



## Full wwPDB EM Validation Report ⓘ

Nov 19, 2022 – 11:21 pm GMT

PDB ID : 6FAI  
EMDB ID : EMD-4214  
Title : Structure of a eukaryotic cytoplasmic pre-40S ribosomal subunit  
Authors : Scaiola, A.; Pena, C.; Weisser, M.; Boehringer, D.; Leibundgut, M.; Klingauf-Nerurkar, P.; Gerhardy, S.; Panse, V.G.; Ban, N.  
Deposited on : 2017-12-15  
Resolution : 3.40 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

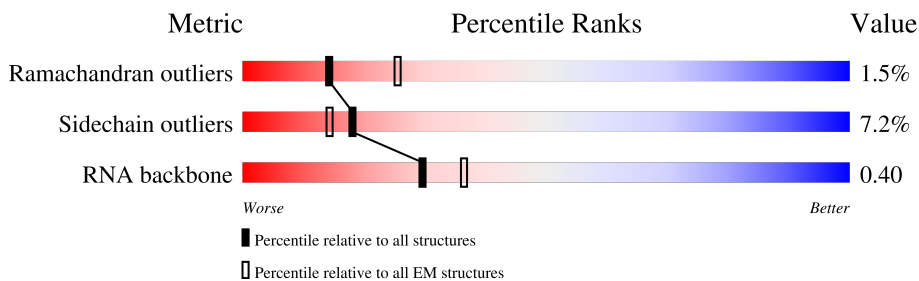
EMDB validation analysis : 0.0.1.dev43  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 3.40 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.










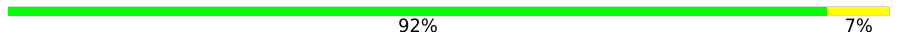

















Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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

Mol	Chain	Length	Quality of chain
1	b	82	
2	c	67	
3	d	56	
4	e	63	
5	g	319	
6	h	274	
7	i	483	
8	j	463	

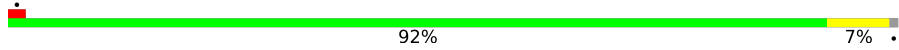
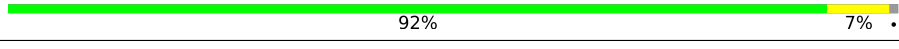

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Mol	Chain	Length	Quality of chain
9	k	788	 81% 15%
10	l	425	 62% 5% 33%
11	2	1800	 62% 35%
12	A	252	 74% 8% 18%
13	B	255	 77% 7% 16%
14	C	254	 76% 9% 15%
15	D	240	 74% 78% 6% 16%
16	E	261	 92% 7%
17	F	225	 87% 8%
18	G	236	 90% 8%
19	H	190	 87% 9%
20	I	200	 84% 10% 6%
21	J	197	 84% 10% 6%
22	L	156	 82% 8% 10%
23	M	143	 11% 82% 5% 13%
24	N	151	 91% 9%
25	O	137	 86% 7% 7%
26	P	142	 85% 5% 11%
27	Q	143	 83% 6% 11%
28	R	136	 85% 7% 8%
29	S	146	 88% 8%
30	T	144	 92% 8%
31	U	121	 5% 78% 7% 15%
32	V	87	 91% 9%
33	W	130	 85% 11%

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Mol	Chain	Length	Quality of chain
34	X	145	 92% 7%
35	Y	135	 92% 7%
36	Z	108	 58% 42%

## 2 Entry composition [i](#)

There are 38 unique types of molecules in this entry. The entry contains 84964 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 40S ribosomal protein S27-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	b	81	610	382	110	113	5	0	0

- Molecule 2 is a protein called 40S ribosomal protein S28-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	c	63	497	306	99	91	1	0	0

- Molecule 3 is a protein called 40S ribosomal protein S29-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	d	37	302	186	62	50	4	0	0

- Molecule 4 is a protein called 40S ribosomal protein S30-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	e	48	384	242	81	59	2	0	0

- Molecule 5 is a protein called Guanine nucleotide-binding protein subunit beta-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	g	317	2431	1538	417	468	8	0	0

- Molecule 6 is a protein called Pre-rRNA-processing protein PNO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	h	181	1436	917	261	254	4	0	0

- Molecule 7 is a protein called Essential nuclear protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	i	262	2133	1388	364	378	3	0	0

- Molecule 8 is a protein called Protein LTV1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	j	46	396	242	57	95	2	0	0

- Molecule 9 is a protein called Ribosome biogenesis protein TSR1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	k	670	5402	3449	937	1002	14	0	0

- Molecule 10 is a protein called Serine/threonine-protein kinase RIO2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	l	286	2322	1464	410	430	18	0	0

- Molecule 11 is a RNA chain called 20S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
11	2	1775	37824	16909	6694	12446	1775	0	0

- Molecule 12 is a protein called 40S ribosomal protein S0-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	A	206	1611	1036	285	288	2	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	206	PHE	ASP	conflict	UNP P32905

- Molecule 13 is a protein called 40S ribosomal protein S1-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	B	214	Total	C	N	O	S	0	0
			1709	1084	310	311	4		

- Molecule 14 is a protein called 40S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	C	217	Total	C	N	O	S	0	0
			1635	1047	289	297	2		

- Molecule 15 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	D	202	Total	C	N	O	S	0	0
			1576	998	290	282	6		

- Molecule 16 is a protein called 40S ribosomal protein S4-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	E	260	Total	C	N	O	S	0	0
			2068	1316	389	360	3		

- Molecule 17 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	F	206	Total	C	N	O	S	0	0
			1609	1007	300	299	3		

- Molecule 18 is a protein called 40S ribosomal protein S6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	G	232	Total	C	N	O	S	0	0
			1873	1172	366	332	3		

- Molecule 19 is a protein called 40S ribosomal protein S7-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	H	184	Total	C	N	O	0	0
			1481	951	265	265		

- Molecule 20 is a protein called 40S ribosomal protein S8-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	I	188	1489	925	298	264	2	0	0

- Molecule 21 is a protein called 40S ribosomal protein S9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	J	185	1494	943	289	261	1	0	0

- Molecule 22 is a protein called 40S ribosomal protein S11-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	L	140	1129	724	215	187	3	0	0

- Molecule 23 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	M	125	941	591	166	182	2	0	0

- Molecule 24 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	N	150	1192	759	224	207	2	0	0

- Molecule 25 is a protein called 40S ribosomal protein S14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	O	127	926	569	185	169	3	0	0

- Molecule 26 is a protein called 40S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	P	127	1001	637	186	171	7	0	0

- Molecule 27 is a protein called 40S ribosomal protein S16-A.



Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
27	Q	127	993	640	177	176	0	0

- Molecule 28 is a protein called 40S ribosomal protein S17-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	R	125	1000	625	188	185	2	0	0

- Molecule 29 is a protein called 40S ribosomal protein S18-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	S	135	1110	696	215	197	2	0	0

- Molecule 30 is a protein called 40S ribosomal protein S19-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	T	143	1112	694	208	208	2	0	0

- Molecule 31 is a protein called 40S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	U	103	819	519	148	151	1	0	0

- Molecule 32 is a protein called 40S ribosomal protein S21-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	V	87	684	420	125	137	2	0	0

- Molecule 33 is a protein called 40S ribosomal protein S22-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	W	129	1021	650	188	180	3	0	0

- Molecule 34 is a protein called 40S ribosomal protein S23-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	X	144	Total	C	N	O	S	0	0
			1121	708	220	191	2		

- Molecule 35 is a protein called 40S ribosomal protein S24-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
35	Y	134	Total	C	N	O	0	0
			1073	676	208	189		

- Molecule 36 is a protein called 40S ribosomal protein S25-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
36	Z	63	Total	C	N	O	0	0
			512	328	94	90		

- Molecule 37 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
37	b	1	Total	Zn	0
			1	1	
37	d	1	Total	Zn	0
			1	1	

- Molecule 38 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

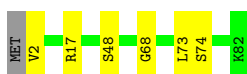
Mol	Chain	Residues	Atoms		AltConf
38	2	46	Total	Mg	0
			46	46	

### 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: 40S ribosomal protein S27-A

Chain b: 



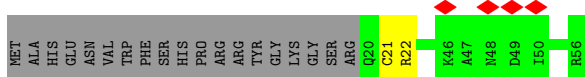
- Molecule 2: 40S ribosomal protein S28-A

Chain c: 



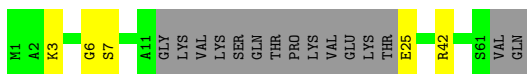
- Molecule 3: 40S ribosomal protein S29-A

Chain d: 

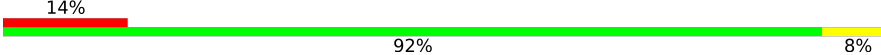


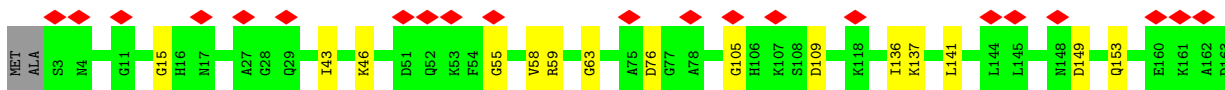
- Molecule 4: 40S ribosomal protein S30-A

Chain e: 



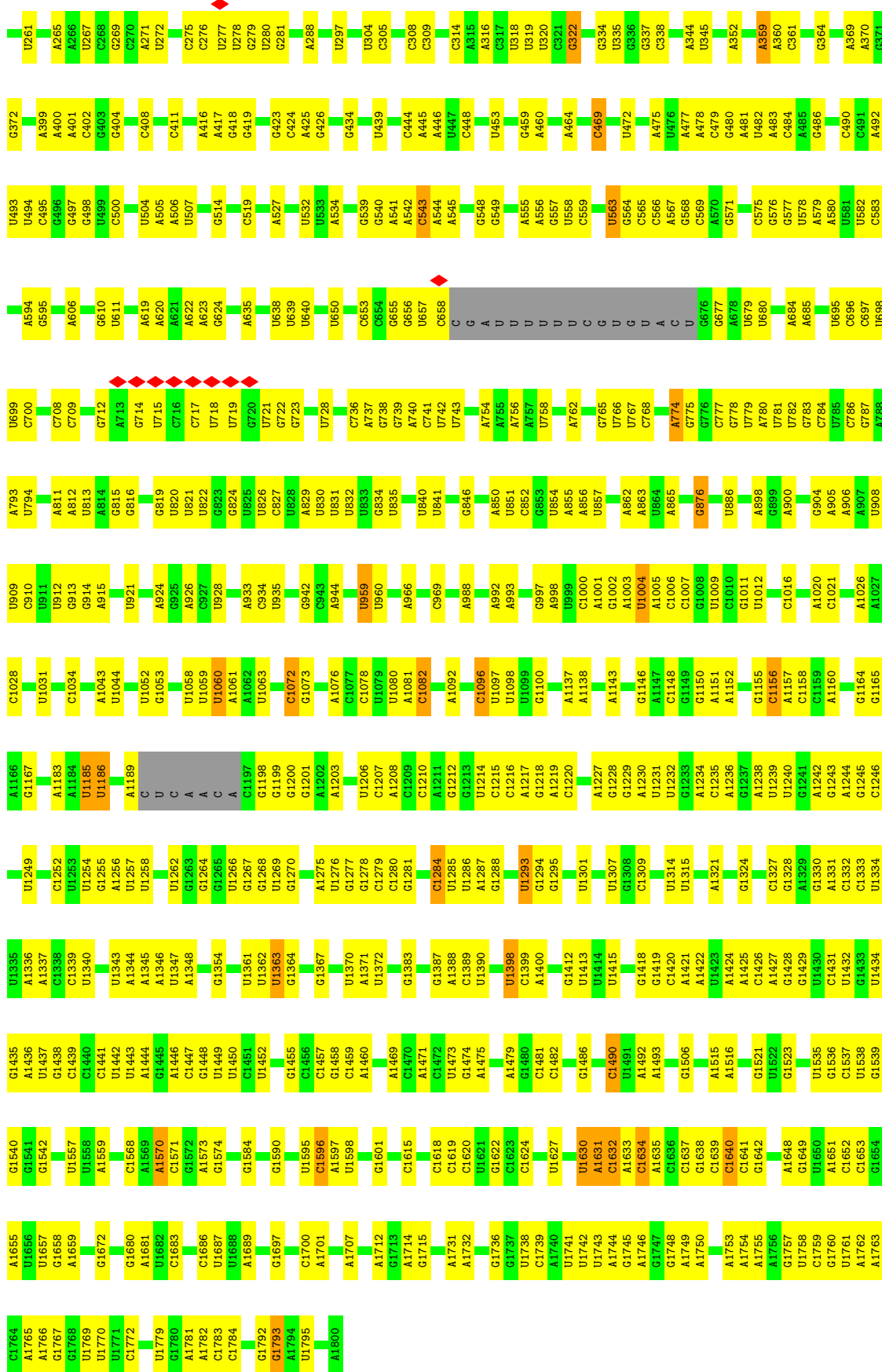
- Molecule 5: Guanine nucleotide-binding protein subunit beta-like protein

