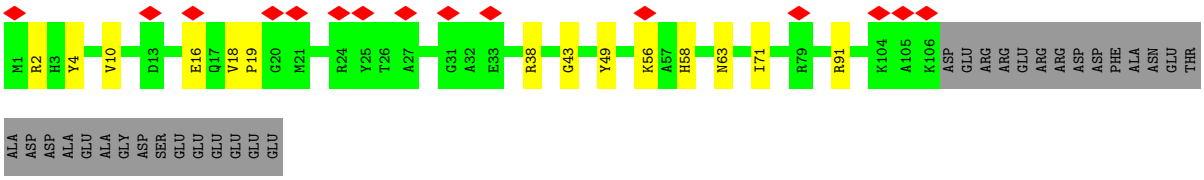
- Molecule 5: 30S ribosomal protein S5

Chain E:



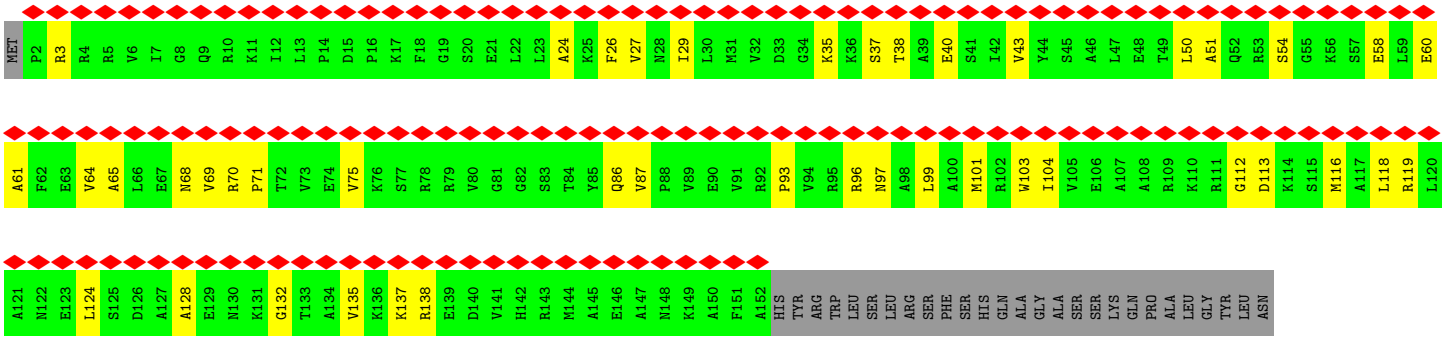
- Molecule 6: 30S ribosomal protein S6

Chain F:



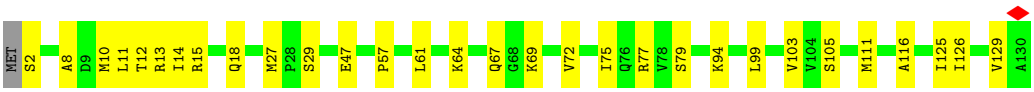
- Molecule 7: 30S ribosomal protein S7

Chain G: 84% 60% 24% 16%



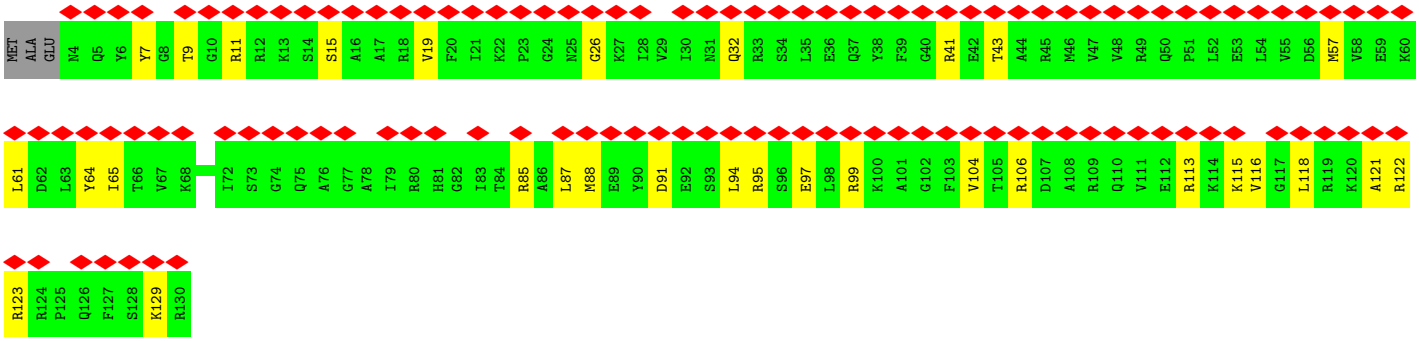
- Molecule 8: 30S ribosomal protein S8

Chain H: 76% 23%



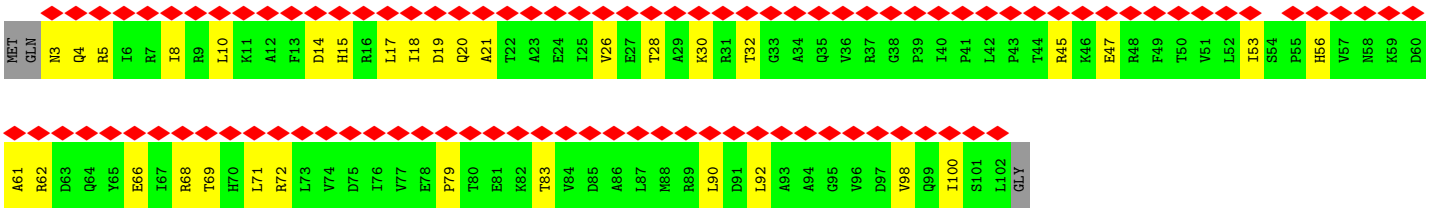
- Molecule 9: 30S ribosomal protein S9

Chain I: 89% 74% 24%



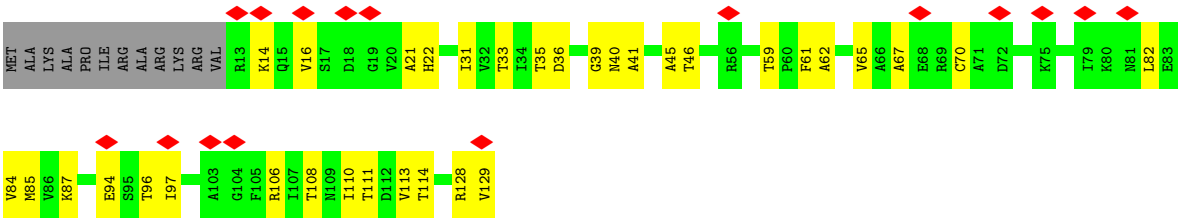
- Molecule 10: 30S ribosomal protein S10

Chain J: 96% 65% 32%



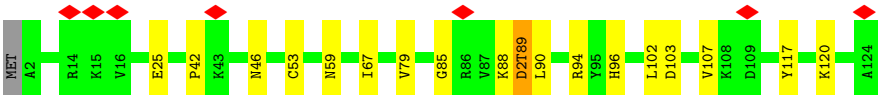
- Molecule 11: 30S ribosomal protein S11

Chain K: 12% 64% 26% 9%



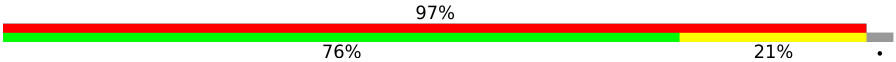
• Molecule 12: 30S ribosomal protein S12

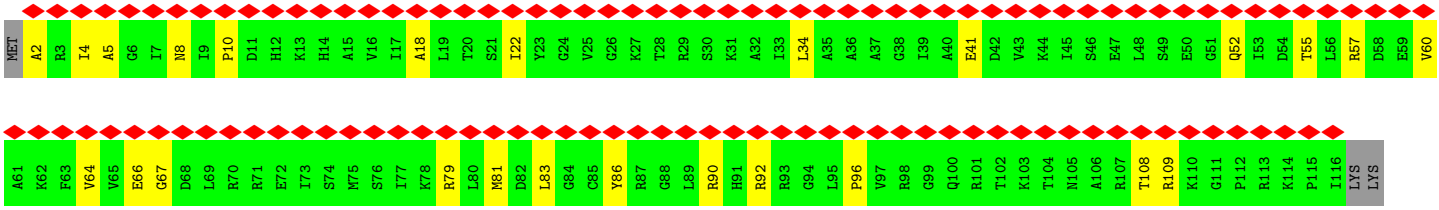
Chain L:



• Molecule 13: 30S ribosomal protein S13

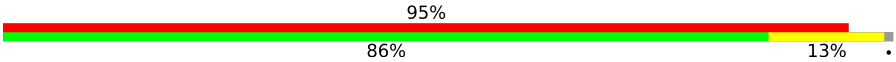
Chain M:

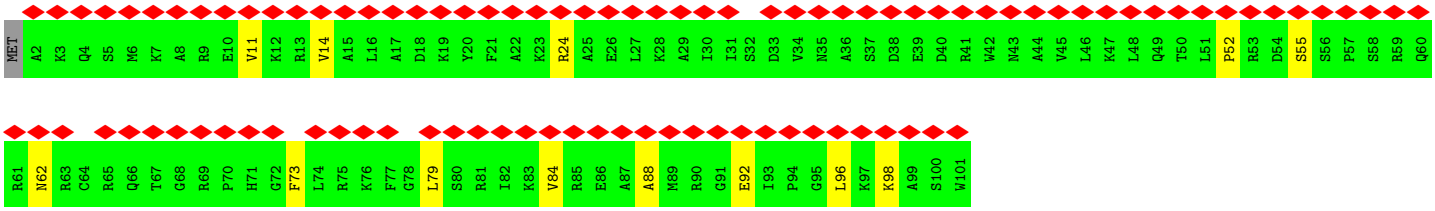




• Molecule 14: 30S ribosomal protein S14

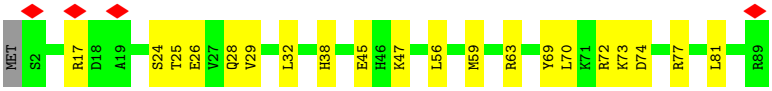
Chain N:





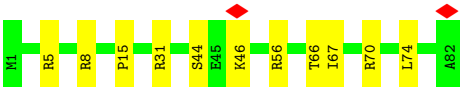
• Molecule 15: 30S ribosomal protein S15

Chain O:



• Molecule 16: 30S ribosomal protein S16

Chain P:

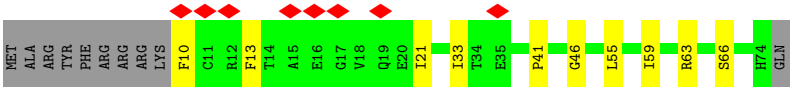


- Molecule 17: 30S ribosomal protein S17

Chain Q:

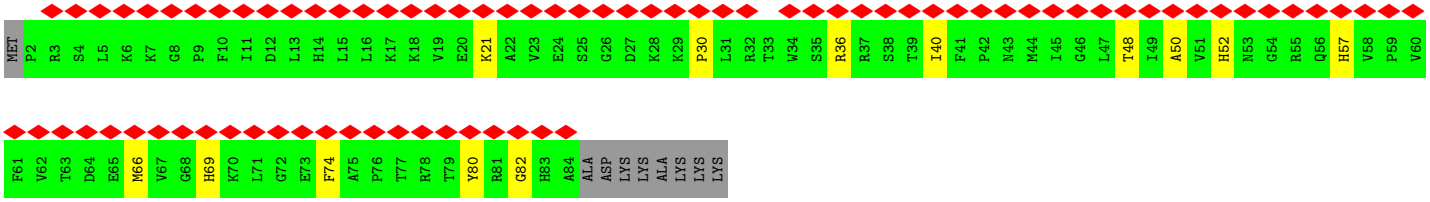
- Molecule 18: 30S ribosomal protein S18

Chain R:



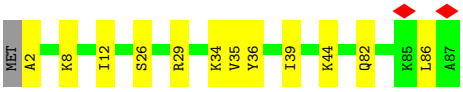
- Molecule 19: 30S ribosomal protein S19

Chain S:



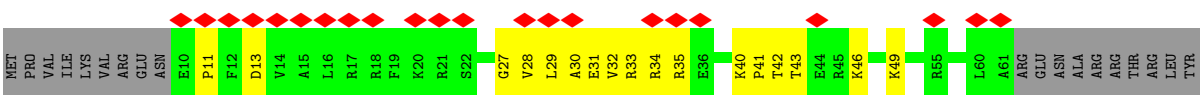
- Molecule 20: 30S ribosomal protein S20

Chain T:



- Molecule 21: 30S ribosomal protein S21

Chain U:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	25682	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 ($e^-/Å^2$)	38.8	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.094	Depositor
Minimum map value	-0.028	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.016	Depositor
Map size (Å)	419.99997, 419.99997, 419.99997	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.05, 1.05, 1.05	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: UR3, G7M, MA6, 4OC, ZN, 5MC, MG, D2T, 2MG, PSU

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	0.68	0/36593	0.76	9/57081 (0.0%)
2	B	0.51	0/1784	0.57	0/2403
3	C	0.50	0/1680	0.53	0/2263
4	D	0.39	0/1665	0.47	0/2227
5	E	0.46	0/1165	0.53	0/1568
6	F	0.56	0/881	0.60	0/1189
7	G	0.45	0/1195	0.53	0/1602
8	H	0.46	0/989	0.53	0/1326
9	I	0.52	0/1033	0.57	0/1375
10	J	0.49	0/813	0.58	0/1100
11	K	0.51	0/893	0.59	0/1205
12	L	0.48	0/960	0.56	0/1286
13	M	0.52	0/900	0.58	0/1204
14	N	0.49	0/817	0.48	0/1088
15	O	0.38	0/722	0.48	0/964
16	P	0.54	0/659	0.59	0/884
17	Q	0.49	0/657	0.54	0/881
18	R	0.43	0/544	0.48	0/731
19	S	0.51	0/680	0.54	0/915
20	T	0.30	0/676	0.41	0/895
21	U	0.28	0/436	0.39	0/577
All	All	0.62	0/55742	0.70	9/82764 (0.0%)

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1158	C	C2-N1-C1'	8.08	127.69	118.80
1	A	1158	C	N1-C2-O2	7.46	123.37	118.90
1	A	1484	C	N1-C2-O2	6.54	122.82	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1158	C	C6-N1-C1'	-6.17	113.39	120.80
1	A	1279	G	N7-C8-N9	6.11	116.16	113.10
1	A	1484	C	C2-N1-C1'	6.07	125.47	118.80
1	A	1158	C	N3-C2-O2	-5.47	118.07	121.90
1	A	328	C	C2-N1-C1'	5.38	124.72	118.80
1	A	848	C	C2-N1-C1'	5.25	124.57	118.80

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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	32930	0	16590	271	0
2	B	1753	0	1780	30	0
3	C	1653	0	1727	42	0
4	D	1643	0	1707	28	0
5	E	1152	0	1196	19	0
6	F	862	0	864	8	0
7	G	1181	0	1238	30	0
8	H	979	0	1031	21	0
9	I	1021	0	1070	26	0
10	J	803	0	842	20	0
11	K	877	0	887	22	0
12	L	957	0	1017	14	0
13	M	891	0	952	19	0
14	N	805	0	844	8	0
15	O	714	0	734	14	0
16	P	649	0	666	8	0
17	Q	648	0	691	7	0
18	R	535	0	552	7	0
19	S	663	0	688	8	0
20	T	670	0	719	9	0
21	U	430	0	458	12	0
22	A	152	0	0	0	0
23	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	51969	0	36253	569	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 7.