Chain g: 

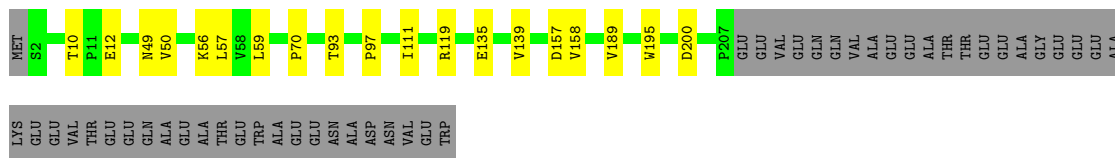




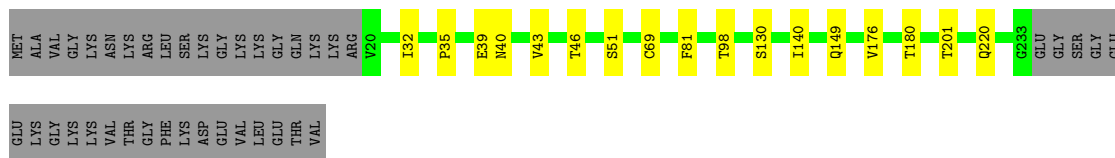
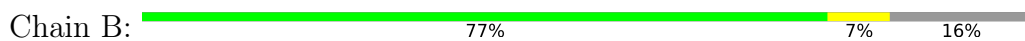




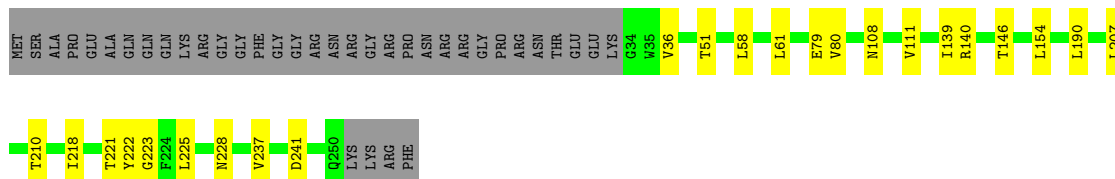
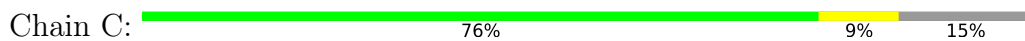
• Molecule 12: 40S ribosomal protein S0-A



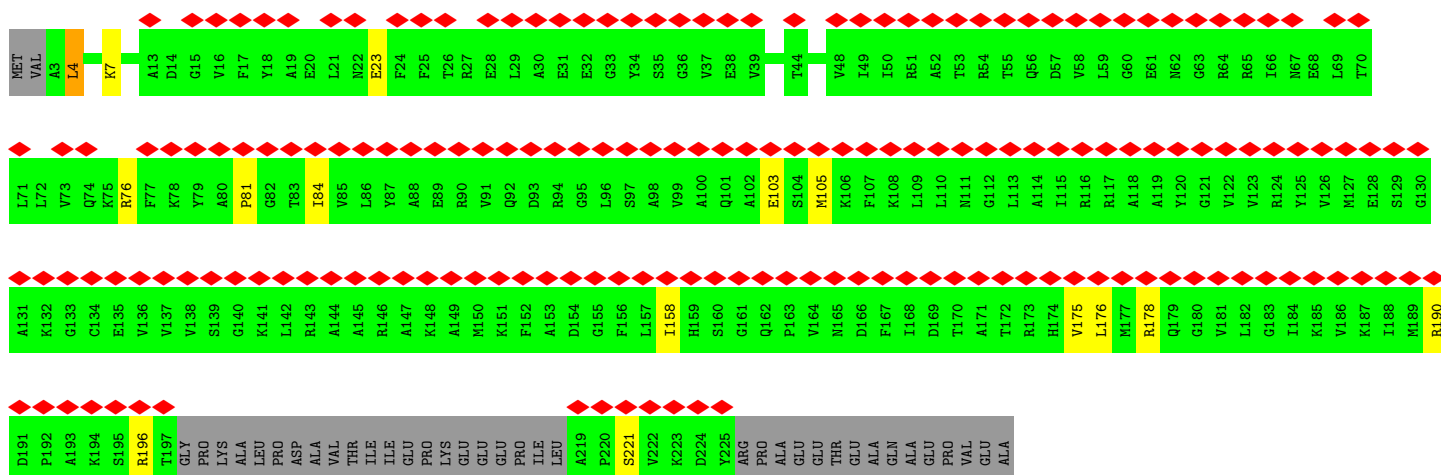
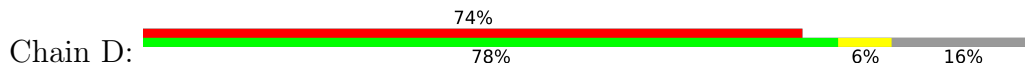
• Molecule 13: 40S ribosomal protein S1-A



• Molecule 14: 40S ribosomal protein S2

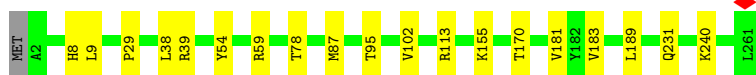


• Molecule 15: 40S ribosomal protein S3




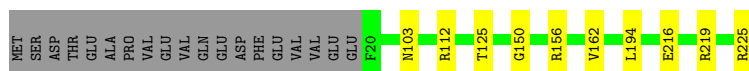
• Molecule 16: 40S ribosomal protein S4-A

Chain E:  92% 7%




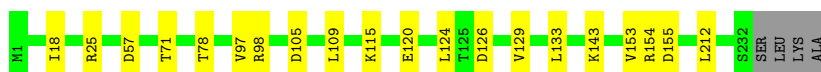
- Molecule 17: 40S ribosomal protein S5

Chain F:  87% 8%




- Molecule 18: 40S ribosomal protein S6-A

Chain G:  90% 8%




- Molecule 19: 40S ribosomal protein S7-A

Chain H:  87% 9%




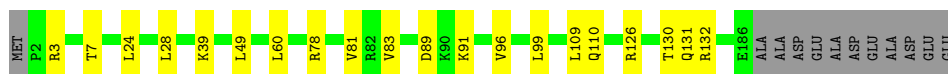
- Molecule 20: 40S ribosomal protein S8-A

Chain I:  84% 10% 6%




- Molecule 21: 40S ribosomal protein S9-A

Chain J:  84% 10% 6%



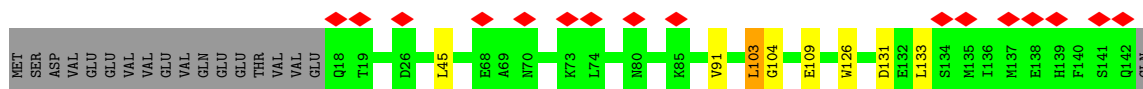
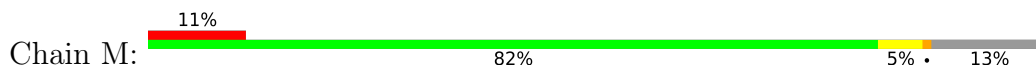
- Molecule 22: 40S ribosomal protein S11-A

Chain L:  82% 8% 10%



- Molecule 23: 40S ribosomal protein S12

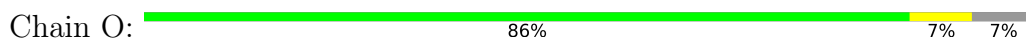




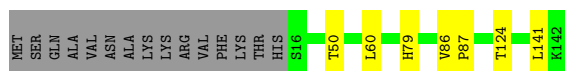
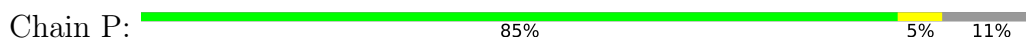
- Molecule 24: 40S ribosomal protein S13



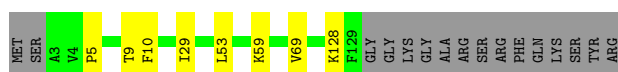
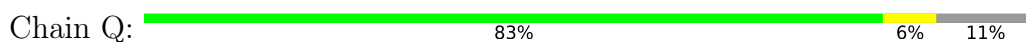
- Molecule 25: 40S ribosomal protein S14-A



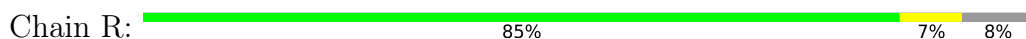
- Molecule 26: 40S ribosomal protein S15



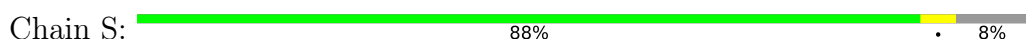
- Molecule 27: 40S ribosomal protein S16-A



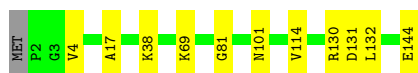
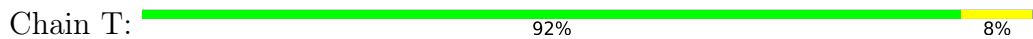
- Molecule 28: 40S ribosomal protein S17-A



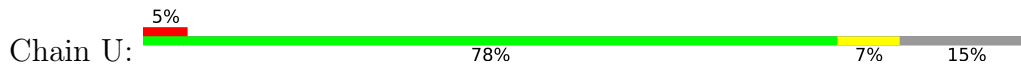
- Molecule 29: 40S ribosomal protein S18-A



- Molecule 30: 40S ribosomal protein S19-A



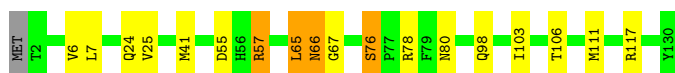
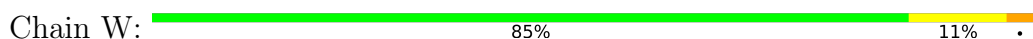
• Molecule 31: 40S ribosomal protein S20



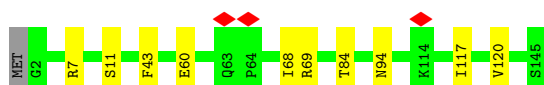
• Molecule 32: 40S ribosomal protein S21-A



• Molecule 33: 40S ribosomal protein S22-A



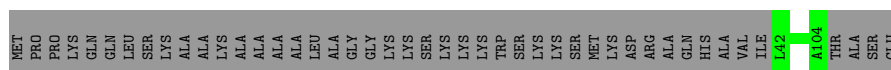
• Molecule 34: 40S ribosomal protein S23-A



• Molecule 35: 40S ribosomal protein S24-A



• Molecule 36: 40S ribosomal protein S25-A



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	165168	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.393	Depositor
Minimum map value	-0.144	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.010	Depositor
Recommended contour level	0.01	Depositor
Map size (Å)	444.8, 444.8, 444.8	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.39, 1.39, 1.39	Depositor

## 5 Model quality [i](#)

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

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

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	b	0.37	0/620	0.57	0/838
2	c	0.31	0/499	0.46	0/670
3	d	0.34	0/306	0.52	0/404
4	e	0.34	0/390	0.55	0/517
5	g	0.34	0/2484	0.47	0/3382
6	h	0.31	0/1462	0.49	0/1969
7	i	0.36	0/2188	0.46	0/2970
8	j	0.38	0/403	0.42	0/543
9	k	0.31	0/5528	0.48	0/7477
10	l	0.34	0/2368	0.48	0/3181
11	2	0.60	1/42303 (0.0%)	1.02	100/65912 (0.2%)
12	A	0.37	0/1653	0.56	0/2261
13	B	0.35	0/1735	0.55	0/2335
14	C	0.44	0/1665	0.60	0/2263
15	D	0.36	0/1596	0.45	0/2142
16	E	0.47	0/2109	0.60	0/2839
17	F	0.33	0/1629	0.47	0/2202
18	G	0.32	0/1897	0.47	0/2532
19	H	0.33	0/1506	0.48	0/2028
20	I	0.39	0/1514	0.54	0/2021
21	J	0.43	0/1519	0.60	0/2035
22	L	0.51	0/1155	0.56	0/1557
23	M	0.37	0/949	0.49	0/1284
24	N	0.39	0/1215	0.54	0/1638
25	O	0.32	0/937	0.52	0/1261
26	P	0.30	0/1022	0.46	0/1373
27	Q	0.34	0/1011	0.49	0/1362
28	R	0.35	0/1010	0.49	0/1355
29	S	0.33	0/1128	0.47	0/1518
30	T	0.33	0/1130	0.45	0/1517
31	U	0.35	0/829	0.49	0/1121
32	V	0.38	0/693	0.54	0/935

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	W	0.57	0/1038	0.68	2/1395 (0.1%)
34	X	0.47	0/1139	0.57	0/1518
35	Y	0.44	0/1087	0.55	0/1449
36	Z	0.34	0/519	0.46	0/696
All	All	0.49	1/90236 (0.0%)	0.81	102/130500 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	2	99	C	N1-C6	-6.38	1.33	1.37

All (102) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	2	1185	U	OP2-P-O3'	-10.53	82.04	105.20
11	2	1096	C	N1-C2-O2	9.85	124.81	118.90
11	2	1185	U	OP1-P-O3'	-9.38	84.56	105.20
11	2	1004	U	C2-N1-C1'	9.19	128.73	117.70
11	2	1257	U	C2-N1-C1'	8.77	128.22	117.70
11	2	1186	U	OP1-P-OP2	8.74	132.72	119.60
11	2	453	U	N1-C2-O2	8.15	128.50	122.80
11	2	453	U	C2-N1-C1'	7.79	127.05	117.70
11	2	1389	C	C2-N1-C1'	7.60	127.16	118.80
11	2	1490	C	C6-N1-C2	-7.54	117.28	120.30
11	2	1640	C	N1-C2-O2	7.48	123.39	118.90
11	2	543	C	N1-C2-O2	7.33	123.30	118.90
11	2	36	C	C5-C4-N4	-7.30	115.09	120.20
11	2	876	G	N1-C6-O6	7.29	124.28	119.90
11	2	1640	C	C2-N1-C1'	7.20	126.71	118.80
11	2	75	U	C2-N1-C1'	7.10	126.22	117.70
11	2	543	C	C2-N1-C1'	7.08	126.58	118.80
11	2	74	U	C2-N1-C1'	7.00	126.11	117.70
11	2	1096	C	N3-C2-O2	-6.97	117.02	121.90
11	2	1004	U	N1-C2-O2	6.92	127.65	122.80
11	2	1398	U	N1-C2-O2	6.83	127.58	122.80
11	2	876	G	C5-C6-O6	-6.79	124.53	128.60
11	2	569	C	N3-C2-O2	-6.74	117.19	121.90
11	2	1630	U	O5'-P-OP1	6.71	118.75	110.70
11	2	453	U	C6-N1-C1'	-6.67	111.87	121.20
11	2	1096	C	C2-N1-C1'	6.61	126.07	118.80
11	2	569	C	C6-N1-C2	-6.60	117.66	120.30
11	2	543	C	N3-C2-O2	-6.59	117.28	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	2	1004	U	C5-C6-N1	6.55	125.97	122.70
11	2	75	U	N1-C2-O2	6.43	127.30	122.80
11	2	695	U	C2-N1-C1'	6.43	125.42	117.70
11	2	36	C	C2-N3-C4	-6.39	116.70	119.90
11	2	1784	C	C2-N1-C1'	6.34	125.77	118.80
11	2	1634	C	N1-C2-O2	6.32	122.69	118.90
11	2	569	C	N1-C2-O2	6.30	122.68	118.90
11	2	959	U	N3-C2-O2	-6.29	117.80	122.20
11	2	876	G	N9-C4-C5	-6.23	102.91	105.40
11	2	1398	U	C2-N1-C1'	6.21	125.16	117.70
11	2	1052	U	C2-N1-C1'	6.20	125.14	117.70
11	2	1632	C	C6-N1-C2	-6.18	117.83	120.30
11	2	778	G	O4'-C1'-N9	6.13	113.10	108.20
11	2	1082	C	C2-N1-C1'	6.12	125.53	118.80
11	2	40	A	N1-C6-N6	-6.08	114.95	118.60
11	2	959	U	C2-N1-C1'	6.07	124.98	117.70
11	2	1082	C	N1-C2-O2	6.07	122.54	118.90
11	2	1640	C	N3-C2-O2	-6.06	117.66	121.90
11	2	1257	U	N1-C2-O2	6.05	127.03	122.80
11	2	569	C	C2-N1-C1'	6.03	125.43	118.80
11	2	695	U	C5-C6-N1	6.02	125.71	122.70
11	2	959	U	N1-C2-O2	5.99	126.99	122.80
33	W	76	SER	C-N-CD	5.92	140.83	128.40
11	2	1257	U	C6-N1-C1'	-5.91	112.93	121.20
11	2	1004	U	N3-C2-O2	-5.90	118.07	122.20
11	2	1034	C	C6-N1-C2	5.88	122.65	120.30
11	2	453	U	N3-C2-O2	-5.88	118.08	122.20
11	2	1060	U	C2-N1-C1'	5.85	124.72	117.70
11	2	1004	U	C6-N1-C1'	-5.83	113.04	121.20
11	2	1389	C	N1-C2-O2	5.81	122.38	118.90
11	2	1293	U	C2-N1-C1'	5.79	124.65	117.70
11	2	1363	U	N1-C2-O2	5.79	126.85	122.80
11	2	1631	A	N1-C2-N3	5.72	132.16	129.30
11	2	876	G	C4-C5-N7	5.71	113.08	110.80
11	2	408	C	C6-N1-C2	-5.68	118.03	120.30
11	2	543	C	C6-N1-C2	-5.68	118.03	120.30
11	2	1096	C	C6-N1-C1'	-5.66	114.01	120.80
11	2	322	G	N3-C4-N9	5.62	129.37	126.00
33	W	65	LEU	CA-CB-CG	5.62	128.22	115.30
11	2	1389	C	C6-N1-C1'	-5.60	114.08	120.80
11	2	75	U	N3-C2-O2	-5.58	118.29	122.20
11	2	1793	G	C8-N9-C4	5.57	108.63	106.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	2	1156	C	P-O3'-C3'	5.57	126.39	119.70
11	2	1052	U	N1-C2-O2	5.54	126.68	122.80
11	2	1363	U	N3-C2-O2	-5.53	118.33	122.20
11	2	1006	C	C2-N1-C1'	5.52	124.87	118.80
11	2	1257	U	N3-C2-O2	-5.49	118.35	122.20
11	2	469	C	C6-N1-C2	-5.49	118.11	120.30
11	2	1784	C	N1-C2-O2	5.46	122.18	118.90
11	2	1793	G	C4-N9-C1'	-5.44	119.43	126.50
11	2	1072	C	C6-N1-C2	-5.39	118.14	120.30
11	2	1640	C	C6-N1-C2	-5.38	118.15	120.30
11	2	1006	C	N1-C2-O2	5.36	122.11	118.90
11	2	1006	C	C6-N1-C2	-5.31	118.17	120.30
11	2	472	U	C2-N3-C4	-5.31	123.81	127.00
11	2	1398	U	N3-C2-O2	-5.30	118.49	122.20
11	2	1006	C	N3-C2-O2	-5.29	118.19	121.90
11	2	36	C	N3-C4-C5	5.25	124.00	121.90
11	2	1672	G	N3-C4-C5	-5.22	125.99	128.60
11	2	297	U	N3-C2-O2	-5.21	118.55	122.20
11	2	1052	U	N3-C2-O2	-5.21	118.56	122.20
11	2	359	A	C8-N9-C4	5.21	107.88	105.80
11	2	563	U	C2-N1-C1'	5.18	123.92	117.70
11	2	372	G	C4-C5-N7	5.18	112.87	110.80
11	2	1307	U	C2-N1-C1'	5.16	123.89	117.70
11	2	297	U	N1-C2-O2	5.13	126.39	122.80
11	2	364	G	C8-N9-C4	-5.11	104.36	106.40
11	2	1570	A	P-O3'-C3'	5.09	125.81	119.70
11	2	1284	C	C6-N1-C2	-5.09	118.27	120.30
11	2	1389	C	C5-C6-N1	5.08	123.54	121.00
11	2	1596	C	C2-N1-C1'	5.07	124.38	118.80
11	2	297	U	C2-N1-C1'	5.05	123.76	117.70
11	2	322	G	C8-N9-C1'	-5.03	120.46	127.00
11	2	774	A	C6-N1-C2	-5.02	115.59	118.60