All (569) 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)
3:C:114:LYS:HD3	3:C:185:ASN:ND2	1.31	1.44
1:A:865:A:H5'	1:A:1078:U:O4	1.50	1.11
3:C:114:LYS:CD	3:C:185:ASN:ND2	2.16	1.08
3:C:80:LYS:HA	3:C:80:LYS:HE2	1.39	1.03
11:K:35:THR:HG22	11:K:41:ALA:HA	1.38	1.01
1:A:523:A:N6	12:L:89:D2T:OD1	1.96	0.97
3:C:114:LYS:HD3	3:C:185:ASN:CG	1.85	0.96
3:C:114:LYS:HB2	3:C:185:ASN:HD22	1.32	0.93
3:C:114:LYS:HD3	3:C:185:ASN:HD21	1.14	0.90
1:A:1413:A:H61	1:A:1487:G:H1	1.20	0.89
1:A:1026:G:H1	1:A:1035:A:H2	1.19	0.88
2:B:165:ASP:CB	2:B:204:ASP:OD2	2.23	0.87
1:A:1239:A:H62	1:A:1299:A:H62	1.24	0.86
3:C:114:LYS:CD	3:C:185:ASN:HD21	1.83	0.86
8:H:14:ILE:HD11	8:H:61:LEU:HD12	1.59	0.85
5:E:83:HIS:HE1	5:E:148:ASN:H	1.21	0.84
8:H:29:SER:HB3	8:H:57:PRO:HB2	1.60	0.84
1:A:1277:C:HO2'	1:A:1279:G:H8	1.25	0.83
1:A:1426:G:H1	1:A:1474:U:H3	1.23	0.83
1:A:1305:G:H21	1:A:1332:A:H2	1.23	0.83
15:O:29:VAL:HG11	15:O:81:LEU:HD21	1.61	0.81
1:A:677:U:H3	1:A:713:G:H22	1.28	0.81
8:H:12:THR:HG22	8:H:15:ARG:HH21	1.46	0.81
1:A:1006:G:O6	1:A:1023:U:O2	1.99	0.81
15:O:73:LYS:O	15:O:74:ASP:OD1	1.98	0.80
3:C:59:ARG:CZ	3:C:64:ILE:HD12	2.13	0.79
2:B:23:TRP:HZ3	2:B:25:PRO:HA	1.48	0.78
1:A:923:A:H5'	5:E:26:LYS:HD3	1.68	0.76
7:G:93:PRO:O	7:G:97:ASN:ND2	2.19	0.75
2:B:165:ASP:HA	2:B:204:ASP:OD2	1.86	0.75
1:A:376:G:H5"	16:P:5:ARG:HB2	1.70	0.74
3:C:114:LYS:HB2	3:C:185:ASN:ND2	2.02	0.73
3:C:80:LYS:HE2	3:C:80:LYS:CA	2.14	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:47:LEU:HB3	3:C:50:ALA:HB3	1.71	0.72
19:S:50:ALA:HB1	19:S:57:HIS:HB3	1.69	0.72
1:A:1406:U:O2	1:A:1517:G:N2	2.22	0.72
2:B:165:ASP:CA	2:B:204:ASP:OD2	2.39	0.71
11:K:87:LYS:HG3	11:K:114:THR:HA	1.72	0.71
1:A:8:A:N6	4:D:202:GLU:O	2.22	0.71
7:G:70:ARG:NH2	7:G:97:ASN:OD1	2.23	0.70
2:B:165:ASP:HB2	2:B:204:ASP:OD2	1.90	0.70
1:A:683:G:N2	11:K:39:GLY:O	2.25	0.70
1:A:86:G:N3	1:A:87:C:N4	2.41	0.69
9:I:104:VAL:HG12	9:I:104:VAL:O	1.92	0.69
18:R:10:PHE:HB2	18:R:46:GLY:HA3	1.75	0.69
1:A:1026:G:O6	1:A:1035:A:N1	2.26	0.69
9:I:32:GLN:NE2	9:I:64:TYR:OH	2.26	0.69
1:A:1500:A:H5"	1:A:1508:A:H5'	1.75	0.69
2:B:187:VAL:HG13	2:B:191:SER:HB2	1.75	0.68
1:A:523:A:C6	12:L:89:D2T:OD1	2.46	0.68
3:C:185:ASN:OD1	3:C:186:THR:N	2.26	0.68
11:K:16:VAL:HG11	11:K:36:ASP:HB3	1.75	0.68
1:A:523:A:N1	12:L:89:D2T:OD1	2.27	0.68
1:A:156:C:H42	1:A:165:G:H1	1.40	0.68
3:C:153:VAL:HG12	3:C:198:VAL:HG22	1.76	0.67
1:A:664:G:H22	1:A:741:G:H1	1.40	0.67
2:B:68:LEU:HB3	2:B:161:LEU:HD23	1.77	0.67
1:A:1005:A:H3'	1:A:1006:G:H8	1.60	0.67
1:A:1409:C:H2'	1:A:1410:A:H8	1.60	0.67
10:J:19:ASP:OD1	10:J:20:GLN:N	2.28	0.67
1:A:406:G:H21	4:D:116:GLN:HE22	1.43	0.66
5:E:14:LYS:NZ	5:E:116:GLU:OE1	2.27	0.66
7:G:75:VAL:HB	7:G:86:GLN:HG3	1.76	0.66
1:A:310:G:H5"	16:P:31:ARG:HB2	1.79	0.65
5:E:34:THR:HG22	5:E:52:LYS:HG2	1.78	0.65
20:T:2:ALA:HB3	20:T:8:LYS:HG2	1.78	0.65
1:A:1006:G:C6	1:A:1023:U:O2	2.49	0.65
1:A:1413:A:N6	1:A:1487:G:H1	1.92	0.65
1:A:976:G:OP2	1:A:1358:U:O2'	2.14	0.65
1:A:1457:G:OP1	20:T:34:LYS:NZ	2.26	0.65
7:G:71:PRO:O	7:G:96:ARG:NE	2.29	0.64
3:C:114:LYS:CB	3:C:185:ASN:ND2	2.60	0.64
1:A:1530:G:O6	21:U:46:LYS:NZ	2.28	0.64
1:A:1239:A:H62	1:A:1299:A:N6	1.95	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:O:69:TYR:HA	15:O:72:ARG:HE	1.63	0.64
8:H:15:ARG:NH1	8:H:75:ILE:O	2.31	0.64
11:K:22:HIS:HD2	11:K:85:MET:HB2	1.63	0.64
1:A:1409:C:H2'	1:A:1410:A:C8	2.33	0.63
1:A:78:A:C6	1:A:79:G:H1'	2.34	0.63
1:A:1077:G:N2	1:A:1080:A:OP2	2.23	0.63
1:A:278:G:OP2	17:Q:43:LYS:NZ	2.29	0.63
21:U:31:GLU:HG3	21:U:34:ARG:HH22	1.64	0.63
8:H:13:ARG:HD2	8:H:27:MET:HG3	1.81	0.63
13:M:8:ASN:OD1	13:M:66:GLU:OE2	2.17	0.62
1:A:1166:G:N1	1:A:1169:A:OP2	2.32	0.62
1:A:1023:U:O4	1:A:1024:G:N2	2.28	0.62
1:A:1033:G:H2'	1:A:1034:G:C8	2.34	0.62
3:C:114:LYS:CG	3:C:185:ASN:ND2	2.61	0.62
1:A:36:C:OP1	12:L:120:LYS:NZ	2.33	0.61
1:A:843:U:H2'	1:A:844:G:C8	2.36	0.61
3:C:40:ARG:NH1	14:N:92:GLU:OE1	2.33	0.61
4:D:95:GLU:HA	4:D:100:ASN:ND2	2.15	0.61
12:L:46:ASN:ND2	12:L:89:D2T:SB	2.74	0.61
4:D:126:ASN:O	4:D:128:ARG:NH1	2.31	0.61
11:K:128:ARG:O	11:K:129:VAL:HG13	2.01	0.61
1:A:1437:A:H5"	20:T:29:ARG:HH12	1.66	0.61
2:B:23:TRP:CZ3	2:B:25:PRO:HA	2.34	0.60
14:N:79:LEU:HB2	14:N:84:VAL:HG23	1.84	0.60
8:H:67:GLN:OE1	8:H:69:LYS:HE2	2.01	0.60
1:A:865:A:H5'	1:A:1078:U:C4	2.30	0.60
7:G:27:VAL:HG12	7:G:43:VAL:HG21	1.83	0.60
9:I:88:MET:HE3	9:I:104:VAL:HG22	1.84	0.60
1:A:823:C:HO2'	8:H:2:SER:N	1.98	0.60
3:C:6:HIS:CE1	3:C:8:ASN:HB3	2.37	0.60
9:I:113:ARG:O	9:I:121:ALA:HB2	2.02	0.60
1:A:352:C:O2'	1:A:354:G:OP1	2.19	0.60
1:A:911:U:OP2	12:L:94:ARG:NH2	2.34	0.60
3:C:85:GLU:OE2	3:C:88:ARG:NH2	2.29	0.60
10:J:32:THR:HG21	10:J:83:THR:OG1	2.02	0.60
1:A:1413:A:N1	1:A:1487:G:N2	2.44	0.59
1:A:1391:U:H2'	1:A:1392:G:C8	2.37	0.59
4:D:41:HIS:HB3	4:D:44:ARG:HH21	1.68	0.59
11:K:94:GLU:HA	11:K:97:ILE:HD12	1.84	0.59
1:A:1026:G:N1	1:A:1035:A:C2	2.64	0.59
5:E:83:HIS:CE1	5:E:148:ASN:H	2.10	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:115:LEU:HD13	5:E:123:VAL:HG11	1.84	0.59
10:J:4:GLN:HB3	10:J:79:PRO:HD2	1.85	0.59
1:A:1474:U:H2'	1:A:1475:G:H8	1.68	0.58
11:K:33:THR:HG22	11:K:35:THR:HG23	1.84	0.58
15:O:56:LEU:HA	15:O:59:MET:HE2	1.86	0.58
7:G:64:VAL:O	7:G:68:ASN:ND2	2.37	0.58
4:D:15:GLU:OE2	4:D:63:ARG:NH1	2.36	0.58
1:A:31:G:O2'	1:A:48:C:N4	2.38	0.57
1:A:1428:A:H2'	1:A:1429:A:C8	2.39	0.57
1:A:77:A:H2'	1:A:78:A:C8	2.40	0.57
1:A:559:A:OP2	5:E:126:LYS:NZ	2.38	0.57
1:A:865:A:C5'	1:A:1078:U:O4	2.40	0.57
7:G:61:ALA:HA	7:G:64:VAL:HG12	1.86	0.57
4:D:147:GLU:HA	4:D:150:LYS:HG3	1.87	0.57
1:A:713:G:H2'	1:A:714:G:C8	2.40	0.57
1:A:1078:U:H1'	5:E:135:ASN:HD21	1.70	0.57
1:A:1270:G:HO2'	1:A:1313:U:HO2'	1.52	0.57
15:O:26:GLU:OE2	15:O:77:ARG:NE	2.28	0.56
1:A:202:G:HO2'	1:A:468:A:H8	1.54	0.56
1:A:1405:G:HO2'	1:A:1518:MA6:HO2'	1.53	0.56
11:K:59:THR:HG23	11:K:62:ALA:H	1.70	0.56
13:M:64:VAL:HG23	13:M:64:VAL:O	2.05	0.56
2:B:111:ILE:HD12	2:B:152:LYS:HA	1.87	0.56
1:A:6:G:HO2'	1:A:7:A:H8	1.53	0.56
1:A:1426:G:H2'	1:A:1427:C:C6	2.41	0.56
21:U:28:VAL:O	21:U:32:VAL:HG23	2.05	0.56
2:B:68:LEU:HD23	2:B:161:LEU:CD2	2.36	0.56
7:G:104:ILE:HD11	7:G:124:LEU:HA	1.88	0.56
1:A:451:A:H61	1:A:481:G:H5'	1.70	0.55
7:G:35:LYS:HB3	7:G:38:THR:HB	1.88	0.55
1:A:77:A:H2'	1:A:78:A:H8	1.71	0.55
1:A:1064:G:O2'	1:A:1190:G:N2	2.39	0.55
4:D:95:GLU:HA	4:D:100:ASN:HD22	1.71	0.55
13:M:81:MET:O	13:M:92:ARG:NH2	2.39	0.55
3:C:56:VAL:HG22	3:C:67:THR:HB	1.87	0.55
4:D:25:VAL:HG13	4:D:26:ARG:HG3	1.89	0.55
13:M:4:ILE:HA	13:M:57:ARG:HG2	1.87	0.55
21:U:31:GLU:HG3	21:U:34:ARG:NH2	2.21	0.55
10:J:53:ILE:HD11	10:J:61:ALA:HB1	1.89	0.55
1:A:1516:2MG:N2	1:A:1519:MA6:OP2	2.36	0.55
1:A:1080:A:OP1	5:E:52:LYS:HD2	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:696:A:N3	1:A:786:G:O2'	2.36	0.55
1:A:212:G:O2'	1:A:213:G:OP1	2.21	0.54
1:A:401:C:O2'	1:A:621:A:N3	2.33	0.54
1:A:769:G:H4'	1:A:1513:A:H4'	1.89	0.54
13:M:52:GLN:O	13:M:55:THR:HG22	2.07	0.54
1:A:1006:G:O6	1:A:1023:U:C2	2.60	0.54
3:C:138:VAL:HA	3:C:149:ILE:HD13	1.90	0.54
1:A:1178:G:N2	1:A:1181:G:OP2	2.38	0.54
1:A:1231:G:H5"	9:I:129:LYS:HE2	1.89	0.54
7:G:68:ASN:ND2	7:G:128:ALA:O	2.41	0.54
13:M:86:TYR:CZ	13:M:90:ARG:HD2	2.43	0.54
1:A:67:C:H2'	1:A:68:G:C8	2.43	0.54
1:A:523:A:C2	12:L:88:LYS:HB3	2.42	0.54
17:Q:25:ILE:HD11	17:Q:61:ILE:HD11	1.88	0.54
1:A:1026:G:N1	1:A:1035:A:H2	1.97	0.54
3:C:80:LYS:CA	3:C:80:LYS:CE	2.86	0.54
12:L:42:PRO:HA	12:L:90:LEU:HD23	1.89	0.54
13:M:2:ALA:O	13:M:10:PRO:HD2	2.08	0.54
1:A:1086:U:H3	1:A:1099:G:H22	1.56	0.53
1:A:1316:G:N1	1:A:1319:A:OP2	2.41	0.53
1:A:1428:A:H2'	1:A:1429:A:H8	1.73	0.53
1:A:1477:U:H2'	1:A:1478:U:H6	1.74	0.53
2:B:173:ILE:HG23	2:B:183:VAL:HG21	1.89	0.53
14:N:52:PRO:O	14:N:55:SER:OG	2.21	0.53
1:A:161:A:N1	1:A:347:G:O2'	2.32	0.53
1:A:477:C:H2'	1:A:478:A:C8	2.43	0.53
1:A:1143:G:H2'	1:A:1144:G:H8	1.73	0.53
7:G:60:GLU:N	7:G:60:GLU:OE1	2.41	0.53
15:O:45:GLU:O	15:O:47:LYS:NZ	2.40	0.53
1:A:486:U:H2'	1:A:487:A:H8	1.73	0.53
1:A:1218:C:H2'	1:A:1219:A:C8	2.44	0.53
1:A:1423:G:H2'	1:A:1424:U:O4'	2.08	0.53
17:Q:79:VAL:HG12	17:Q:80:GLU:HG2	1.91	0.53
1:A:1299:A:N3	1:A:1299:A:H2'	2.22	0.53
2:B:165:ASP:CG	2:B:204:ASP:OD2	2.47	0.53
1:A:1140:C:O2'	1:A:1141:C:O5'	2.26	0.53
4:D:116:GLN:HE21	4:D:154:ARG:HH12	1.56	0.53
6:F:10:VAL:HG11	6:F:18:VAL:HG21	1.90	0.53
7:G:37:SER:HA	7:G:40:GLU:HG2	1.91	0.53
12:L:25:GLU:OE1	12:L:59:ASN:ND2	2.38	0.53
1:A:1317:C:O5'	14:N:24:ARG:NH2	2.41	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:123:GLN:HG2	3:C:126:ARG:HH21	1.74	0.53
1:A:52:C:H2'	1:A:53:A:C8	2.43	0.53
7:G:103:TRP:CG	7:G:137:LYS:HE3	2.44	0.53
1:A:1140:C:HO2'	1:A:1141:C:C5'	2.21	0.52
2:B:31:ILE:HD13	2:B:39:HIS:CE1	2.44	0.52
6:F:49:TYR:CE1	18:R:66:SER:HA	2.43	0.52
1:A:1277:C:O2'	1:A:1279:G:H8	1.91	0.52
9:I:88:MET:HE3	9:I:104:VAL:CG2	2.39	0.52
1:A:1474:U:H2'	1:A:1475:G:C8	2.45	0.52
1:A:427:U:OP2	1:A:428:G:O2'	2.23	0.52
1:A:1068:G:N2	1:A:1191:A:N3	2.47	0.52
9:I:88:MET:SD	9:I:95:ARG:NH2	2.83	0.52
15:O:26:GLU:HG3	15:O:81:LEU:HD22	1.91	0.52
1:A:494:G:O2'	1:A:496:A:H1'	2.10	0.52
1:A:1410:A:H2'	1:A:1411:C:C6	2.44	0.52
7:G:50:LEU:HG	7:G:54:SER:HB2	1.92	0.52
1:A:720:C:H5"	18:R:41:PRO:HA	1.92	0.52
1:A:946:A:H2'	1:A:947:G:C8	2.45	0.52
3:C:62:LYS:O	3:C:62:LYS:HG2	2.10	0.52
8:H:12:THR:HG22	8:H:15:ARG:NH2	2.22	0.52
8:H:18:GLN:HE21	8:H:72:VAL:HB	1.74	0.52
17:Q:58:VAL:HB	17:Q:80:GLU:HB2	1.92	0.52
1:A:944:G:N1	1:A:1338:G:OP2	2.39	0.51
1:A:1530:G:H2'	1:A:1531:A:C8	2.45	0.51
3:C:91:VAL:HG21	3:C:101:ILE:HD11	1.92	0.51
16:P:8:ARG:HH22	16:P:15:PRO:HG3	1.74	0.51
8:H:47:GLU:HG2	8:H:64:LYS:HB2	1.92	0.51
10:J:21:ALA:HB1	10:J:92:LEU:HD13	1.92	0.51
13:M:5:ALA:HB2	13:M:60:VAL:HG11	1.93	0.51
16:P:66:THR:HG22	16:P:67:ILE:N	2.26	0.51
1:A:269:C:H2'	1:A:270:A:C8	2.46	0.51
21:U:40:LYS:HG2	21:U:42:THR:HG22	1.93	0.51
2:B:23:TRP:HB3	2:B:39:HIS:CD2	2.45	0.51
8:H:111:MET:HG3	8:H:116:ALA:HB2	1.92	0.51
1:A:1038:C:H2'	1:A:1039:G:H8	1.75	0.51
12:L:85:GLY:HA3	12:L:96:HIS:HD2	1.75	0.51
15:O:29:VAL:HG23	15:O:63:ARG:HG3	1.91	0.51
1:A:212:G:HO2'	1:A:213:G:P	2.33	0.51
1:A:1031:C:H4'	1:A:1032:G:O5'	2.11	0.50
1:A:1191:A:OP2	3:C:2:GLY:N	2.45	0.50
7:G:26:PHE:O	7:G:29:ILE:HG22	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:86:G:H1'	1:A:87:C:H5	1.76	0.50
8:H:11:LEU:HD22	8:H:75:ILE:HD11	1.94	0.50
1:A:475:C:H2'	1:A:476:U:C6	2.47	0.50
1:A:1415:G:H3'	1:A:1416:G:H8	1.76	0.50
20:T:44:LYS:HE2	20:T:86:LEU:HB2	1.92	0.50
1:A:464:U:O2'	1:A:466:A:N7	2.36	0.50
1:A:1266:G:N2	1:A:1269:A:OP2	2.42	0.50
1:A:1518:MA6:N6	1:A:1519:MA6:H103	2.26	0.50
4:D:198:HIS:HA	4:D:201:VAL:HG22	1.93	0.50
1:A:1119:C:OP1	9:I:85:ARG:NH1	2.44	0.50
10:J:8:ILE:HG22	10:J:100:ILE:HG12	1.92	0.50
1:A:920:U:O4'	1:A:1080:A:C2	2.65	0.50
1:A:356:A:N3	1:A:368:U:O2'	2.38	0.50
1:A:1420:U:H2'	1:A:1421:G:C8	2.46	0.50
11:K:45:ALA:HB3	11:K:70:CYS:HB2	1.93	0.50
3:C:6:HIS:HE1	3:C:8:ASN:HB3	1.76	0.50
1:A:920:U:O4'	1:A:1080:A:N1	2.45	0.49
1:A:1151:A:HO2'	1:A:1152:A:H8	1.60	0.49
11:K:67:ALA:HB2	11:K:96:THR:HG23	1.92	0.49
1:A:171:A:H2'	1:A:172:A:C8	2.47	0.49
1:A:390:U:H2'	1:A:391:G:C8	2.48	0.49
4:D:116:GLN:NE2	4:D:154:ARG:HH12	2.08	0.49
13:M:10:PRO:HB2	13:M:18:ALA:HB1	1.94	0.49
1:A:1147:C:O2'	9:I:7:TYR:OH	2.23	0.49
6:F:4:TYR:CE2	6:F:71:ILE:HG13	2.47	0.49
10:J:10:LEU:HD22	10:J:98:VAL:HG22	1.94	0.49
11:K:106:ARG:HH21	11:K:108:THR:HG22	1.77	0.49
1:A:1485:U:O2'	1:A:1486:G:H5"	2.12	0.49
1:A:475:C:H2'	1:A:476:U:H6	1.78	0.49
1:A:252:U:O4	1:A:253:A:N6	2.45	0.49
1:A:685:G:O2'	1:A:686:U:O5'	2.27	0.49
1:A:948:C:OP1	13:M:108:THR:HG22	2.12	0.49
1:A:1179:A:H5"	9:I:104:VAL:HG12	1.94	0.49
9:I:19:VAL:HG22	9:I:65:ILE:HG12	1.94	0.49
10:J:14:ASP:OD2	10:J:17:LEU:N	2.45	0.49
12:L:79:VAL:HG12	12:L:102:LEU:HD23	1.95	0.48
9:I:26:GLY:HA2	9:I:61:LEU:O	2.12	0.48
10:J:15:HIS:HA	10:J:18:ILE:HG22	1.95	0.48
1:A:1402:4OC:HM22	1:A:1403:C:H5'	1.95	0.48
1:A:1384:C:H2'	1:A:1385:G:C8	2.48	0.48
8:H:105:SER:HB3	8:H:126:ILE:HD11	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1410:A:H2'	1:A:1411:C:H6	1.77	0.48
1:A:1414:U:O2	1:A:1486:G:O6	2.32	0.48
1:A:6:G:O6	5:E:100:SER:N	2.44	0.48
1:A:471:U:O2'	1:A:472:U:OP1	2.30	0.48
1:A:685:G:H4'	1:A:686:U:OP1	2.13	0.48
1:A:1297:G:N2	1:A:1298:U:O4	2.39	0.48
1:A:126:G:OP1	1:A:605:U:O2'	2.22	0.48
1:A:1349:A:OP1	9:I:123:ARG:HB2	2.14	0.48
10:J:71:LEU:O	10:J:72:ARG:NH1	2.36	0.48
18:R:33:ILE:HD11	18:R:59:ILE:HG21	1.96	0.47
1:A:501:C:H2'	1:A:502:A:C8	2.48	0.47
1:A:855:U:OP2	1:A:871:U:N3	2.41	0.47
2:B:187:VAL:O	2:B:201:PRO:HA	2.14	0.47
7:G:132:GLY:O	7:G:135:VAL:HG22	2.13	0.47
1:A:1518:MA6:H8	1:A:1518:MA6:OP2	2.13	0.47
3:C:59:ARG:NH1	3:C:64:ILE:HD12	2.29	0.47
13:M:96:PRO:HA	13:M:109:ARG:HD3	1.95	0.47
7:G:65:ALA:HA	7:G:128:ALA:HA	1.96	0.47
9:I:115:LYS:HB2	9:I:118:LEU:HD12	1.95	0.47
11:K:21:ALA:HB2	11:K:82:LEU:HD12	1.95	0.47
2:B:73:LYS:HB2	2:B:76:ALA:HB3	1.95	0.47
1:A:684:U:O2'	11:K:40:ASN:HB3	2.15	0.47
3:C:59:ARG:NH2	3:C:64:ILE:HD12	2.29	0.47
6:F:38:ARG:HB3	6:F:63:ASN:HB2	1.96	0.47
3:C:79:LYS:O	3:C:82:GLU:HG2	2.14	0.47
4:D:54:GLN:HG3	4:D:203:LEU:HD13	1.97	0.47
10:J:3:ASN:HD21	10:J:5:ARG:HB2	1.80	0.47
10:J:66:GLU:OE2	10:J:68:ARG:NH1	2.45	0.47
1:A:80:A:H3'	1:A:81:A:O4'	2.15	0.47
1:A:362:G:N1	1:A:365:U:OP2	2.45	0.47
1:A:993:G:O2'	1:A:994:A:N7	2.48	0.47
3:C:42:TYR:OH	3:C:90:VAL:HG11	2.14	0.47
16:P:8:ARG:NH1	16:P:15:PRO:HB3	2.30	0.47
1:A:1166:G:O2'	1:A:1169:A:N6	2.47	0.46
3:C:15:VAL:HB	3:C:207:ILE:HD12	1.96	0.46
10:J:26:VAL:O	10:J:30:LYS:HB2	2.15	0.46
1:A:96:U:H2'	1:A:97:G:H8	1.80	0.46
1:A:946:A:O2'	1:A:1333:A:N3	2.41	0.46
1:A:1420:U:H2'	1:A:1421:G:H8	1.80	0.46
9:I:104:VAL:O	9:I:104:VAL:CG1	2.61	0.46
21:U:40:LYS:O	21:U:43:THR:OG1	2.29	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:460:A:H61	1:A:472:U:H3	1.63	0.46
1:A:908:A:H2'	1:A:909:A:C8	2.50	0.46
1:A:1180:A:OP2	9:I:99:ARG:NH2	2.48	0.46
1:A:718:A:O2'	21:U:35:ARG:NH2	2.48	0.46
1:A:108:G:H5'	1:A:109:A:H5'	1.97	0.46
1:A:212:G:H2'	1:A:213:G:H8	1.81	0.46
4:D:171:LEU:HD23	4:D:182:PHE:HA	1.97	0.46
6:F:43:GLY:HA2	6:F:58:HIS:CE1	2.51	0.46
9:I:91:ASP:HB3	9:I:94:LEU:HG	1.97	0.46
10:J:45:ARG:NH2	10:J:47:GLU:OE2	2.48	0.46
11:K:35:THR:HG22	11:K:41:ALA:CA	2.27	0.46
1:A:1029:U:O2'	1:A:1032:G:O6	2.33	0.46
1:A:1115:U:OP1	10:J:68:ARG:NH2	2.49	0.46
1:A:999:C:H2'	1:A:1000:A:C8	2.51	0.46
1:A:1412:C:H2'	1:A:1413:A:C8	2.50	0.46
3:C:110:GLU:HB2	3:C:144:LEU:HD22	1.97	0.46
7:G:97:ASN:O	7:G:101:MET:HG2	2.16	0.46
11:K:85:MET:SD	11:K:111:THR:HB	2.56	0.46
13:M:83:LEU:HD11	19:S:66:MET:HG2	1.98	0.46
16:P:44:SER:C	16:P:46:LYS:H	2.19	0.46
1:A:147:G:H2'	1:A:148:G:C8	2.51	0.46
1:A:298:A:HO2'	1:A:299:G:P	2.39	0.46
1:A:996:A:H2'	1:A:997:U:C6	2.50	0.46
1:A:628:G:H2'	1:A:629:A:C8	2.51	0.46
4:D:72:PHE:CE2	4:D:94:LEU:HD11	2.51	0.46
8:H:79:SER:HB2	8:H:125:ILE:O	2.16	0.46
9:I:11:ARG:HA	9:I:15:SER:O	2.16	0.46
1:A:134:G:H1'	1:A:325:A:C5	2.51	0.45
1:A:797:C:H2'	1:A:798:U:H6	1.81	0.45
1:A:920:U:C1'	1:A:1080:A:C2	2.99	0.45
3:C:70:THR:HG21	3:C:76:VAL:HG11	1.98	0.45
13:M:66:GLU:HB3	13:M:67:GLY:H	1.65	0.45
21:U:27:GLY:O	21:U:30:ALA:N	2.47	0.45
1:A:266:G:H3'	17:Q:69:LYS:HB2	1.97	0.45
7:G:69:VAL:HG23	7:G:135:VAL:HA	1.98	0.45
1:A:1380:U:C5	7:G:3:ARG:HA	2.51	0.45
8:H:103:VAL:HG12	8:H:126:ILE:HD12	1.98	0.45
1:A:324:G:N2	1:A:327:A:OP2	2.49	0.45
1:A:429:U:H5'	4:D:9:LEU:HD12	1.98	0.45
1:A:1040:U:H2'	1:A:1041:G:C8	2.50	0.45
7:G:51:ALA:HB2	7:G:58:GLU:HB3	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:M:8:ASN:CG	13:M:66:GLU:OE2	2.55	0.45
1:A:677:U:O2	1:A:777:A:O2'	2.32	0.45
1:A:973:G:H1'	10:J:56:HIS:CD2	2.51	0.45
1:A:1273:C:H2'	1:A:1274:A:O4'	2.17	0.45
6:F:2:ARG:HD3	6:F:91:ARG:HD2	1.99	0.45
1:A:789:U:N3	1:A:792:A:OP2	2.39	0.45
5:E:14:LYS:HG2	5:E:113:ALA:HB1	1.99	0.45
5:E:45:ARG:HD2	5:E:71:MET:HB2	1.98	0.45
11:K:61:PHE:O	11:K:65:VAL:HG23	2.17	0.45
1:A:80:A:C2	1:A:81:A:H1'	2.52	0.45
1:A:371:A:H2'	1:A:372:C:O4'	2.16	0.45
1:A:1038:C:H2'	1:A:1039:G:C8	2.52	0.45
4:D:167:LYS:HD2	4:D:167:LYS:N	2.31	0.45
1:A:20:U:H2'	1:A:21:G:O4'	2.16	0.45
4:D:3:ARG:HH11	4:D:115:ARG:HD3	1.82	0.45
4:D:51:TYR:HA	4:D:54:GLN:HE21	1.82	0.45
1:A:212:G:H2'	1:A:213:G:C8	2.51	0.44
7:G:65:ALA:HB2	7:G:128:ALA:HB2	1.98	0.44
7:G:101:MET:O	7:G:104:ILE:HG22	2.16	0.44
8:H:77:ARG:NH2	8:H:79:SER:O	2.50	0.44
16:P:56:ARG:HD2	16:P:56:ARG:HA	1.63	0.44
1:A:202:G:O2'	1:A:468:A:H8	1.99	0.44
1:A:410:G:H2'	1:A:429:U:C4	2.52	0.44
1:A:920:U:H1'	1:A:1080:A:C2	2.52	0.44
1:A:1013:G:N2	1:A:1016:A:OP2	2.42	0.44
1:A:1189:U:OP1	14:N:98:LYS:NZ	2.51	0.44
7:G:113:ASP:HB3	7:G:118:LEU:HD23	1.99	0.44
13:M:41:GLU:OE1	13:M:41:GLU:N	2.50	0.44
1:A:73:C:O2'	1:A:74:A:O4'	2.34	0.44
1:A:86:G:H21	1:A:87:C:H42	1.64	0.44
2:B:174:LYS:HB2	2:B:174:LYS:HE2	1.78	0.44
11:K:87:LYS:HD3	11:K:113:VAL:HG23	1.99	0.44
1:A:685:G:HO2'	1:A:686:U:C5'	2.27	0.44
1:A:719:C:OP2	1:A:720:C:N4	2.42	0.44
1:A:797:C:H2'	1:A:798:U:C6	2.53	0.44
1:A:1028:C:C2	1:A:1029:U:H1'	2.52	0.44
1:A:1344:C:H4'	9:I:122:ARG:O	2.18	0.44
6:F:16:GLU:O	6:F:19:PRO:HD2	2.17	0.44
1:A:131:A:H2'	1:A:132:C:C6	2.52	0.44
4:D:188:ARG:HA	4:D:188:ARG:HD2	1.85	0.44
1:A:1179:A:H2'	1:A:1180:A:O4'	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:72:THR:OG1	2:B:169:GLU:OE2	2.27	0.44
7:G:112:GLY:N	7:G:119:ARG:HD3	2.32	0.44
1:A:173:U:H6	1:A:198:G:HO2'	1.63	0.44
1:A:890:G:O2'	1:A:906:A:N6	2.51	0.44
1:A:1305:G:HO2'	1:A:1306:A:H8	1.60	0.44
2:B:171:ILE:O	2:B:175:GLU:HG3	2.18	0.44
15:O:47:LYS:HE2	15:O:47:LYS:HB2	1.78	0.44
18:R:59:ILE:O	18:R:63:ARG:HG3	2.18	0.44
1:A:259:G:OP1	20:T:36:TYR:OH	2.32	0.43
2:B:154:MET:HG2	2:B:156:GLY:O	2.18	0.43
13:M:34:LEU:HD13	13:M:41:GLU:HA	1.99	0.43
1:A:720:C:H2'	1:A:721:G:C8	2.53	0.43
1:A:745:G:H2'	1:A:746:A:C8	2.52	0.43
1:A:1427:C:H2'	1:A:1428:A:H8	1.82	0.43