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	b	79/82 (96%)	69 (87%)	9 (11%)	1 (1%)	12	39
2	c	61/67 (91%)	53 (87%)	7 (12%)	1 (2%)	9	34
3	d	35/56 (62%)	32 (91%)	2 (6%)	1 (3%)	4	24
4	e	44/63 (70%)	36 (82%)	7 (16%)	1 (2%)	6	28
5	g	315/319 (99%)	279 (89%)	30 (10%)	6 (2%)	8	31
6	h	179/274 (65%)	165 (92%)	12 (7%)	2 (1%)	14	44
7	i	260/483 (54%)	247 (95%)	12 (5%)	1 (0%)	34	67
8	j	44/463 (10%)	42 (96%)	2 (4%)	0	100	100
9	k	664/788 (84%)	599 (90%)	54 (8%)	11 (2%)	9	34
10	l	282/425 (66%)	253 (90%)	21 (7%)	8 (3%)	5	24
12	A	204/252 (81%)	181 (89%)	17 (8%)	6 (3%)	4	24
13	B	212/255 (83%)	184 (87%)	24 (11%)	4 (2%)	8	31
14	C	215/254 (85%)	196 (91%)	15 (7%)	4 (2%)	8	31
15	D	198/240 (82%)	182 (92%)	14 (7%)	2 (1%)	15	46
16	E	258/261 (99%)	235 (91%)	20 (8%)	3 (1%)	13	41
17	F	204/225 (91%)	184 (90%)	19 (9%)	1 (0%)	29	61
18	G	230/236 (98%)	216 (94%)	14 (6%)	0	100	100
19	H	182/190 (96%)	162 (89%)	16 (9%)	4 (2%)	6	29
20	I	184/200 (92%)	160 (87%)	19 (10%)	5 (3%)	5	26
21	J	183/197 (93%)	163 (89%)	18 (10%)	2 (1%)	14	44
22	L	138/156 (88%)	129 (94%)	9 (6%)	0	100	100
23	M	123/143 (86%)	110 (89%)	9 (7%)	4 (3%)	4	22
24	N	148/151 (98%)	137 (93%)	10 (7%)	1 (1%)	22	55
25	O	125/137 (91%)	113 (90%)	10 (8%)	2 (2%)	9	34
26	P	125/142 (88%)	116 (93%)	8 (6%)	1 (1%)	19	51

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
27	Q	125/143 (87%)	112 (90%)	11 (9%)	2 (2%)	9	34
28	R	123/136 (90%)	114 (93%)	9 (7%)	0	100	100
29	S	133/146 (91%)	122 (92%)	11 (8%)	0	100	100
30	T	141/144 (98%)	131 (93%)	7 (5%)	3 (2%)	7	30
31	U	101/121 (84%)	93 (92%)	4 (4%)	4 (4%)	3	18
32	V	85/87 (98%)	77 (91%)	8 (9%)	0	100	100
33	W	127/130 (98%)	110 (87%)	11 (9%)	6 (5%)	2	15
34	X	142/145 (98%)	128 (90%)	12 (8%)	2 (1%)	11	37
35	Y	132/135 (98%)	119 (90%)	12 (9%)	1 (1%)	19	51
36	Z	61/108 (56%)	56 (92%)	5 (8%)	0	100	100
All	All	5862/7354 (80%)	5305 (90%)	468 (8%)	89 (2%)	14	36

All (89) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	k	483	PRO
12	A	189	VAL
13	B	81	PHE
23	M	104	GLY
23	M	109	GLU
25	O	36	LYS
30	T	69	LYS
30	T	81	GLY
33	W	57	ARG
33	W	66	ASN
33	W	78	ARG
1	b	68	GLY
5	g	55	GLY
6	h	228	ASP
9	k	374	TYR
12	A	49	ASN
13	B	35	PRO
17	F	150	GLY
19	H	111	LYS
20	I	186	GLY
21	J	91	LYS
23	M	103	LEU
24	N	68	GLY

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
25	O	44	GLY
5	g	58	VAL
5	g	63	GLY
5	g	105	GLY
5	g	237	GLN
6	h	227	ALA
9	k	186	ALA
9	k	348	GLU
9	k	381	PRO
9	k	749	LEU
10	l	30	GLU
10	l	254	PHE
12	A	70	PRO
14	C	190	LEU
16	E	170	THR
20	I	35	ASN
31	U	71	PRO
33	W	55	ASP
34	X	69	ARG
3	d	22	ARG
5	g	15	GLY
9	k	708	PHE
9	k	712	LYS
10	l	47	SER
10	l	68	VAL
10	l	193	GLU
13	B	40	ASN
14	C	146	THR
14	C	223	GLY
15	D	4	LEU
16	E	231	GLN
19	H	85	PHE
20	I	6	ASP
26	P	87	PRO
33	W	67	GLY
9	k	78	GLY
9	k	395	GLY
12	A	97	PRO
13	B	39	GLU
14	C	79	GLU
15	D	81	PRO
19	H	32	PRO

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Mol	Chain	Res	Type
20	I	79	ALA
21	J	126	ARG
23	M	126	TRP
27	Q	128	LYS
30	T	17	ALA
35	Y	31	ASN
9	k	392	VAL
10	l	99	ASN
10	l	183	SER
12	A	158	VAL
19	H	84	LYS
4	e	6	GLY
12	A	139	VAL
27	Q	5	PRO
33	W	76	SER
34	X	68	ILE
2	c	24	GLY
7	i	250	ASN
10	l	98	GLY
31	U	96	PRO
16	E	29	PRO
20	I	104	ILE
31	U	55	PRO
31	U	73	GLY

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	b	70/71 (99%)	65 (93%)	5 (7%)	14	44
2	c	56/60 (93%)	49 (88%)	7 (12%)	4	17
3	d	33/49 (67%)	32 (97%)	1 (3%)	41	68
4	e	40/54 (74%)	36 (90%)	4 (10%)	7	27
5	g	259/262 (99%)	241 (93%)	18 (7%)	15	45

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
6	h	158/238 (66%)	148 (94%)	10 (6%)	18	47
7	i	234/424 (55%)	224 (96%)	10 (4%)	29	59
8	j	44/419 (10%)	42 (96%)	2 (4%)	27	58
9	k	580/703 (82%)	557 (96%)	23 (4%)	31	60
10	l	260/384 (68%)	243 (94%)	17 (6%)	17	46
12	A	171/210 (81%)	158 (92%)	13 (8%)	13	41
13	B	191/224 (85%)	178 (93%)	13 (7%)	16	45
14	C	176/205 (86%)	157 (89%)	19 (11%)	6	24
15	D	164/195 (84%)	150 (92%)	14 (8%)	10	35
16	E	221/222 (100%)	205 (93%)	16 (7%)	14	43
17	F	173/191 (91%)	164 (95%)	9 (5%)	23	53
18	G	198/201 (98%)	178 (90%)	20 (10%)	7	27
19	H	165/170 (97%)	151 (92%)	14 (8%)	10	35
20	I	150/161 (93%)	135 (90%)	15 (10%)	7	27
21	J	158/166 (95%)	140 (89%)	18 (11%)	5	21
22	L	125/137 (91%)	113 (90%)	12 (10%)	8	29
23	M	101/119 (85%)	96 (95%)	5 (5%)	24	54
24	N	127/128 (99%)	115 (91%)	12 (9%)	8	30
25	O	91/105 (87%)	84 (92%)	7 (8%)	13	40
26	P	105/118 (89%)	99 (94%)	6 (6%)	20	50
27	Q	107/119 (90%)	101 (94%)	6 (6%)	21	51
28	R	113/124 (91%)	103 (91%)	10 (9%)	10	33
29	S	120/129 (93%)	114 (95%)	6 (5%)	24	54
30	T	115/116 (99%)	107 (93%)	8 (7%)	15	44
31	U	96/114 (84%)	91 (95%)	5 (5%)	23	53
32	V	74/74 (100%)	66 (89%)	8 (11%)	6	24
33	W	110/111 (99%)	96 (87%)	14 (13%)	4	16
34	X	119/120 (99%)	111 (93%)	8 (7%)	16	46
35	Y	112/113 (99%)	103 (92%)	9 (8%)	12	38
36	Z	56/89 (63%)	56 (100%)	0	100	100
All	All	5072/6325 (80%)	4708 (93%)	364 (7%)	18	43

All (364) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	b	2	VAL
1	b	17	ARG
1	b	48	SER
1	b	73	LEU
1	b	74	SER
2	c	8	THR
2	c	19	THR
2	c	33	LEU
2	c	42	ARG
2	c	55	VAL
2	c	56	LEU
2	c	65	ARG
3	d	21	CYS
4	e	3	LYS
4	e	7	SER
4	e	25	GLU
4	e	42	ARG
5	g	43	ILE
5	g	46	LYS
5	g	59	ARG
5	g	76	ASP
5	g	109	ASP
5	g	136	ILE
5	g	137	LYS
5	g	141	LEU
5	g	149	ASP
5	g	153	GLN
5	g	165	ASP
5	g	202	LEU
5	g	207	ASP
5	g	238	ASP
5	g	265	LEU
5	g	268	GLN
5	g	290	VAL
5	g	292	LEU
6	h	106	MET
6	h	146	THR
6	h	152	LEU
6	h	174	LEU
6	h	192	THR
6	h	209	ASP
6	h	220	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
6	h	221	ARG
6	h	234	LEU
6	h	251	ILE
7	i	217	VAL
7	i	240	ARG
7	i	274	GLU
7	i	283	LEU
7	i	311	LEU
7	i	328	THR
7	i	333	ARG
7	i	350	LEU
7	i	385	GLN
7	i	421	PHE
8	j	360	GLN
8	j	362	ASP
9	k	62	ARG
9	k	153	LYS
9	k	175	GLN
9	k	191	VAL
9	k	198	VAL
9	k	225	ARG
9	k	234	ASP
9	k	253	ARG
9	k	265	ASP
9	k	360	TYR
9	k	371	THR
9	k	392	VAL
9	k	396	THR
9	k	497	ARG
9	k	504	LEU
9	k	515	ASP
9	k	526	LYS
9	k	572	GLN
9	k	595	ASN
9	k	600	ARG
9	k	608	VAL
9	k	696	ILE
9	k	729	TRP
10	l	12	THR
10	l	14	ASP
10	l	32	VAL
10	l	34	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
10	1	62	ILE
10	1	121	VAL
10	1	124	ILE
10	1	153	HIS
10	1	176	VAL
10	1	181	ASP
10	1	189	MET
10	1	198	ARG
10	1	216	PHE
10	1	228	CYS
10	1	235	ILE
10	1	254	PHE
10	1	257	CYS
12	A	10	THR
12	A	12	GLU
12	A	50	VAL
12	A	56	LYS
12	A	57	LEU
12	A	59	LEU
12	A	93	THR
12	A	111	ILE
12	A	119	ARG
12	A	135	GLU
12	A	157	ASP
12	A	195	TRP
12	A	200	ASP
13	B	32	ILE
13	B	43	VAL
13	B	46	THR
13	B	51	SER
13	B	69	CYS
13	B	98	THR
13	B	130	SER
13	B	140	ILE
13	B	149	GLN
13	B	176	VAL
13	B	180	THR
13	B	201	THR
13	B	220	GLN
14	C	36	VAL
14	C	51	THR
14	C	58	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
14	C	61	LEU
14	C	80	VAL
14	C	108	ASN
14	C	111	VAL
14	C	139	ILE
14	C	140	ARG
14	C	154	LEU
14	C	207	LEU
14	C	210	THR
14	C	218	ILE
14	C	221	THR
14	C	222	TYR
14	C	225	LEU
14	C	228	ASN
14	C	237	VAL
14	C	241	ASP
15	D	4	LEU
15	D	7	LYS
15	D	23	GLU
15	D	76	ARG
15	D	84	ILE
15	D	103	GLU
15	D	105	MET
15	D	158	ILE
15	D	175	VAL
15	D	176	LEU
15	D	178	ARG
15	D	190	ARG
15	D	196	ARG
15	D	221	SER
16	E	8	HIS
16	E	9	LEU
16	E	38	LEU
16	E	39	ARG
16	E	54	TYR
16	E	59	ARG
16	E	78	THR
16	E	87	MET
16	E	95	THR
16	E	102	VAL
16	E	113	ARG
16	E	155	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	E	181	VAL
16	E	183	VAL
16	E	189	LEU
16	E	240	LYS
17	F	103	ASN
17	F	112	ARG
17	F	125	THR
17	F	156	ARG
17	F	162	VAL
17	F	194	LEU
17	F	216	GLU
17	F	219	ARG
17	F	225	ARG
18	G	18	ILE
18	G	25	ARG
18	G	57	ASP
18	G	71	THR
18	G	78	THR
18	G	97	VAL
18	G	98	ARG
18	G	105	ASP
18	G	109	LEU
18	G	115	LYS
18	G	120	GLU
18	G	124	LEU
18	G	126	ASP
18	G	129	VAL
18	G	133	LEU
18	G	143	LYS
18	G	153	VAL
18	G	154	ARG
18	G	155	ASP
18	G	212	LEU
19	H	28	GLU
19	H	46	ILE
19	H	49	ILE
19	H	50	ASP
19	H	73	VAL
19	H	79	ARG
19	H	87	ASP
19	H	105	THR
19	H	112	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
19	H	126	LEU
19	H	129	LEU
19	H	136	VAL
19	H	139	ARG
19	H	144	VAL
20	I	5	ARG
20	I	29	LEU
20	I	45	SER
20	I	49	ARG
20	I	76	THR
20	I	92	ARG
20	I	103	GLN
20	I	107	THR
20	I	137	LYS
20	I	138	ASN
20	I	140	GLU
20	I	164	ARG
20	I	176	SER
20	I	179	CYS
20	I	185	GLU
21	J	3	ARG
21	J	7	THR
21	J	24	LEU
21	J	28	LEU
21	J	39	LYS
21	J	49	LEU
21	J	60	LEU
21	J	78	ARG
21	J	81	VAL
21	J	83	VAL
21	J	89	ASP
21	J	96	VAL
21	J	99	LEU
21	J	109	LEU
21	J	110	GLN
21	J	130	THR
21	J	131	GLN
21	J	132	ARG
22	L	37	ASN
22	L	40	LEU
22	L	44	THR
22	L	58	CYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
22	L	67	ARG
22	L	69	LYS
22	L	77	SER
22	L	83	THR
22	L	109	VAL
22	L	123	VAL
22	L	129	ARG
22	L	131	ILE
23	M	45	LEU
23	M	91	VAL
23	M	103	LEU
23	M	131	ASP
23	M	133	LEU
24	N	3	ARG
24	N	4	MET
24	N	20	ARG
24	N	39	LYS
24	N	42	ARG
24	N	53	LEU
24	N	64	ARG
24	N	67	THR
24	N	76	LYS
24	N	88	LEU
24	N	125	LEU
24	N	134	VAL
25	O	31	THR
25	O	43	THR
25	O	54	GLU
25	O	67	VAL
25	O	89	THR
25	O	105	LEU
25	O	124	ASP
26	P	50	THR
26	P	60	LEU
26	P	79	HIS
26	P	86	VAL
26	P	124	THR
26	P	141	LEU
27	Q	9	THR
27	Q	10	PHE
27	Q	29	ILE
27	Q	53	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
27	Q	59	LYS
27	Q	69	VAL
28	R	3	ARG
28	R	25	THR
28	R	29	GLN
28	R	34	LEU
28	R	38	ILE
28	R	49	LYS
28	R	82	ASP
28	R	99	VAL
28	R	102	VAL
28	R	115	LEU
29	S	20	THR
29	S	29	VAL
29	S	62	THR
29	S	74	GLN
29	S	100	THR
29	S	105	VAL
30	T	4	VAL
30	T	38	LYS
30	T	101	ASN
30	T	114	VAL
30	T	130	ARG
30	T	131	ASP
30	T	132	LEU
30	T	144	GLU
31	U	22	ILE
31	U	30	LYS
31	U	31	VAL
31	U	64	LYS
31	U	89	ARG
32	V	1	MET
32	V	8	LEU
32	V	20	THR
32	V	25	LYS
32	V	32	VAL
32	V	51	VAL
32	V	62	ARG
32	V	71	ARG
33	W	6	VAL
33	W	7	LEU
33	W	24	GLN