7:G:99:LEU:HD12	7:G:103:TRP:CZ2	2.52	0.43
8:H:10:MET:O	8:H:14:ILE:HG12	2.18	0.43
15:O:28:GLN:O	15:O:32:LEU:HD23	2.18	0.43
21:U:29:LEU:O	21:U:33:ARG:HG2	2.18	0.43
3:C:83:ASP:OD1	3:C:83:ASP:N	2.49	0.43
1:A:180:U:H2'	1:A:181:A:H5'	2.01	0.43
1:A:436:C:H2'	1:A:437:U:C6	2.54	0.43
1:A:486:U:H2'	1:A:487:A:C8	2.53	0.43
1:A:1010:U:H2'	1:A:1011:C:C6	2.53	0.43
1:A:1134:G:H2'	1:A:1135:U:O4'	2.19	0.43
4:D:126:ASN:HD21	4:D:141:ASP:HA	1.82	0.43
1:A:864:A:H2'	1:A:865:A:C8	2.54	0.43
1:A:1004:A:N7	1:A:1024:G:O2'	2.41	0.43
1:A:1484:C:N4	1:A:1485:U:O4	2.52	0.43
3:C:84:VAL:O	3:C:87:LEU:HB2	2.19	0.43
5:E:115:LEU:HB3	5:E:120:VAL:CG2	2.48	0.43
8:H:8:ALA:O	8:H:12:THR:HG23	2.18	0.43
12:L:107:VAL:HG23	12:L:117:TYR:HB3	2.00	0.43
4:D:206:LYS:HE3	4:D:206:LYS:HB2	1.74	0.43
21:U:49:LYS:HD2	21:U:49:LYS:HA	1.89	0.43
1:A:17:U:H2'	1:A:18:C:C6	2.53	0.43
1:A:1040:U:H2'	1:A:1041:G:H8	1.83	0.43
20:T:8:LYS:O	20:T:12:ILE:HG12	2.18	0.43
8:H:75:ILE:CD1	8:H:129:VAL:HG22	2.48	0.43
21:U:40:LYS:HG3	21:U:41:PRO:HD2	2.01	0.43
1:A:82:G:N3	1:A:82:G:H2'	2.34	0.43
1:A:921:U:H2'	1:A:922:G:O4'	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:68:LEU:HA	2:B:90:PHE:O	2.19	0.43
2:B:187:VAL:N	2:B:200:ILE:O	2.45	0.43
5:E:157:ARG:NH1	8:H:99:LEU:O	2.49	0.43
1:A:58:C:O2'	1:A:388:G:N7	2.45	0.42
1:A:96:U:H2'	1:A:97:G:C8	2.53	0.42
1:A:517:G:N1	1:A:533:A:OP1	2.40	0.42
1:A:555:U:H2'	1:A:556:C:C6	2.54	0.42
1:A:1431:A:C6	1:A:1432:G:C6	3.07	0.42
2:B:9:MET:HB3	2:B:14:VAL:HB	2.00	0.42
1:A:757:U:OP1	1:A:822:U:O2'	2.33	0.42
1:A:1026:G:C6	1:A:1035:A:N1	2.87	0.42
1:A:1402:4OC:H6	1:A:1402:4OC:O5'	2.19	0.42
9:I:87:LEU:HD23	9:I:87:LEU:HA	1.82	0.42
13:M:5:ALA:HB3	13:M:22:ILE:HG21	2.01	0.42
1:A:410:G:OP2	4:D:31:LYS:NZ	2.44	0.42
4:D:99:ASP:OD1	4:D:100:ASN:N	2.51	0.42
5:E:159:LYS:HD3	5:E:163:GLU:OE2	2.19	0.42
10:J:28:THR:HG21	10:J:90:LEU:HD21	2.00	0.42
16:P:70:ARG:O	16:P:74:LEU:HG	2.19	0.42
1:A:8:A:C6	4:D:206:LYS:HB3	2.55	0.42
1:A:205:A:H2'	1:A:206:C:O4'	2.19	0.42
1:A:1406:U:H2'	1:A:1407:5MC:O4'	2.19	0.42
11:K:84:VAL:HB	11:K:110:ILE:HD12	2.02	0.42
13:M:83:LEU:HG	19:S:74:PHE:HE2	1.84	0.42
1:A:560:A:H4'	1:A:561:U:H5"	2.00	0.42
3:C:181:ASP:HB2	3:C:207:ILE:HG13	2.02	0.42
5:E:15:LEU:HD21	5:E:18:VAL:HG13	2.01	0.42
9:I:57:MET:HE2	9:I:61:LEU:HD11	2.00	0.42
1:A:62:U:O2'	1:A:379:C:O2	2.38	0.42
2:B:143:LYS:HE2	2:B:143:LYS:HB3	1.92	0.42
3:C:125:GLU:HG3	3:C:189:ALA:HB1	2.02	0.42
4:D:100:ASN:O	4:D:104:ARG:HG2	2.20	0.42
5:E:38:VAL:HG12	5:E:117:VAL:HG21	2.02	0.42
14:N:88:ALA:HB2	14:N:96:LEU:HD23	2.01	0.42
20:T:35:VAL:O	20:T:39:ILE:HG13	2.20	0.42
1:A:559:A:H4'	1:A:560:A:H3'	2.02	0.42
1:A:740:U:OP1	15:O:38:HIS:HE1	2.03	0.42
1:A:1240:U:OP1	7:G:116:MET:HB2	2.20	0.42
10:J:32:THR:CG2	10:J:83:THR:OG1	2.66	0.42
1:A:298:A:O2'	1:A:299:G:OP1	2.28	0.42
1:A:324:G:N1	1:A:327:A:OP2	2.47	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
18:R:21:ILE:HG21	18:R:55:LEU:HD23	2.01	0.42
1:A:59:A:H5"	1:A:387:U:H5"	2.02	0.42
1:A:411:A:H4'	1:A:412:A:H5'	2.02	0.42
1:A:600:A:H2'	1:A:601:G:C8	2.55	0.42
1:A:751:U:H4'	15:O:24:SER:HA	2.02	0.42
1:A:779:C:H2'	1:A:780:A:O4'	2.20	0.42
15:O:25:THR:HB	15:O:70:LEU:HD22	2.00	0.42
17:Q:58:VAL:HG12	17:Q:79:VAL:HB	2.01	0.42
1:A:163:C:H2'	1:A:164:G:O4'	2.20	0.41
1:A:464:U:H2'	1:A:466:A:OP2	2.19	0.41
1:A:696:A:H2'	1:A:697:U:C6	2.54	0.41
12:L:102:LEU:HB3	12:L:103:ASP:H	1.64	0.41
18:R:13:PHE:CZ	18:R:55:LEU:HD21	2.55	0.41
19:S:36:ARG:HD2	19:S:52:HIS:O	2.20	0.41
1:A:95:C:H2'	1:A:96:U:C6	2.56	0.41
3:C:180:ALA:HB1	3:C:203:PHE:CE1	2.55	0.41
11:K:14:LYS:HA	11:K:14:LYS:HD2	1.73	0.41
1:A:1347:G:O2'	1:A:1373:G:O6	2.31	0.41
2:B:90:PHE:CE2	2:B:154:MET:HA	2.55	0.41
9:I:9:THR:O	9:I:85:ARG:HD2	2.21	0.41
1:A:524:G:H2'	1:A:525:C:C6	2.55	0.41
1:A:1235:U:H2'	1:A:1236:A:O4'	2.21	0.41
2:B:60:ILE:HG22	2:B:65:GLY:HA3	2.01	0.41
4:D:19:LEU:HB2	4:D:21:LEU:HG	2.03	0.41
7:G:24:ALA:O	7:G:27:VAL:HG22	2.20	0.41
14:N:11:VAL:HA	14:N:14:VAL:HG12	2.02	0.41
19:S:21:LYS:HE3	19:S:21:LYS:HB2	1.93	0.41
1:A:1297:G:H1'	1:A:1298:U:H5	1.85	0.41
9:I:116:VAL:HG11	10:J:62:ARG:HG2	2.03	0.41
2:B:162:PHE:HA	2:B:184:PHE:O	2.20	0.41
1:A:123:U:H5"	1:A:311:C:O2'	2.20	0.41
1:A:258:G:H5"	20:T:82:GLN:HE21	1.85	0.41
1:A:413:G:H1'	1:A:428:G:H21	1.85	0.41
1:A:539:A:H2'	1:A:540:G:C8	2.56	0.41
1:A:767:A:H2'	1:A:768:A:O4'	2.21	0.41
1:A:859:G:H2'	1:A:860:A:C8	2.55	0.41
2:B:221:VAL:O	2:B:225:ARG:HG2	2.20	0.41
5:E:93:ARG:HB2	5:E:128:TYR:HB2	2.03	0.41
9:I:97:GLU:OE1	9:I:97:GLU:N	2.41	0.41
9:I:106:ARG:HA	9:I:106:ARG:HD2	1.87	0.41
11:K:84:VAL:HB	11:K:110:ILE:CD1	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:649:A:H2'	1:A:650:G:O4'	2.21	0.41
1:A:1019:A:H2'	1:A:1020:G:O4'	2.21	0.41
1:A:1419:G:O2'	1:A:1420:U:H5'	2.21	0.41
2:B:20:THR:O	2:B:23:TRP:HD1	2.04	0.41
3:C:136:ARG:HA	3:C:139:GLN:HG2	2.02	0.41
13:M:79:ARG:O	13:M:83:LEU:HB2	2.21	0.41
1:A:74:A:H2'	1:A:75:G:O4'	2.21	0.41
1:A:1486:G:H2'	1:A:1487:G:O4'	2.21	0.41
2:B:90:PHE:CZ	2:B:154:MET:HA	2.56	0.41
3:C:54:ARG:HG2	3:C:69:HIS:HB2	2.02	0.41
3:C:181:ASP:HB3	3:C:205:GLY:O	2.20	0.41
7:G:68:ASN:O	7:G:138:ARG:NH1	2.54	0.41
9:I:41:ARG:HH21	9:I:43:THR:HB	1.86	0.41
19:S:30:PRO:HA	19:S:48:THR:O	2.21	0.41
1:A:730:G:C5	1:A:731:G:H1'	2.56	0.41
1:A:1305:G:O2'	1:A:1306:A:H8	2.04	0.41
3:C:77:ILE:O	3:C:81:GLY:HA2	2.21	0.41
6:F:56:LYS:HD3	6:F:56:LYS:HA	1.92	0.41
15:O:17:ARG:H	15:O:17:ARG:HG2	1.74	0.41
21:U:11:PRO:HB2	21:U:13:ASP:OD1	2.21	0.41
1:A:1133:G:H2'	1:A:1134:G:C8	2.56	0.40
1:A:1305:G:N2	1:A:1331:G:H1'	2.36	0.40
1:A:384:G:H2'	1:A:385:C:C6	2.56	0.40
7:G:112:GLY:H	7:G:119:ARG:HD3	1.86	0.40
19:S:40:ILE:HG13	19:S:69:HIS:O	2.21	0.40
19:S:80:TYR:CZ	19:S:82:GLY:HA2	2.56	0.40
1:A:56:U:H2'	1:A:57:G:C8	2.56	0.40
1:A:89:U:O2'	1:A:90:C:O5'	2.40	0.40
1:A:701:U:H4'	1:A:702:A:H5"	2.03	0.40
4:D:48:LEU:HD12	4:D:48:LEU:HA	1.94	0.40
8:H:94:LYS:HE2	8:H:94:LYS:HB3	1.90	0.40
11:K:31:ILE:HG23	11:K:46:THR:HG22	2.04	0.40
12:L:53:CYS:HB2	12:L:67:ILE:HD11	2.04	0.40
10:J:45:ARG:HB3	10:J:69:THR:CG2	2.51	0.40
14:N:62:ASN:HB3	14:N:73:PHE:CD2	2.56	0.40
1:A:335:C:O2'	1:A:1433:A:N3	2.46	0.40
1:A:841:C:H42	1:A:845:A:H62	1.68	0.40
1:A:841:C:N4	1:A:845:A:H62	2.20	0.40
1:A:1032:G:O6	1:A:1033:G:N2	2.55	0.40
1:A:1427:C:H2'	1:A:1428:A:C8	2.57	0.40
1:A:1458:G:H5"	20:T:26:SER:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1504:G:OP2	1:A:1507:A:O2'	2.37	0.40
5:E:97:GLN:HG2	5:E:124:LEU:HB2	2.04	0.40
17:Q:43:LYS:HE2	17:Q:43:LYS:HB3	1.75	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	222/241 (92%)	218 (98%)	4 (2%)	0	100	100
3	C	209/233 (90%)	204 (98%)	5 (2%)	0	100	100
4	D	203/206 (98%)	198 (98%)	5 (2%)	0	100	100
5	E	154/167 (92%)	151 (98%)	3 (2%)	0	100	100
6	F	104/135 (77%)	104 (100%)	0	0	100	100
7	G	149/179 (83%)	140 (94%)	9 (6%)	0	100	100
8	H	127/130 (98%)	125 (98%)	2 (2%)	0	100	100
9	I	125/130 (96%)	123 (98%)	2 (2%)	0	100	100
10	J	98/103 (95%)	94 (96%)	4 (4%)	0	100	100
11	K	115/129 (89%)	112 (97%)	3 (3%)	0	100	100
12	L	120/124 (97%)	116 (97%)	4 (3%)	0	100	100
13	M	113/118 (96%)	111 (98%)	2 (2%)	0	100	100
14	N	98/101 (97%)	96 (98%)	2 (2%)	0	100	100
15	O	86/89 (97%)	85 (99%)	1 (1%)	0	100	100
16	P	80/82 (98%)	78 (98%)	2 (2%)	0	100	100
17	Q	78/84 (93%)	76 (97%)	2 (3%)	0	100	100
18	R	63/75 (84%)	63 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
19	S	81/92 (88%)	80 (99%)	1 (1%)	0	100	100
20	T	84/87 (97%)	84 (100%)	0	0	100	100
21	U	50/71 (70%)	47 (94%)	3 (6%)	0	100	100
All	All	2359/2576 (92%)	2305 (98%)	54 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	186/199 (94%)	186 (100%)	0	100	100
3	C	172/190 (90%)	172 (100%)	0	100	100
4	D	172/173 (99%)	172 (100%)	0	100	100
5	E	119/126 (94%)	119 (100%)	0	100	100
6	F	92/116 (79%)	92 (100%)	0	100	100
7	G	124/147 (84%)	123 (99%)	1 (1%)	81	94
8	H	104/105 (99%)	104 (100%)	0	100	100
9	I	105/107 (98%)	105 (100%)	0	100	100
10	J	88/90 (98%)	88 (100%)	0	100	100
11	K	90/99 (91%)	90 (100%)	0	100	100
12	L	102/103 (99%)	102 (100%)	0	100	100
13	M	93/96 (97%)	93 (100%)	0	100	100
14	N	83/84 (99%)	83 (100%)	0	100	100
15	O	76/77 (99%)	76 (100%)	0	100	100
16	P	65/65 (100%)	65 (100%)	0	100	100
17	Q	74/78 (95%)	74 (100%)	0	100	100
18	R	56/65 (86%)	56 (100%)	0	100	100
19	S	72/79 (91%)	72 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
20	T	65/66 (98%)	65 (100%)	0	100	100
21	U	43/61 (70%)	43 (100%)	0	100	100
All	All	1981/2126 (93%)	1980 (100%)	1 (0%)	93	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
7	G	87	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	51	ASN
2	B	122	GLN
3	C	3	GLN
4	D	40	GLN
4	D	116	GLN
4	D	126	ASN
4	D	152	GLN
5	E	78	ASN
5	E	83	HIS
5	E	89	HIS
5	E	97	GLN
5	E	135	ASN
5	E	146	ASN
5	E	148	ASN
6	F	17	GLN
8	H	18	GLN
9	I	4	ASN
9	I	32	GLN
10	J	3	ASN
10	J	99	GLN
11	K	15	GLN
11	K	22	HIS
11	K	81	ASN
12	L	5	ASN
12	L	6	GLN
12	L	96	HIS
14	N	35	ASN
15	O	35	GLN

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Mol	Chain	Res	Type
15	O	38	HIS
16	P	26	ASN
17	Q	50	ASN
18	R	74	HIS
20	T	3	ASN
20	T	20	HIS
20	T	61	GLN
20	T	70	ASN
20	T	78	ASN
20	T	82	GLN
20	T	84	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1530/1542 (99%)	270 (17%)	6 (0%)

All (270) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	4	U
1	A	5	U
1	A	6	G
1	A	9	G
1	A	22	G
1	A	39	G
1	A	44	A
1	A	47	C
1	A	48	C
1	A	50	A
1	A	51	A
1	A	54	C
1	A	70	U
1	A	71	A
1	A	73	C
1	A	74	A
1	A	75	G
1	A	79	G
1	A	80	A
1	A	81	A
1	A	82	G

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Mol	Chain	Res	Type
1	A	84	U
1	A	85	U
1	A	86	G
1	A	87	C
1	A	89	U
1	A	90	C
1	A	91	U
1	A	92	U
1	A	93	U
1	A	94	G
1	A	95	C
1	A	109	A
1	A	110	C
1	A	116	A
1	A	120	A
1	A	121	U
1	A	128	G
1	A	129	A
1	A	130	A
1	A	131	A
1	A	143	A
1	A	149	A
1	A	151	A
1	A	156	C
1	A	173	U
1	A	177	G
1	A	181	A
1	A	191	G
1	A	197	A
1	A	204	G
1	A	207	C
1	A	208	U
1	A	209	U
1	A	210	C
1	A	211	G
1	A	212	G
1	A	213	G
1	A	220	G
1	A	240	G
1	A	247	G
1	A	251	G
1	A	266	G

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Mol	Chain	Res	Type
1	A	267	C
1	A	271	C
1	A	280	C
1	A	289	G
1	A	299	G
1	A	321	A
1	A	327	A
1	A	328	C
1	A	332	G
1	A	344	A
1	A	345	C
1	A	346	G
1	A	348	G
1	A	352	C
1	A	354	G
1	A	356	A
1	A	367	U
1	A	372	C
1	A	392	C
1	A	398	U
1	A	406	G
1	A	411	A
1	A	413	G
1	A	421	U
1	A	422	C
1	A	423	G
1	A	424	G
1	A	429	U
1	A	446	G
1	A	456	A
1	A	467	U
1	A	468	A
1	A	472	U
1	A	474	G
1	A	481	G
1	A	482	A
1	A	484	G
1	A	486	U
1	A	495	A
1	A	509	A
1	A	511	C
1	A	512	U

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Mol	Chain	Res	Type
1	A	518	C
1	A	522	C
1	A	527	G7M
1	A	530	G
1	A	547	A
1	A	559	A
1	A	562	U
1	A	564	C
1	A	572	A
1	A	573	A
1	A	576	C
1	A	577	G
1	A	579	A
1	A	619	U
1	A	633	G
1	A	650	G
1	A	653	U
1	A	665	A
1	A	682	G
1	A	686	U
1	A	687	A
1	A	703	G
1	A	718	A
1	A	720	C
1	A	721	G
1	A	723	U
1	A	724	G
1	A	734	G
1	A	755	G
1	A	777	A
1	A	785	G
1	A	792	A
1	A	793	U
1	A	794	A
1	A	815	A
1	A	817	C
1	A	828	U
1	A	832	G
1	A	836	G
1	A	841	C
1	A	842	U
1	A	845	A

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Mol	Chain	Res	Type
1	A	849	G
1	A	864	A
1	A	872	A
1	A	884	U
1	A	885	G
1	A	889	A
1	A	899	C
1	A	901	A
1	A	902	G
1	A	914	A
1	A	923	A
1	A	926	G
1	A	931	C
1	A	934	C
1	A	935	A
1	A	942	G
1	A	960	U
1	A	966	2MG
1	A	969	A
1	A	971	G
1	A	975	A
1	A	976	G
1	A	977	A
1	A	983	A
1	A	993	G
1	A	1004	A
1	A	1009	U
1	A	1020	G
1	A	1022	A
1	A	1025	U
1	A	1026	G
1	A	1028	C
1	A	1030	U
1	A	1031	C
1	A	1032	G
1	A	1033	G
1	A	1036	A
1	A	1037	C
1	A	1053	G
1	A	1054	C
1	A	1065	U
1	A	1085	U

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Mol	Chain	Res	Type
1	A	1089	G
1	A	1092	A
1	A	1094	G
1	A	1095	U
1	A	1098	C
1	A	1101	A
1	A	1108	G
1	A	1130	A
1	A	1132	C
1	A	1133	G
1	A	1136	C
1	A	1137	C
1	A	1139	G
1	A	1140	C
1	A	1141	C
1	A	1142	G
1	A	1152	A
1	A	1154	G
1	A	1159	U
1	A	1160	G
1	A	1168	U
1	A	1181	G
1	A	1184	G
1	A	1187	G
1	A	1196	A
1	A	1197	A
1	A	1212	U
1	A	1213	A
1	A	1214	C
1	A	1227	A
1	A	1238	A
1	A	1258	G
1	A	1280	A
1	A	1285	A
1	A	1286	U
1	A	1287	A
1	A	1302	C
1	A	1305	G
1	A	1317	C
1	A	1320	C
1	A	1336	C
1	A	1346	A

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Mol	Chain	Res	Type
1	A	1353	G
1	A	1363	A
1	A	1364	U
1	A	1368	A
1	A	1370	G
1	A	1378	C
1	A	1386	G
1	A	1387	G
1	A	1398	A
1	A	1400	C
1	A	1401	G
1	A	1414	U
1	A	1415	G
1	A	1419	G
1	A	1420	U
1	A	1422	G
1	A	1423	G
1	A	1432	G
1	A	1441	A
1	A	1446	A
1	A	1450	U
1	A	1454	G
1	A	1472	U
1	A	1479	C
1	A	1481	U
1	A	1483	A
1	A	1484	C
1	A	1486	G
1	A	1491	G
1	A	1493	A
1	A	1497	G
1	A	1499	A
1	A	1503	A
1	A	1505	G
1	A	1506	U
1	A	1508	A
1	A	1517	G
1	A	1529	G
1	A	1530	G

All (6) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	212	G
1	A	298	A
1	A	428	G
1	A	471	U
1	A	685	G
1	A	1031	C

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

12 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	PSU	A	516	1	18,21,22	1.37	3 (16%)	22,30,33	1.93	3 (13%)
1	4OC	A	1402	1	20,23,24	0.75	0	26,32,35	0.94	1 (3%)
1	MA6	A	1518	1	18,26,27	0.91	1 (5%)	19,38,41	1.72	6 (31%)
1	5MC	A	1407	1	18,22,23	0.94	2 (11%)	26,32,35	1.18	3 (11%)
12	D2T	L	89	12	7,9,10	1.04	1 (14%)	6,11,13	1.49	1 (16%)
1	2MG	A	1207	1	18,26,27	0.99	1 (5%)	16,38,41	1.17	3 (18%)
1	UR3	A	1498	1	19,22,23	0.97	0	26,32,35	1.48	1 (3%)
1	5MC	A	967	1	18,22,23	0.92	2 (11%)	26,32,35	1.14	2 (7%)
1	MA6	A	1519	1	18,26,27	0.96	1 (5%)	19,38,41	1.62	5 (26%)
1	2MG	A	1516	1	18,26,27	0.92	1 (5%)	16,38,41	1.12	3 (18%)
1	2MG	A	966	1	18,26,27	0.93	1 (5%)	16,38,41	1.21	3 (18%)
1	G7M	A	527	1	20,26,27	2.37	7 (35%)	17,39,42	1.18	1 (5%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	PSU	A	516	1	-	0/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	4OC	A	1402	1	-	1/9/29/30	0/2/2/2
1	MA6	A	1518	1	-	3/7/29/30	0/3/3/3
1	5MC	A	1407	1	-	0/7/25/26	0/2/2/2
12	D2T	L	89	12	-	2/7/12/14	-
1	2MG	A	1207	1	-	0/5/27/28	0/3/3/3
1	UR3	A	1498	1	-	0/7/25/26	0/2/2/2
1	5MC	A	967	1	-	0/7/25/26	0/2/2/2
1	MA6	A	1519	1	-	2/7/29/30	0/3/3/3
1	2MG	A	1516	1	-	0/5/27/28	0/3/3/3
1	2MG	A	966	1	-	0/5/27/28	0/3/3/3
1	G7M	A	527	1	-	2/3/25/26	0/3/3/3

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	527	G7M	C2-N3	5.23	1.45	1.33
1	A	527	G7M	C4-N3	4.74	1.48	1.37
1	A	527	G7M	C2-N2	4.65	1.45	1.34
1	A	527	G7M	C6-N1	3.49	1.43	1.37
1	A	527	G7M	C5-C6	3.31	1.54	1.45
1	A	516	PSU	C4-N3	-2.98	1.33	1.38
1	A	1207	2MG	C6-N1	-2.96	1.33	1.37
12	L	89	D2T	O-C	2.71	1.30	1.19
1	A	516	PSU	C6-C5	2.66	1.38	1.35
1	A	1516	2MG	C6-N1	-2.63	1.33	1.37
1	A	966	2MG	C6-N1	-2.62	1.34	1.37
1	A	967	5MC	C6-N1	-2.59	1.33	1.38
1	A	1407	5MC	C6-C5	2.53	1.38	1.34
1	A	527	G7M	C2-N1	2.46	1.43	1.37
1	A	1519	MA6	C5-C4	2.45	1.47	1.40
1	A	527	G7M	O6-C6	-2.37	1.18	1.23
1	A	1518	MA6	C5-C4	2.36	1.47	1.40
1	A	1407	5MC	C6-N1	-2.36	1.34	1.38
1	A	967	5MC	C6-C5	2.26	1.38	1.34
1	A	516	PSU	C2-N3	-2.10	1.33	1.37

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1498	UR3	C4-N3-C2	-6.13	118.79	124.56
1	A	516	PSU	N1-C2-N3	6.12	122.07	115.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	516	PSU	C4-N3-C2	-4.02	120.55	126.34
1	A	1407	5MC	C5-C6-N1	-3.71	119.53	123.34
1	A	967	5MC	C5-C6-N1	-3.69	119.54	123.34
1	A	1518	MA6	C9-N6-C6	-3.53	108.83	119.51
1	A	516	PSU	O2-C2-N1	-3.41	119.03	122.79
1	A	1518	MA6	C4-C5-N7	-3.29	105.97	109.40
1	A	1519	MA6	C9-N6-C6	-3.27	109.61	119.51
1	A	1518	MA6	N3-C2-N1	-3.19	123.69	128.68
1	A	1519	MA6	N3-C2-N1	-3.19	123.70	128.68
1	A	527	G7M	C2-N1-C6	-3.15	119.30	125.10
1	A	1519	MA6	C4-C5-N7	-3.10	106.17	109.40
12	L	89	D2T	O-C-CA	-2.98	116.96	124.78
1	A	1519	MA6	N1-C6-N6	2.84	120.04	117.06
1	A	1518	MA6	C10-N6-C6	-2.72	111.28	119.51
1	A	966	2MG	C5-C6-N1	2.48	118.34	113.95
1	A	967	5MC	C5-C4-N3	-2.48	119.00	121.67
1	A	966	2MG	CM2-N2-C2	-2.41	118.55	123.86
1	A	1207	2MG	C5-C6-N1	2.36	118.12	113.95
1	A	1518	MA6	C10-N6-C9	-2.35	108.55	116.12
1	A	1207	2MG	C8-N7-C5	2.33	107.44	102.99
1	A	1407	5MC	C5-C4-N3	-2.30	119.19	121.67
1	A	966	2MG	C8-N7-C5	2.30	107.38	102.99
1	A	1519	MA6	C10-N6-C6	-2.29	112.59	119.51
1	A	1518	MA6	N1-C6-N6	2.27	119.45	117.06
1	A	1516	2MG	C5-C6-N1	2.27	117.95	113.95
1	A	1516	2MG	CM2-N2-C2	-2.14	119.14	123.86
1	A	1516	2MG	C8-N7-C5	2.11	107.00	102.99
1	A	1407	5MC	O2-C2-N3	-2.06	118.97	122.33
1	A	1207	2MG	CM2-N2-C2	-2.05	119.34	123.86
1	A	1402	4OC	C6-C5-C4	2.05	119.47	116.96

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	527	G7M	O4'-C4'-C5'-O5'
1	A	527	G7M	C3'-C4'-C5'-O5'
1	A	1518	MA6	O4'-C4'-C5'-O5'
1	A	1518	MA6	C3'-C4'-C5'-O5'
1	A	1519	MA6	C5-C6-N6-C10
12	L	89	D2T	CG-CB-SB-CB1
1	A	1402	4OC	C3'-C2'-O2'-CM2

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Mol	Chain	Res	Type	Atoms
1	A	1518	MA6	C5-C6-N6-C10
1	A	1519	MA6	C4'-C5'-O5'-P
12	L	89	D2T	SB-CB-CG-OD2

There are no ring outliers.