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Mol	Chain	Res	Type
33	W	25	VAL
33	W	41	MET
33	W	57	ARG
33	W	65	LEU
33	W	66	ASN
33	W	80	ASN
33	W	98	GLN
33	W	103	ILE
33	W	106	THR
33	W	111	MET
33	W	117	ARG
34	X	7	ARG
34	X	11	SER
34	X	43	PHE
34	X	60	GLU
34	X	84	THR
34	X	94	ASN
34	X	117	ILE
34	X	120	VAL
35	Y	3	ASP
35	Y	8	ARG
35	Y	14	SER
35	Y	34	ASN
35	Y	44	LEU
35	Y	55	VAL
35	Y	74	LEU
35	Y	105	ARG
35	Y	108	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (74) such sidechains are listed below:

Mol	Chain	Res	Type
2	c	27	GLN
2	c	43	ASN
5	g	29	GLN
5	g	159	ASN
5	g	268	GLN
6	h	142	ASN
6	h	239	HIS
7	i	385	GLN
7	i	434	GLN
8	j	366	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
9	k	288	ASN
9	k	547	ASN
9	k	647	HIS
10	l	29	HIS
10	l	262	HIS
12	A	23	HIS
12	A	30	GLN
12	A	32	HIS
12	A	39	ASN
12	A	92	HIS
12	A	131	GLN
12	A	168	HIS
13	B	118	GLN
13	B	209	ASN
13	B	211	HIS
14	C	59	HIS
14	C	94	GLN
14	C	108	ASN
14	C	147	ASN
14	C	228	ASN
14	C	233	GLN
15	D	159	HIS
16	E	50	ASN
16	E	98	ASN
16	E	112	HIS
16	E	188	ASN
16	E	197	HIS
16	E	201	HIS
17	F	116	HIS
18	G	56	ASN
19	H	71	HIS
20	I	32	GLN
20	I	84	HIS
20	I	87	ASN
21	J	110	GLN
21	J	123	HIS
21	J	131	GLN
22	L	14	GLN
22	L	37	ASN
22	L	104	HIS
23	M	80	ASN
23	M	139	HIS

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Mol	Chain	Res	Type
24	N	58	HIS
25	O	29	HIS
25	O	99	GLN
26	P	79	HIS
26	P	103	ASN
26	P	128	HIS
28	R	83	GLN
28	R	123	ASN
29	S	71	GLN
29	S	74	GLN
30	T	12	GLN
30	T	48	GLN
30	T	129	GLN
30	T	138	GLN
33	W	24	GLN
33	W	44	HIS
33	W	66	ASN
33	W	120	HIS
34	X	48	HIS
34	X	99	ASN
35	Y	29	HIS
36	Z	98	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	2	1770/1800 (98%)	632 (35%)	20 (1%)

All (632) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
11	2	4	C
11	2	17	C
11	2	25	C
11	2	26	A
11	2	34	G
11	2	42	G
11	2	45	U
11	2	47	A
11	2	50	C
11	2	51	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	57	G
11	2	60	U
11	2	66	U
11	2	67	A
11	2	68	A
11	2	72	A
11	2	73	U
11	2	74	U
11	2	75	U
11	2	77	U
11	2	101	U
11	2	103	A
11	2	104	A
11	2	105	A
11	2	114	C
11	2	115	G
11	2	127	G
11	2	128	U
11	2	130	C
11	2	131	C
11	2	134	U
11	2	135	A
11	2	138	A
11	2	140	A
11	2	141	U
11	2	142	G
11	2	146	U
11	2	153	G
11	2	155	U
11	2	156	A
11	2	158	U
11	2	178	U
11	2	179	A
11	2	185	U
11	2	186	C
11	2	191	C
11	2	192	U
11	2	193	U
11	2	194	U
11	2	195	G
11	2	196	G
11	2	197	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	198	A
11	2	215	A
11	2	217	A
11	2	218	A
11	2	219	A
11	2	220	A
11	2	221	A
11	2	225	A
11	2	227	U
11	2	228	G
11	2	229	U
11	2	230	C
11	2	231	U
11	2	232	U
11	2	233	C
11	2	234	G
11	2	235	G
11	2	236	A
11	2	237	C
11	2	238	U
11	2	240	U
11	2	241	U
11	2	242	U
11	2	250	C
11	2	257	A
11	2	261	U
11	2	265	A
11	2	267	U
11	2	269	G
11	2	271	A
11	2	272	U
11	2	275	C
11	2	276	C
11	2	277	U
11	2	278	U
11	2	279	G
11	2	280	U
11	2	281	G
11	2	288	A
11	2	304	U
11	2	305	C
11	2	308	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	309	C
11	2	314	C
11	2	316	A
11	2	318	U
11	2	319	U
11	2	320	U
11	2	322	G
11	2	334	G
11	2	335	U
11	2	337	G
11	2	338	C
11	2	344	A
11	2	345	U
11	2	352	A
11	2	359	A
11	2	360	A
11	2	361	C
11	2	369	A
11	2	370	A
11	2	399	A
11	2	400	A
11	2	401	A
11	2	402	C
11	2	404	G
11	2	411	C
11	2	416	A
11	2	417	A
11	2	419	G
11	2	423	G
11	2	424	C
11	2	425	A
11	2	426	G
11	2	434	G
11	2	439	U
11	2	444	C
11	2	445	A
11	2	446	A
11	2	448	C
11	2	459	G
11	2	460	A
11	2	464	A
11	2	469	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	475	A
11	2	477	A
11	2	478	A
11	2	479	C
11	2	480	G
11	2	481	A
11	2	482	U
11	2	483	A
11	2	484	C
11	2	486	G
11	2	490	C
11	2	492	A
11	2	493	U
11	2	494	U
11	2	495	C
11	2	497	G
11	2	498	G
11	2	500	C
11	2	504	U
11	2	505	A
11	2	506	A
11	2	507	U
11	2	514	G
11	2	519	C
11	2	527	A
11	2	532	U
11	2	534	A
11	2	540	G
11	2	541	A
11	2	542	A
11	2	543	C
11	2	544	A
11	2	545	A
11	2	548	G
11	2	549	G
11	2	555	A
11	2	556	A
11	2	557	G
11	2	558	U
11	2	559	C
11	2	563	U
11	2	564	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	565	C
11	2	566	C
11	2	567	A
11	2	568	G
11	2	571	G
11	2	575	C
11	2	576	G
11	2	577	G
11	2	578	U
11	2	579	A
11	2	580	A
11	2	582	U
11	2	583	C
11	2	594	A
11	2	595	G
11	2	606	A
11	2	610	G
11	2	611	U
11	2	619	A
11	2	620	A
11	2	622	A
11	2	623	A
11	2	624	G
11	2	635	A
11	2	638	U
11	2	639	U
11	2	640	U
11	2	650	U
11	2	653	C
11	2	655	G
11	2	656	G
11	2	657	U
11	2	658	C
11	2	677	G
11	2	679	U
11	2	680	U
11	2	684	A
11	2	685	A
11	2	696	C
11	2	697	C
11	2	698	U
11	2	699	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	700	C
11	2	708	C
11	2	709	C
11	2	712	G
11	2	714	G
11	2	715	U
11	2	717	C
11	2	718	U
11	2	719	U
11	2	721	U
11	2	722	G
11	2	723	G
11	2	728	U
11	2	736	C
11	2	737	A
11	2	738	G
11	2	739	G
11	2	740	A
11	2	741	C
11	2	742	U
11	2	743	U
11	2	754	A
11	2	756	A
11	2	758	U
11	2	762	A
11	2	765	G
11	2	766	U
11	2	767	U
11	2	768	C
11	2	774	A
11	2	775	G
11	2	777	C
11	2	780	A
11	2	781	U
11	2	782	U
11	2	783	G
11	2	784	C
11	2	786	C
11	2	787	G
11	2	789	A
11	2	793	A
11	2	794	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	811	A
11	2	812	A
11	2	813	U
11	2	815	G
11	2	816	G
11	2	819	G
11	2	820	U
11	2	821	U
11	2	822	U
11	2	824	G
11	2	826	U
11	2	827	C
11	2	829	A
11	2	830	U
11	2	831	U
11	2	832	U
11	2	834	G
11	2	835	U
11	2	840	U
11	2	841	U
11	2	846	G
11	2	850	A
11	2	851	U
11	2	852	C
11	2	854	U
11	2	855	A
11	2	856	A
11	2	857	U
11	2	862	A
11	2	863	A
11	2	865	A
11	2	876	G
11	2	886	U
11	2	898	A
11	2	900	A
11	2	904	G
11	2	905	A
11	2	906	A
11	2	908	U
11	2	909	U
11	2	910	C
11	2	912	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	913	G
11	2	914	G
11	2	915	A
11	2	921	U
11	2	924	A
11	2	926	A
11	2	928	U
11	2	933	A
11	2	934	C
11	2	935	U
11	2	942	G
11	2	944	A
11	2	959	U
11	2	960	U
11	2	966	A
11	2	969	C
11	2	988	A
11	2	992	A
11	2	993	A
11	2	997	G
11	2	998	A
11	2	1000	C
11	2	1001	A
11	2	1002	G
11	2	1003	A
11	2	1004	U
11	2	1005	A
11	2	1007	C
11	2	1009	U
11	2	1011	G
11	2	1012	U
11	2	1016	C
11	2	1020	A
11	2	1021	C
11	2	1026	A
11	2	1028	C
11	2	1031	U
11	2	1043	A
11	2	1044	U
11	2	1053	G
11	2	1058	U
11	2	1059	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1060	U
11	2	1061	A
11	2	1063	U
11	2	1072	C
11	2	1073	G
11	2	1076	A
11	2	1078	C
11	2	1080	U
11	2	1081	A
11	2	1082	C
11	2	1092	A
11	2	1096	C
11	2	1097	U
11	2	1098	U
11	2	1100	G
11	2	1137	A
11	2	1138	A
11	2	1143	A
11	2	1146	G
11	2	1148	C
11	2	1150	G
11	2	1151	A
11	2	1152	A
11	2	1155	G
11	2	1156	C
11	2	1157	A
11	2	1158	C
11	2	1160	A
11	2	1164	G
11	2	1165	G
11	2	1167	G
11	2	1183	A
11	2	1185	U
11	2	1186	U
11	2	1189	A
11	2	1198	G
11	2	1199	G
11	2	1200	G
11	2	1201	G
11	2	1203	A
11	2	1206	U
11	2	1207	C