6 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	1402	4OC	2	0
1	A	1518	MA6	3	0
1	A	1407	5MC	1	0
12	L	89	D2T	4	0
1	A	1519	MA6	2	0
1	A	1516	2MG	1	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 153 ligands modelled in this entry, 153 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

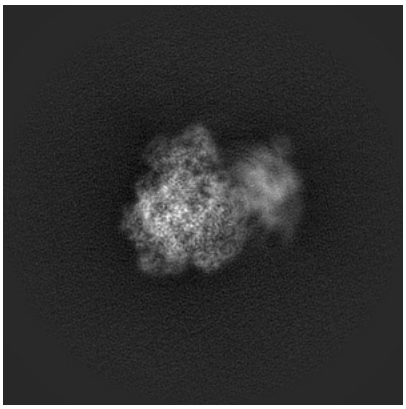
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-12240. These allow visual inspection of the internal detail of the map and identification of artifacts.

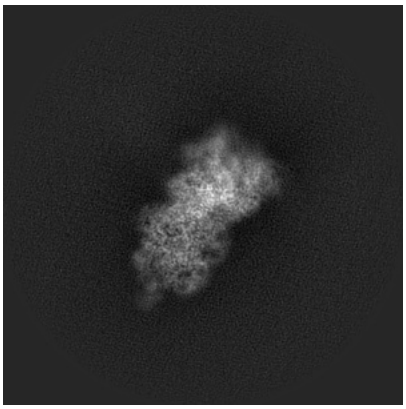
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

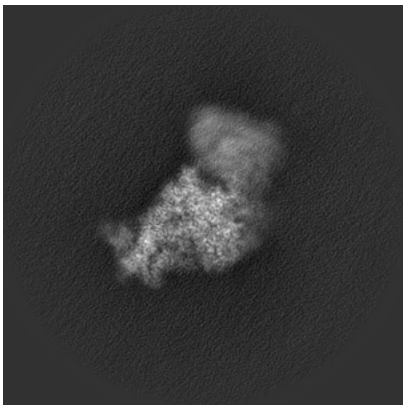
6.1.1 Primary map



X

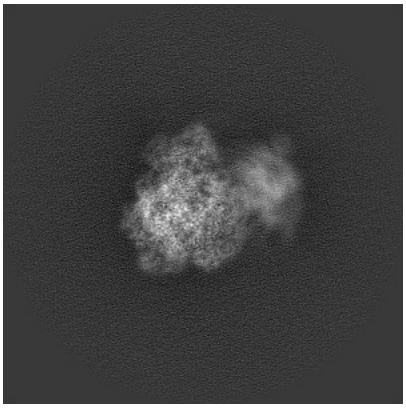


Y

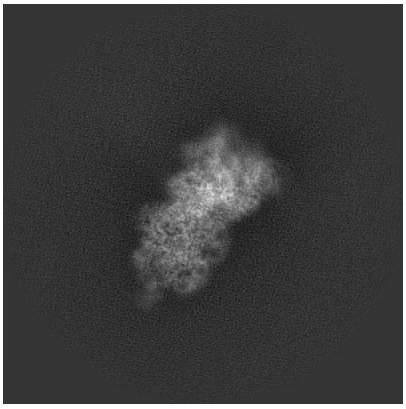


Z

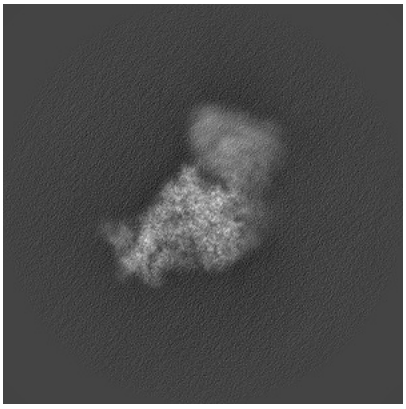
6.1.2 Raw map



X



Y

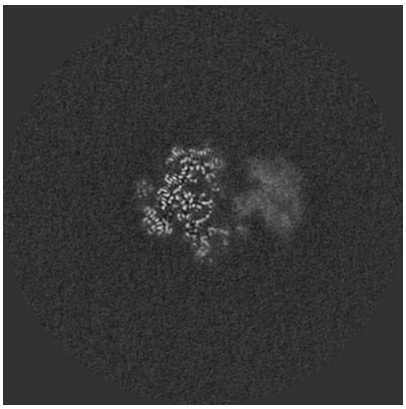


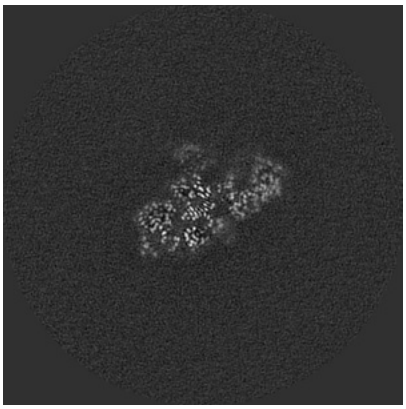
Z

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

6.2 Central slices (i)

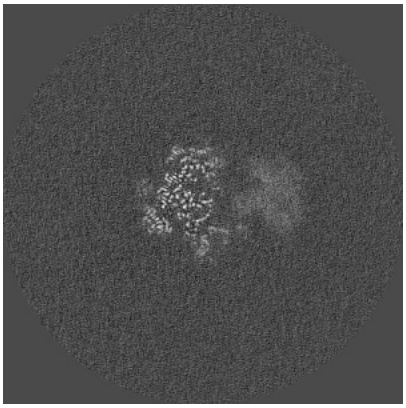
6.2.1 Primary map

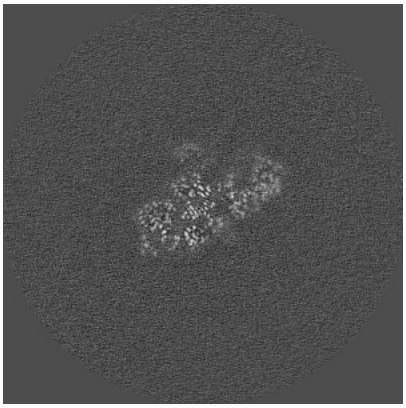

X Index: 200

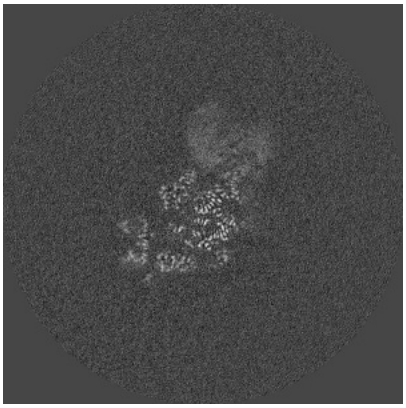

Y Index: 200

Z Index: 200

6.2.2 Raw map


X Index: 200

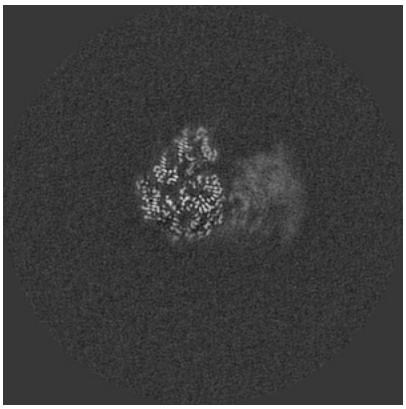

Y Index: 200

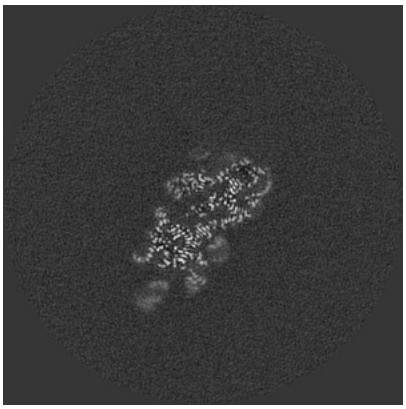

Z Index: 200

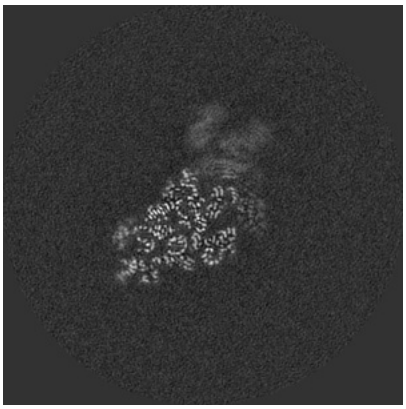
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

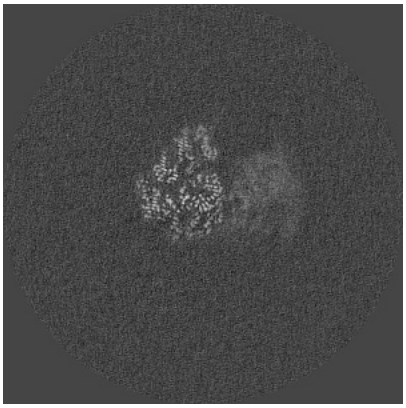
6.3.1 Primary map

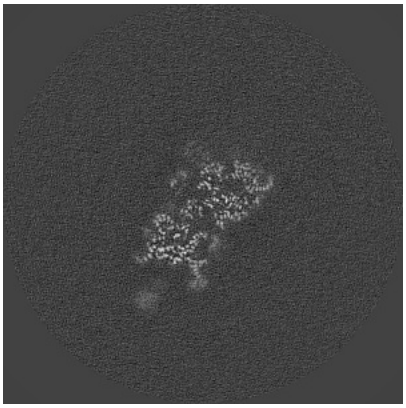

X Index: 215

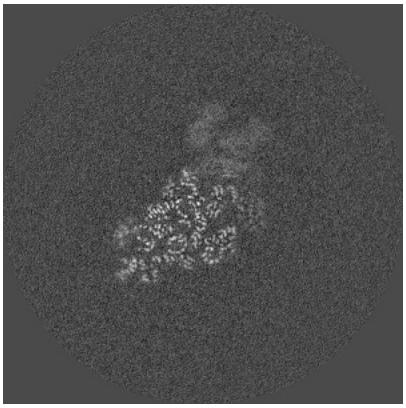

Y Index: 173


Z Index: 189

6.3.2 Raw map


X Index: 215

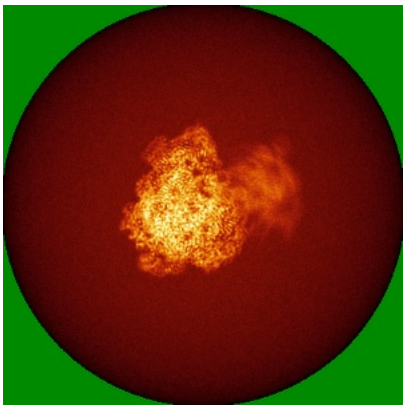

Y Index: 178

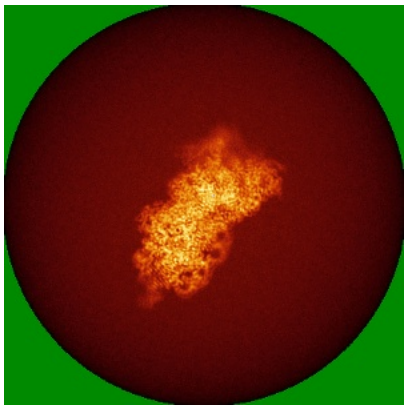

Z Index: 189

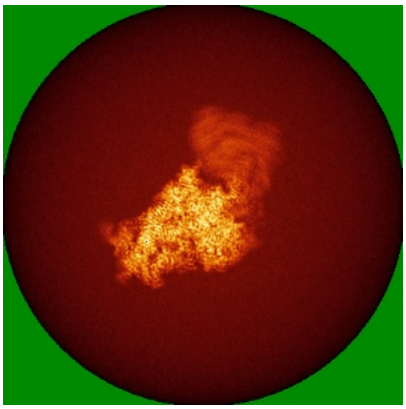
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

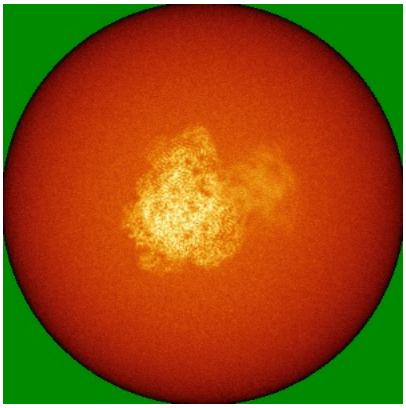
6.4.1 Primary map

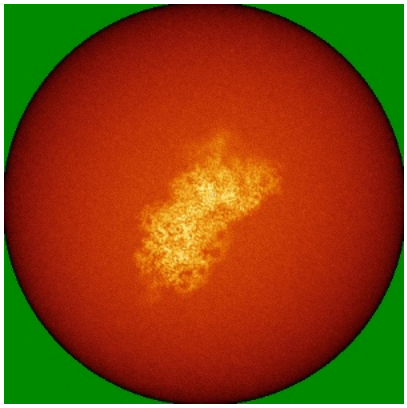

X

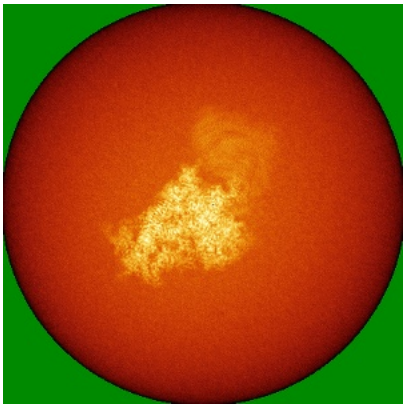

Y


Z

6.4.2 Raw map


X

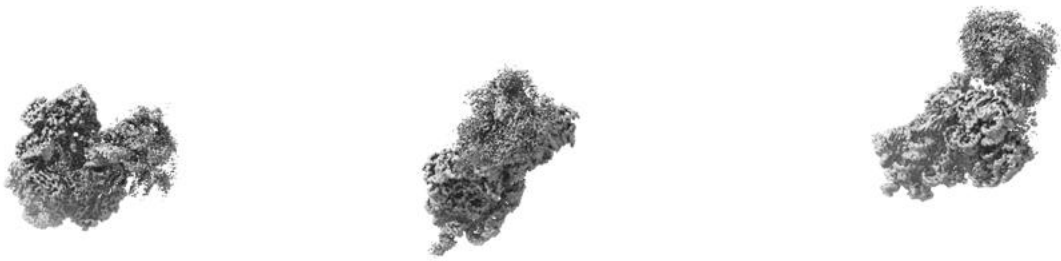

Y


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)

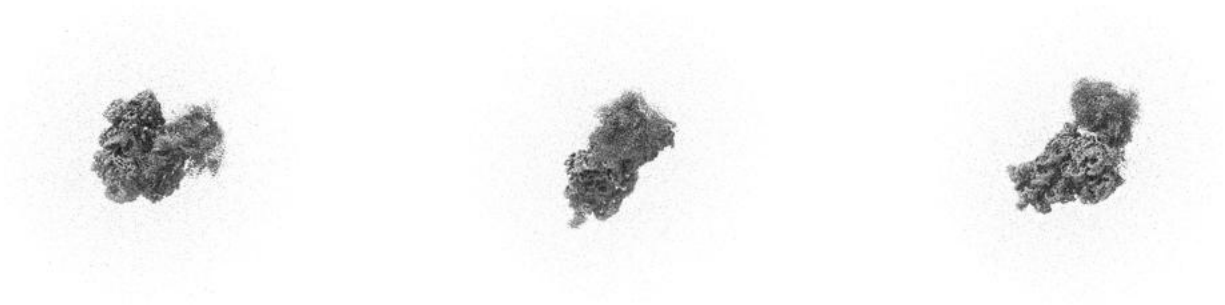
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.016. 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.

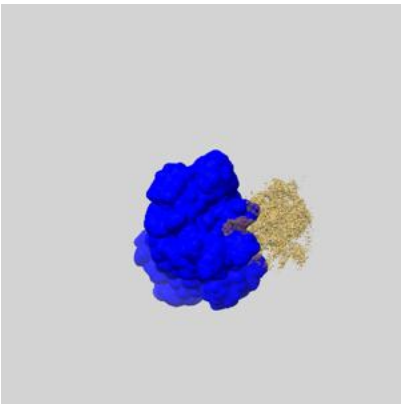
6.6 Mask visualisation (i)

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

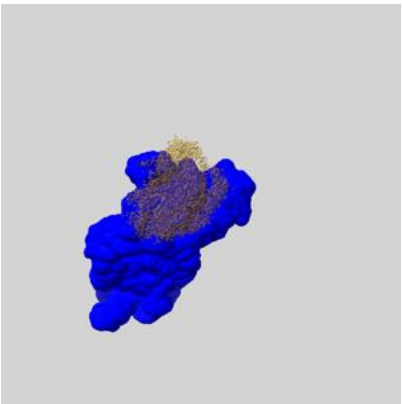
A mask typically either:

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

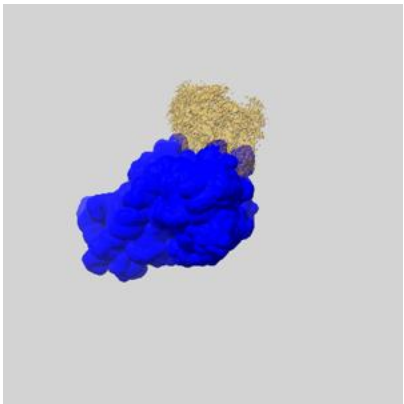
6.6.1 emd_12240_msk_2.map (i)



X

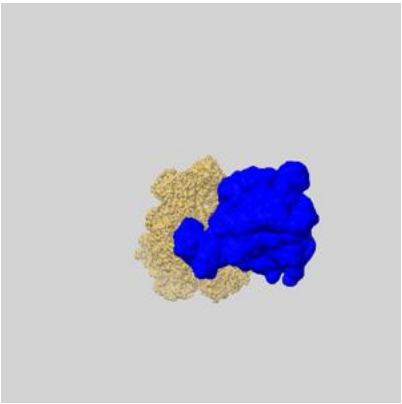


Y

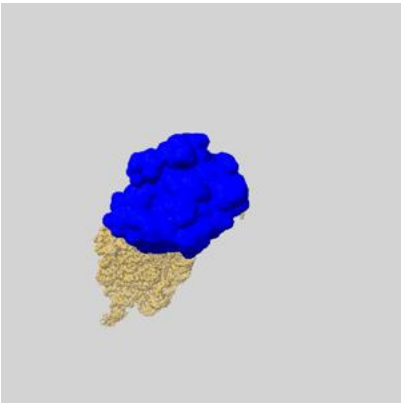


Z

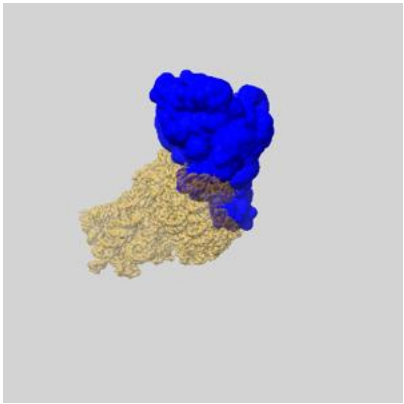
6.6.2 emd_12240_msk_1.map (i)



X



Y

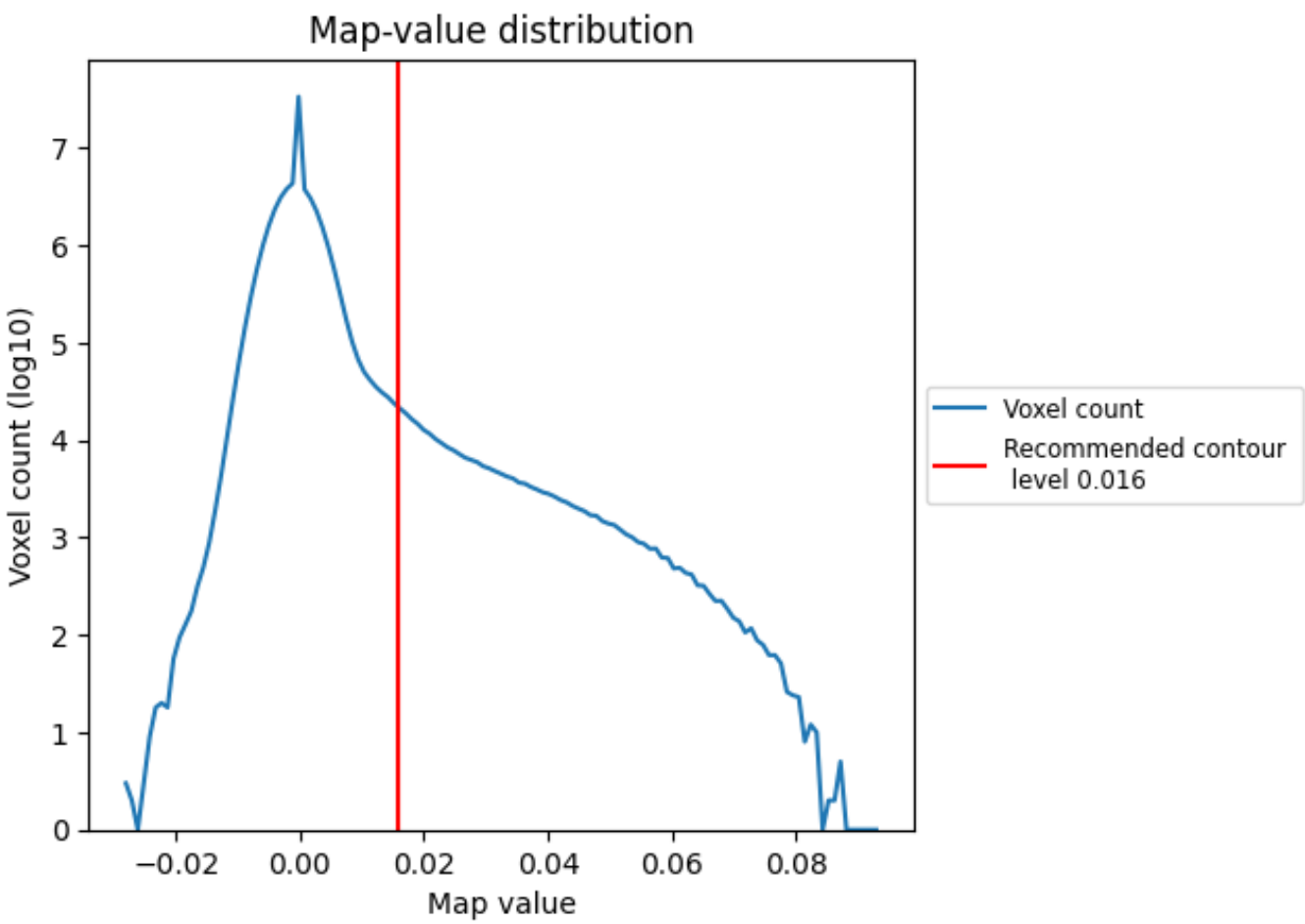


Z

7 Map analysis (i)

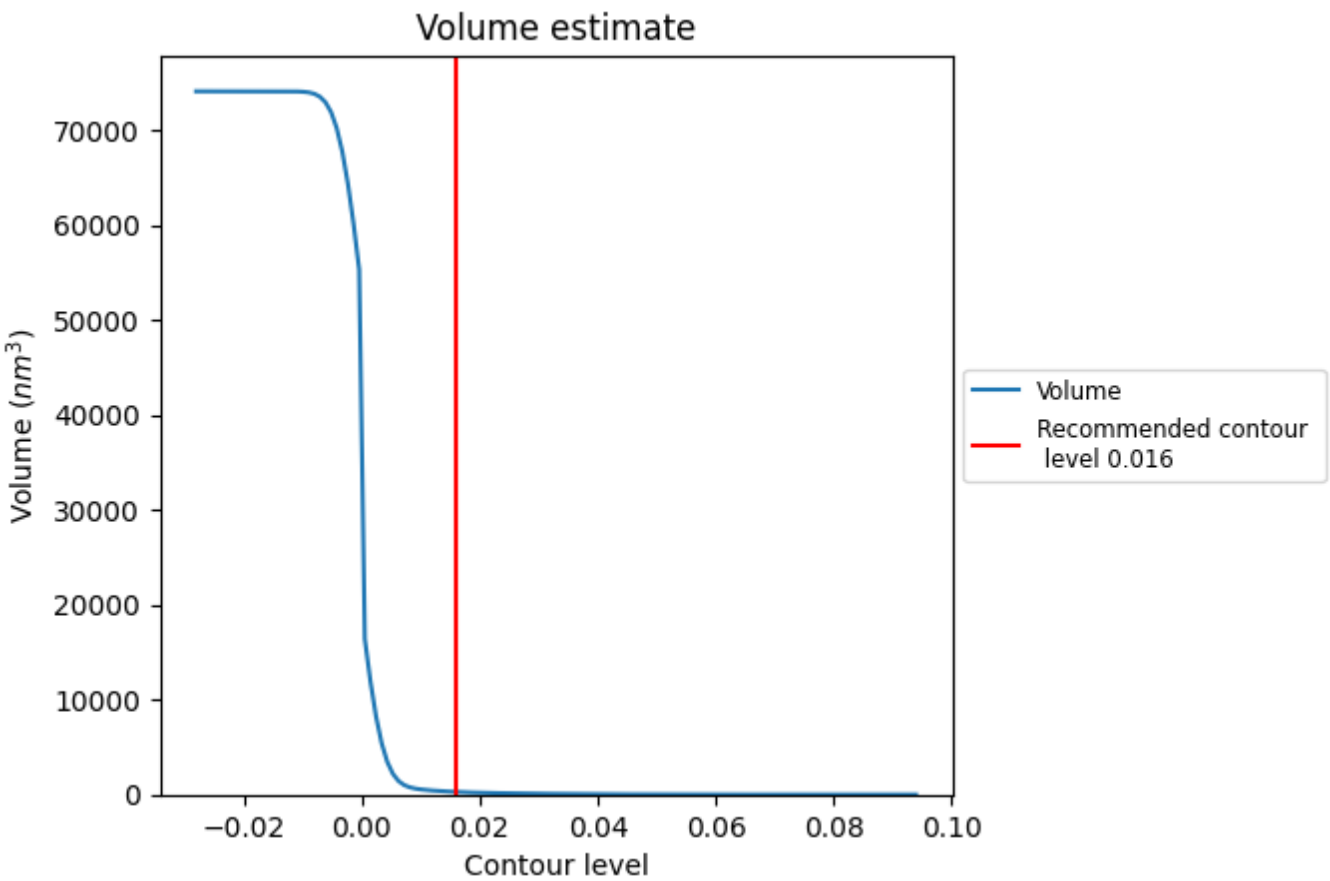
This section contains the results of statistical analysis of the map.

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.