*Continued on next page...*



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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1208	A
11	2	1210	C
11	2	1212	G
11	2	1214	U
11	2	1215	C
11	2	1216	C
11	2	1217	A
11	2	1218	G
11	2	1219	A
11	2	1220	C
11	2	1227	A
11	2	1228	G
11	2	1229	G
11	2	1230	A
11	2	1232	U
11	2	1234	A
11	2	1235	C
11	2	1236	A
11	2	1238	A
11	2	1239	U
11	2	1240	U
11	2	1242	A
11	2	1243	G
11	2	1244	A
11	2	1245	G
11	2	1246	C
11	2	1249	U
11	2	1252	C
11	2	1254	U
11	2	1255	G
11	2	1256	A
11	2	1258	U
11	2	1262	U
11	2	1264	G
11	2	1266	U
11	2	1267	G
11	2	1268	G
11	2	1269	U
11	2	1270	G
11	2	1275	A
11	2	1276	U
11	2	1277	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1278	G
11	2	1279	C
11	2	1280	C
11	2	1281	G
11	2	1284	C
11	2	1285	U
11	2	1286	U
11	2	1287	A
11	2	1288	G
11	2	1293	U
11	2	1294	G
11	2	1295	G
11	2	1301	U
11	2	1309	C
11	2	1314	U
11	2	1315	U
11	2	1321	A
11	2	1324	G
11	2	1327	C
11	2	1328	G
11	2	1330	G
11	2	1331	A
11	2	1332	C
11	2	1333	C
11	2	1334	U
11	2	1336	A
11	2	1337	A
11	2	1339	C
11	2	1340	U
11	2	1343	U
11	2	1344	A
11	2	1345	A
11	2	1346	A
11	2	1347	U
11	2	1348	A
11	2	1354	G
11	2	1361	U
11	2	1362	U
11	2	1363	U
11	2	1364	G
11	2	1367	G
11	2	1370	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1371	A
11	2	1372	U
11	2	1383	G
11	2	1387	G
11	2	1388	A
11	2	1390	U
11	2	1398	U
11	2	1399	C
11	2	1400	A
11	2	1412	G
11	2	1413	U
11	2	1415	U
11	2	1418	G
11	2	1419	G
11	2	1420	C
11	2	1421	A
11	2	1422	A
11	2	1424	A
11	2	1425	A
11	2	1426	C
11	2	1427	A
11	2	1428	G
11	2	1429	G
11	2	1431	C
11	2	1432	U
11	2	1434	U
11	2	1435	G
11	2	1436	A
11	2	1437	U
11	2	1438	G
11	2	1439	C
11	2	1441	C
11	2	1442	U
11	2	1443	U
11	2	1444	A
11	2	1446	A
11	2	1447	C
11	2	1448	G
11	2	1449	U
11	2	1450	U
11	2	1452	U
11	2	1455	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1457	C
11	2	1458	G
11	2	1459	C
11	2	1460	A
11	2	1469	A
11	2	1471	A
11	2	1473	U
11	2	1474	G
11	2	1475	A
11	2	1479	A
11	2	1482	C
11	2	1486	G
11	2	1490	C
11	2	1492	A
11	2	1493	A
11	2	1506	G
11	2	1515	A
11	2	1516	A
11	2	1521	G
11	2	1523	G
11	2	1535	U
11	2	1536	G
11	2	1537	C
11	2	1538	U
11	2	1539	G
11	2	1540	G
11	2	1542	G
11	2	1557	U
11	2	1559	A
11	2	1568	C
11	2	1571	C
11	2	1573	A
11	2	1574	G
11	2	1584	G
11	2	1590	G
11	2	1595	U
11	2	1596	C
11	2	1597	A
11	2	1598	U
11	2	1601	G
11	2	1615	C
11	2	1618	C

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1619	C
11	2	1620	C
11	2	1622	G
11	2	1624	C
11	2	1627	U
11	2	1630	U
11	2	1631	A
11	2	1632	C
11	2	1633	A
11	2	1634	C
11	2	1635	A
11	2	1637	C
11	2	1638	G
11	2	1639	C
11	2	1640	C
11	2	1641	C
11	2	1642	G
11	2	1648	A
11	2	1649	G
11	2	1651	A
11	2	1652	C
11	2	1653	C
11	2	1655	A
11	2	1657	U
11	2	1658	G
11	2	1659	A
11	2	1680	G
11	2	1681	A
11	2	1683	C
11	2	1686	C
11	2	1687	U
11	2	1689	A
11	2	1697	G
11	2	1700	C
11	2	1701	A
11	2	1707	A
11	2	1712	A
11	2	1714	A
11	2	1715	G
11	2	1731	A
11	2	1732	A
11	2	1736	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	1738	U
11	2	1739	C
11	2	1741	U
11	2	1742	U
11	2	1743	U
11	2	1744	A
11	2	1745	G
11	2	1746	A
11	2	1748	G
11	2	1749	A
11	2	1750	A
11	2	1753	A
11	2	1754	A
11	2	1755	A
11	2	1757	G
11	2	1758	U
11	2	1759	C
11	2	1760	G
11	2	1761	U
11	2	1762	A
11	2	1763	A
11	2	1765	A
11	2	1766	A
11	2	1767	G
11	2	1769	U
11	2	1770	U
11	2	1772	C
11	2	1779	U
11	2	1781	A
11	2	1782	A
11	2	1783	C
11	2	1792	G
11	2	1793	G
11	2	1795	U

All (20) RNA pucker outliers are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
11	2	155	U
11	2	278	U
11	2	418	G
11	2	539	G

*Continued on next page...*

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Mol	Chain	Res	Type
11	2	567	A
11	2	721	U
11	2	779	U
11	2	782	U
11	2	912	U
11	2	1156	C
11	2	1200	G
11	2	1229	G
11	2	1231	U
11	2	1343	U
11	2	1458	G
11	2	1481	C
11	2	1570	A
11	2	1573	A
11	2	1631	A
11	2	1652	C

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

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

#### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

#### 5.6 Ligand geometry [i](#)

Of 48 ligands modelled in this entry, 48 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
11	2	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	2	1377:U	O3'	1378:U	P	3.76
1	2	902:G	O3'	903:U	P	3.04



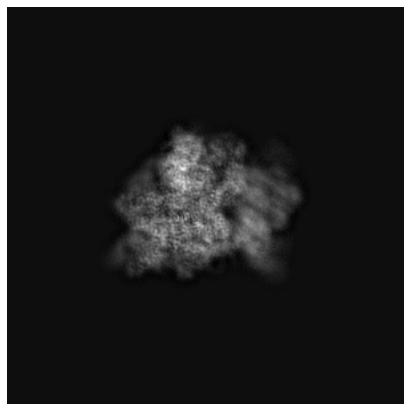
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4214. These allow visual inspection of the internal detail of the map and identification of artifacts.

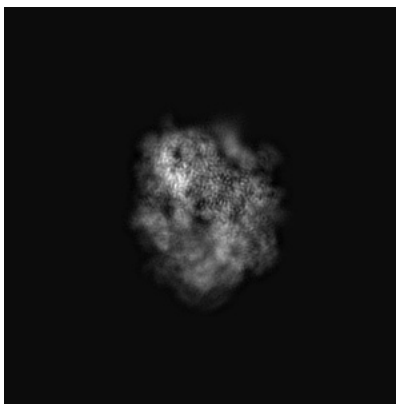
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

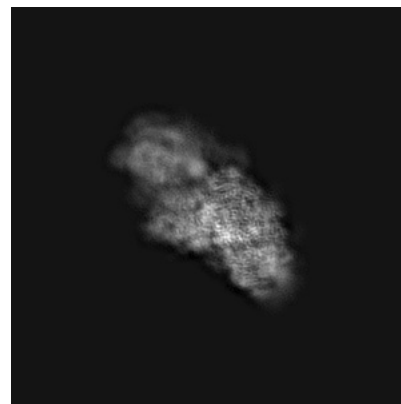
#### 6.1.1 Primary map



X

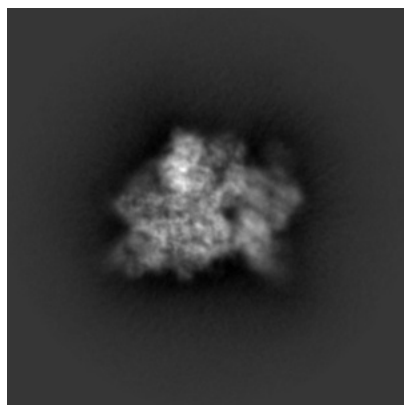


Y

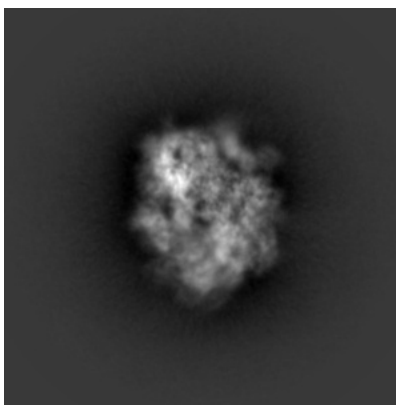


Z

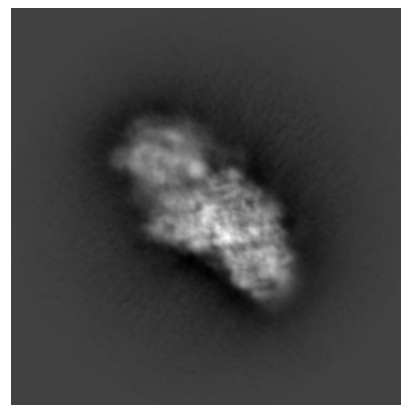
#### 6.1.2 Raw map



X



Y

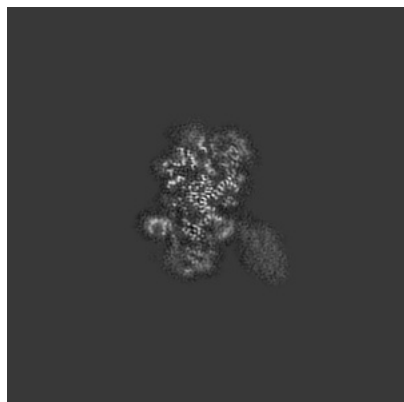


Z

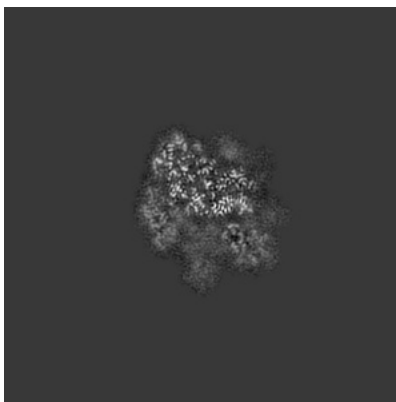
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

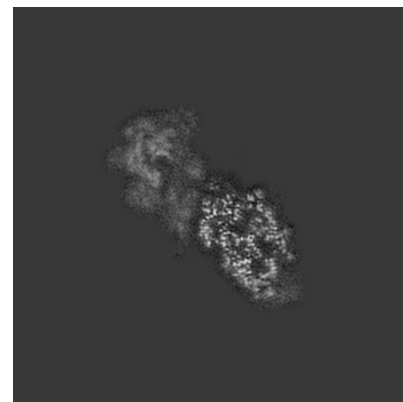
### 6.2.1 Primary map



X Index: 160

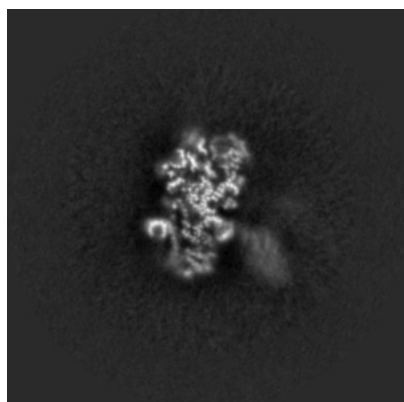


Y Index: 160

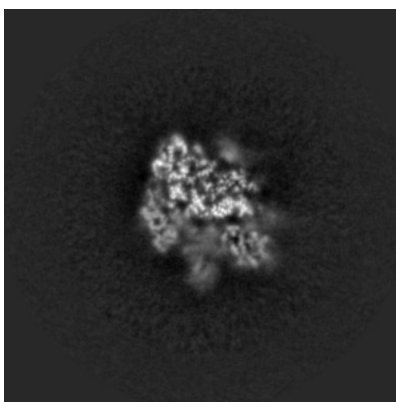


Z Index: 160

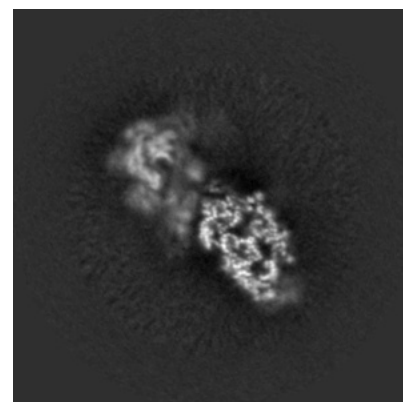
### 6.2.2 Raw map



X Index: 160



Y Index: 160

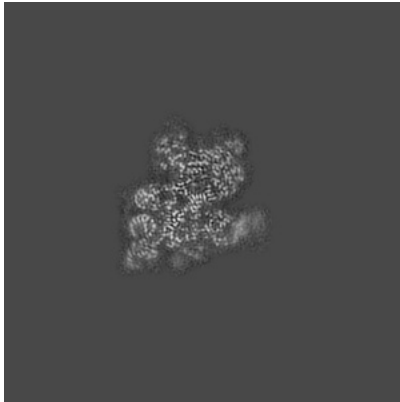


Z Index: 160

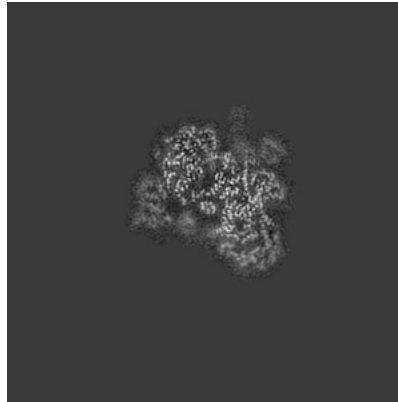
The images above show central slices of the map in three orthogonal directions.

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

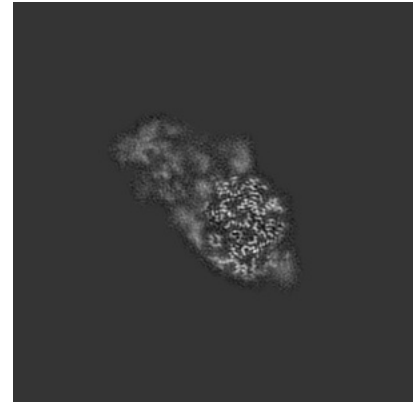
### 6.3.1 Primary map



X Index: 178

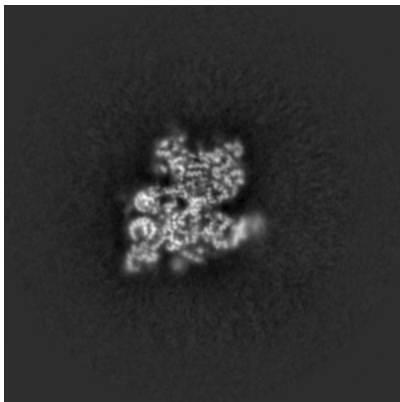


Y Index: 141

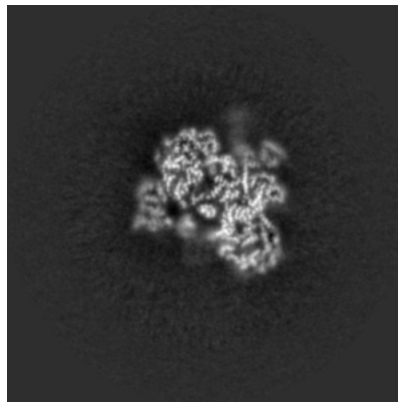


Z Index: 144

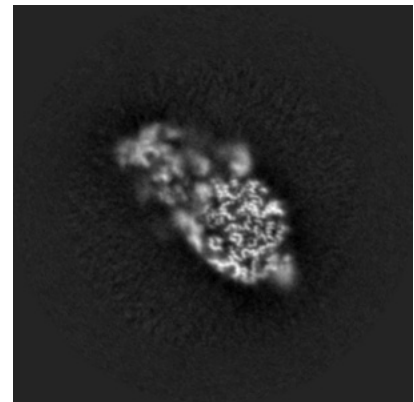
### 6.3.2 Raw map



X Index: 178



Y Index: 141

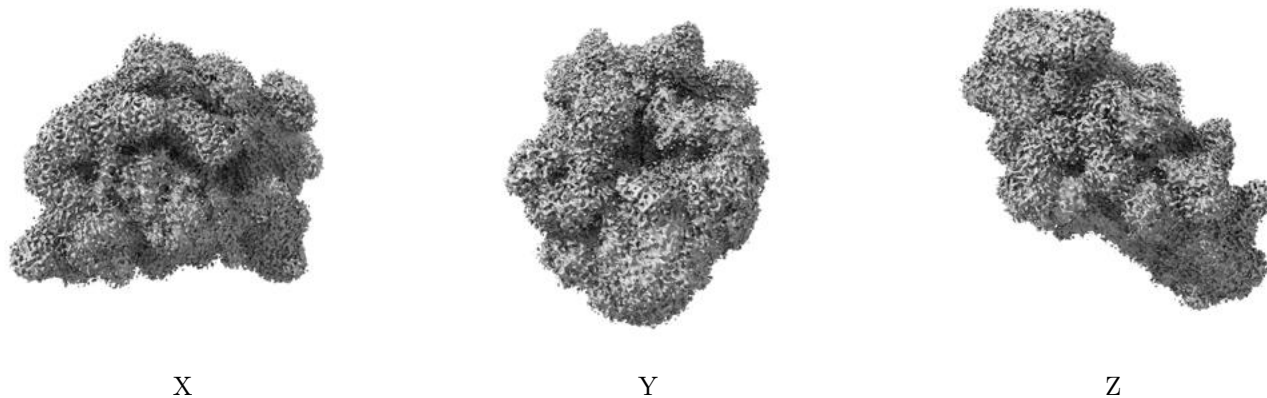


Z Index: 144

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

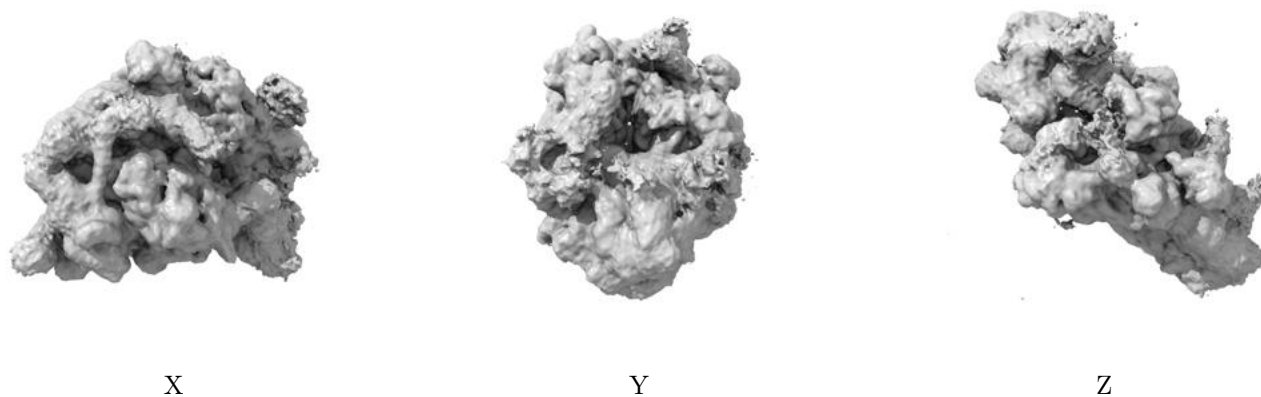
## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 Raw map