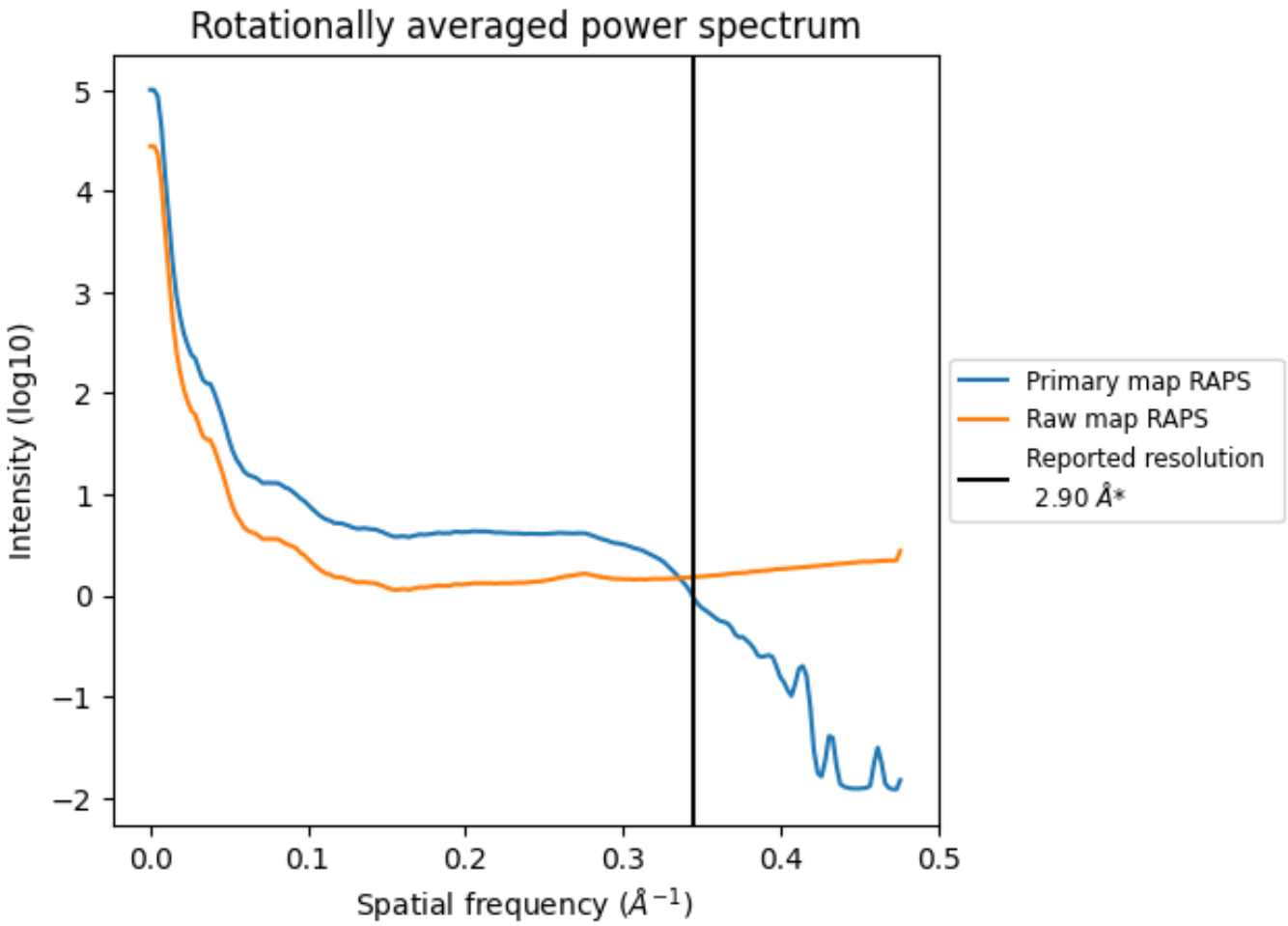
7.2 Volume estimate (i)



The volume at the recommended contour level is 279 nm^3; this corresponds to an approximate mass of 252 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)

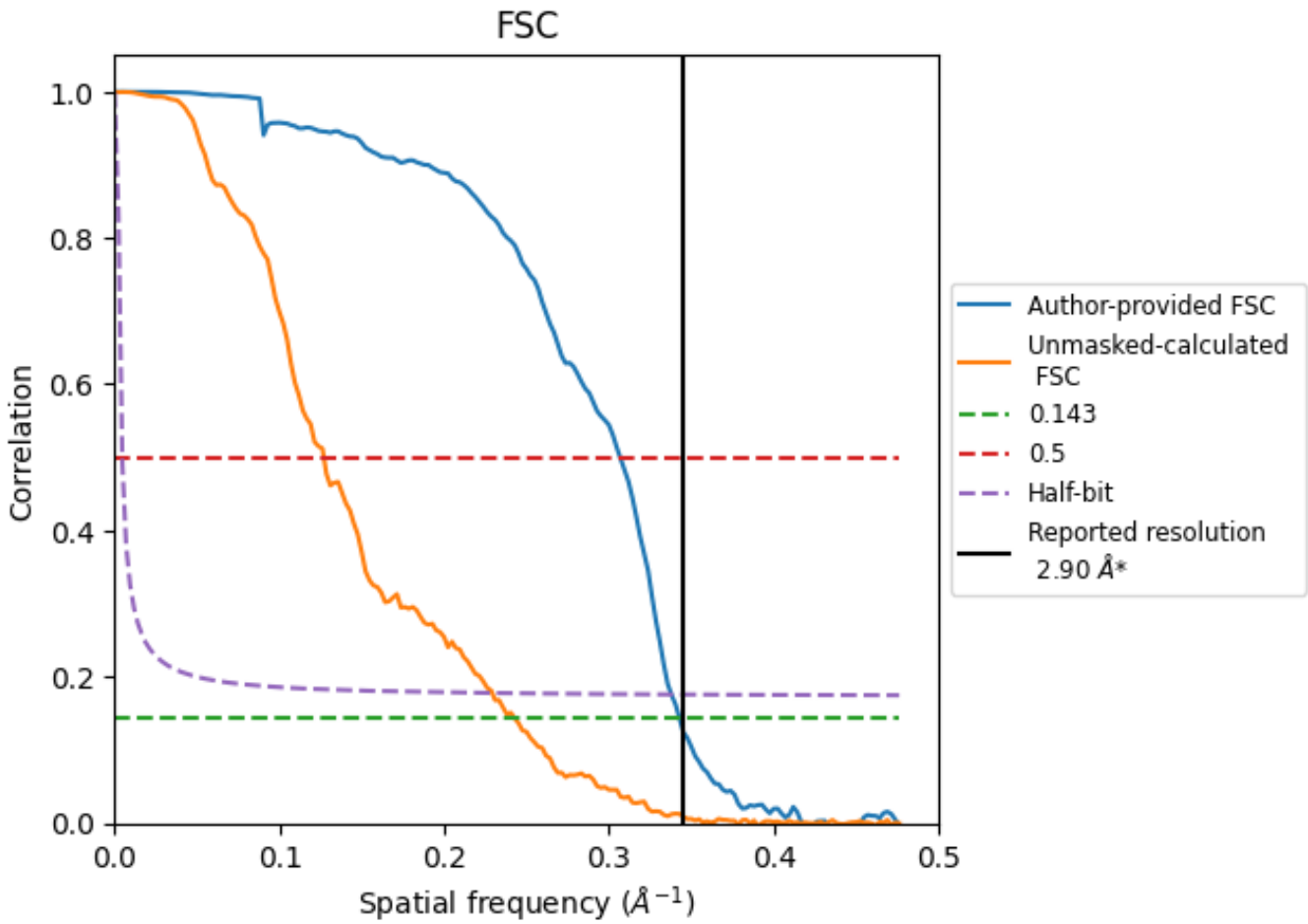


*Reported resolution corresponds to spatial frequency of 0.345 Å^{-1}

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 0.345 Å^{-1}

8.2 Resolution estimates (i)

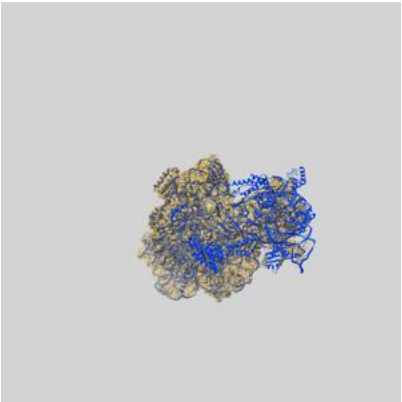
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.90	-	-
Author-provided FSC curve	2.92	3.26	2.96
Unmasked-calculated*	4.12	7.87	4.36

*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 4.12 differs from the reported value 2.9 by more than 10 %

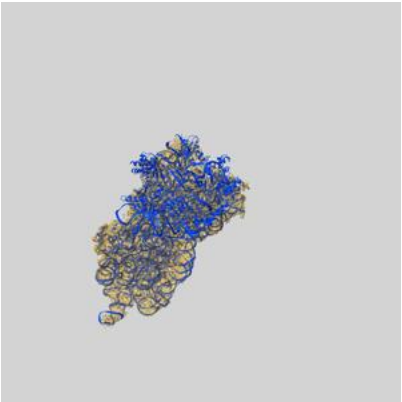
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-12240 and PDB model 7BOE. Per-residue inclusion information can be found in section 3 on page 8.

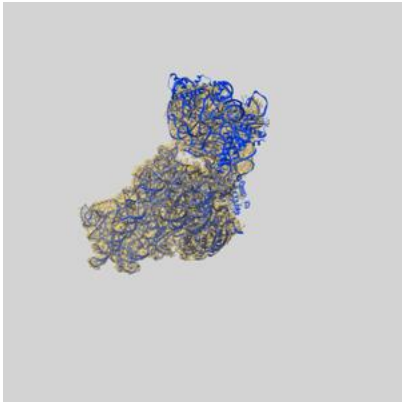
9.1 Map-model overlay (i)



X



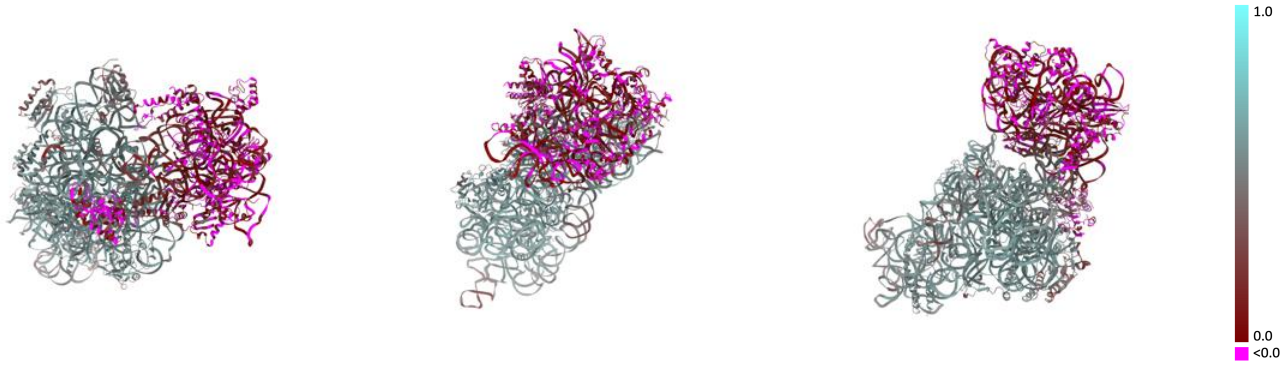
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.016 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.

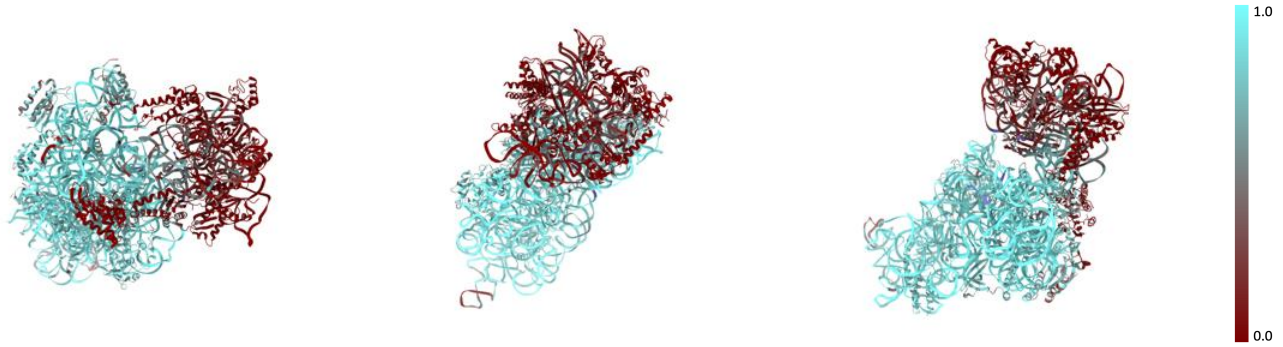
9.2 Q-score mapped to coordinate model (i)



X Y Z

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.

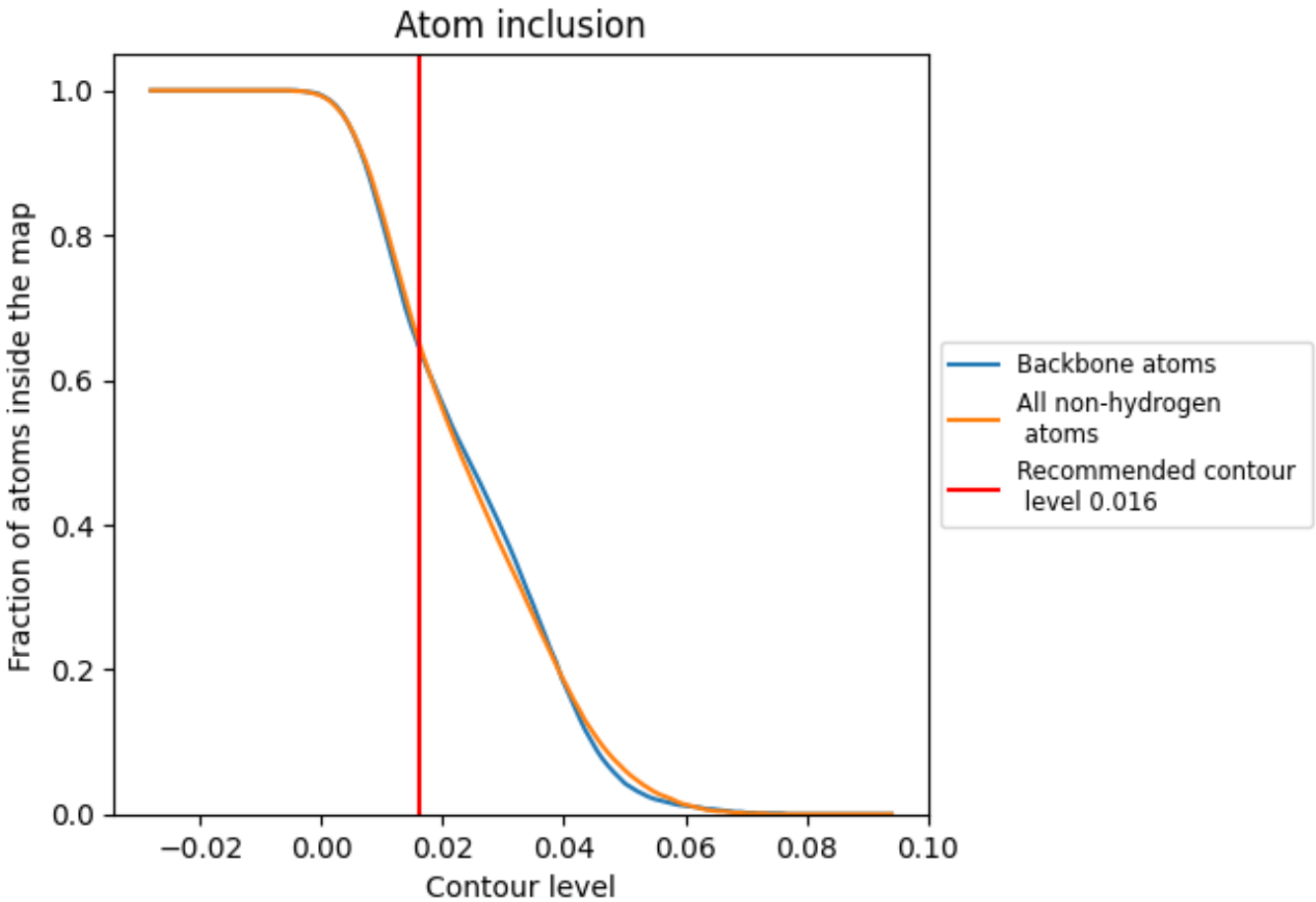
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.016).

9.4 Atom inclusion (i)



At the recommended contour level, 65% of all backbone atoms, 65% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.016) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6540	0.3910
A	0.7670	0.4390
B	0.0590	0.0480
C	0.1720	0.1160
D	0.8250	0.5590
E	0.8240	0.5510
F	0.6250	0.4450
G	0.0020	0.0240
H	0.8260	0.5570
I	0.1060	0.0660
J	0.0390	0.0220
K	0.6740	0.4410
L	0.8420	0.5670
M	0.0180	0.0240
N	0.0620	0.0410
O	0.8160	0.5310
P	0.8630	0.5600
Q	0.8100	0.5530
R	0.7340	0.5120
S	0.0390	0.0150
T	0.8530	0.5520
U	0.4720	0.4440