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

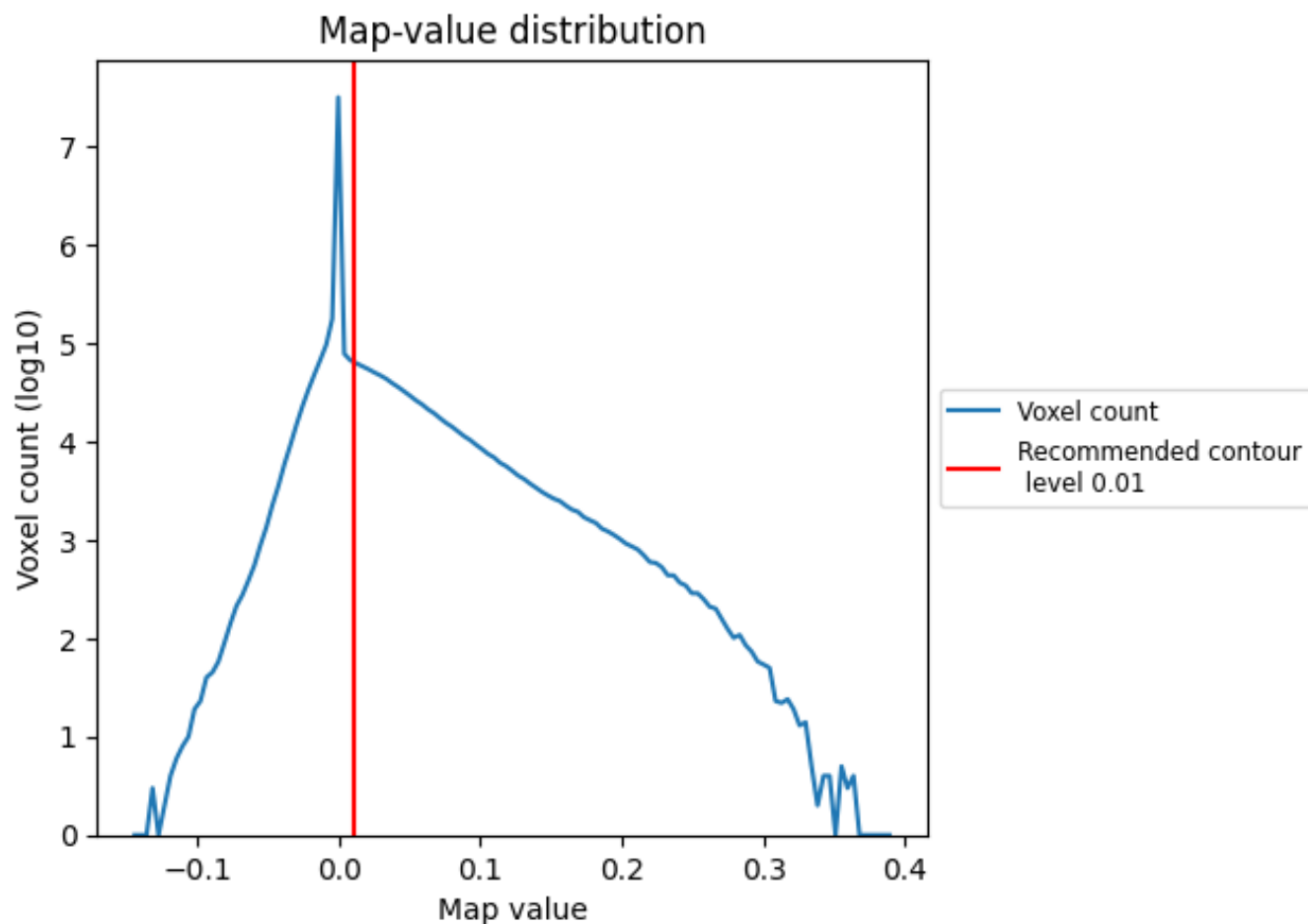
## 6.5 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

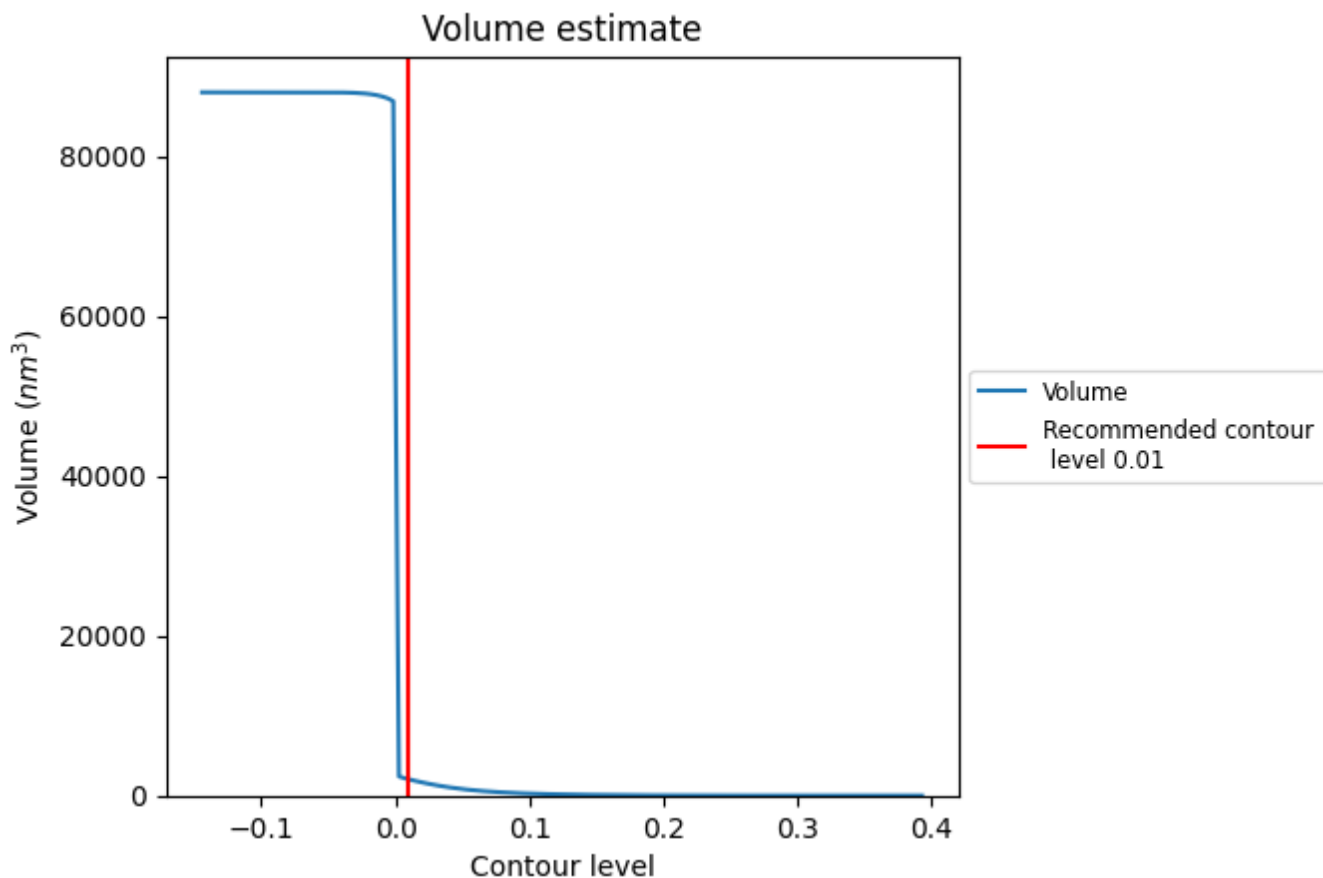
This section contains the results of statistical analysis of the map.

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



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

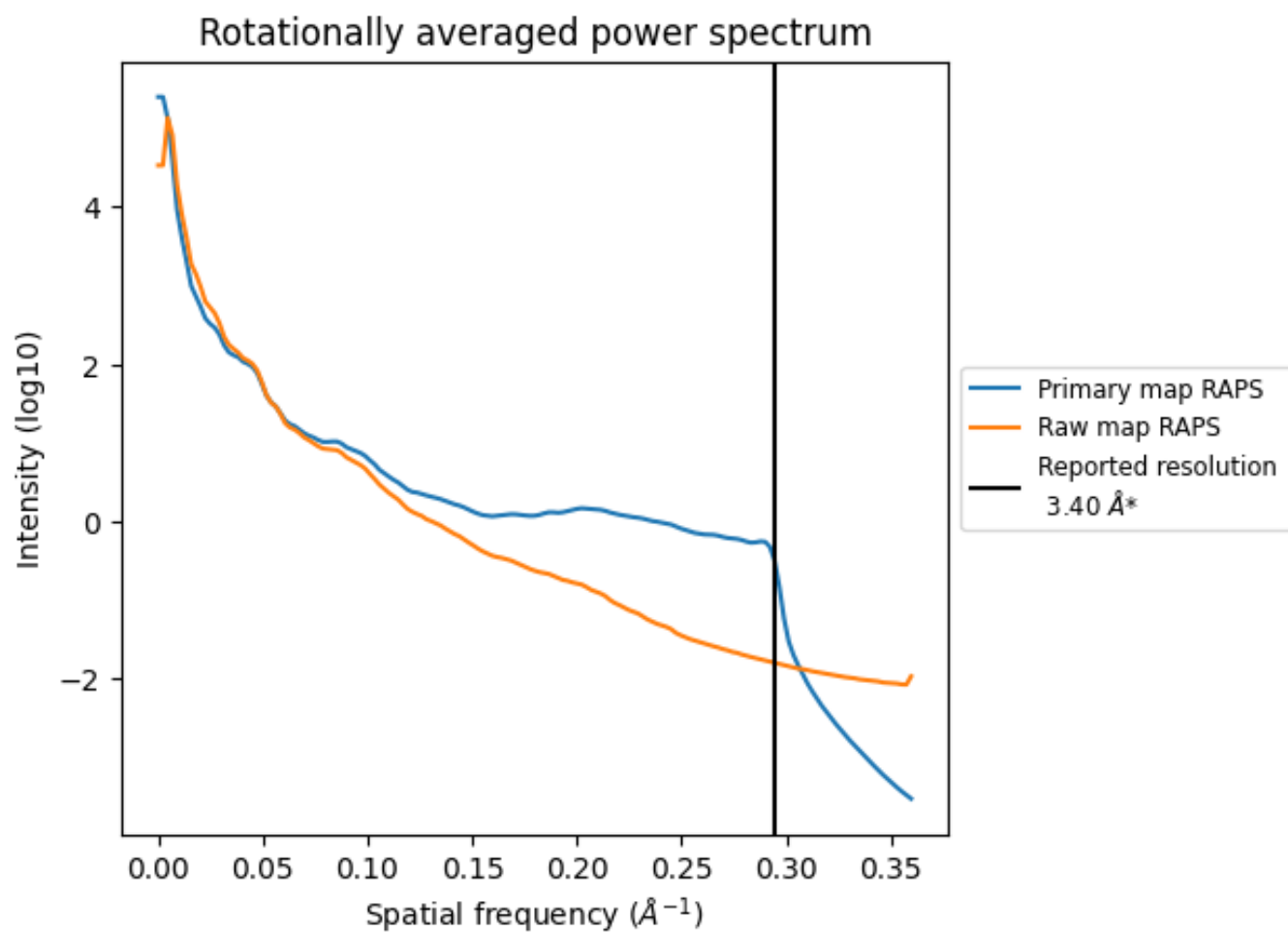
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 2041  $\text{nm}^3$ ; this corresponds to an approximate mass of 1844 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 [\(i\)](#)

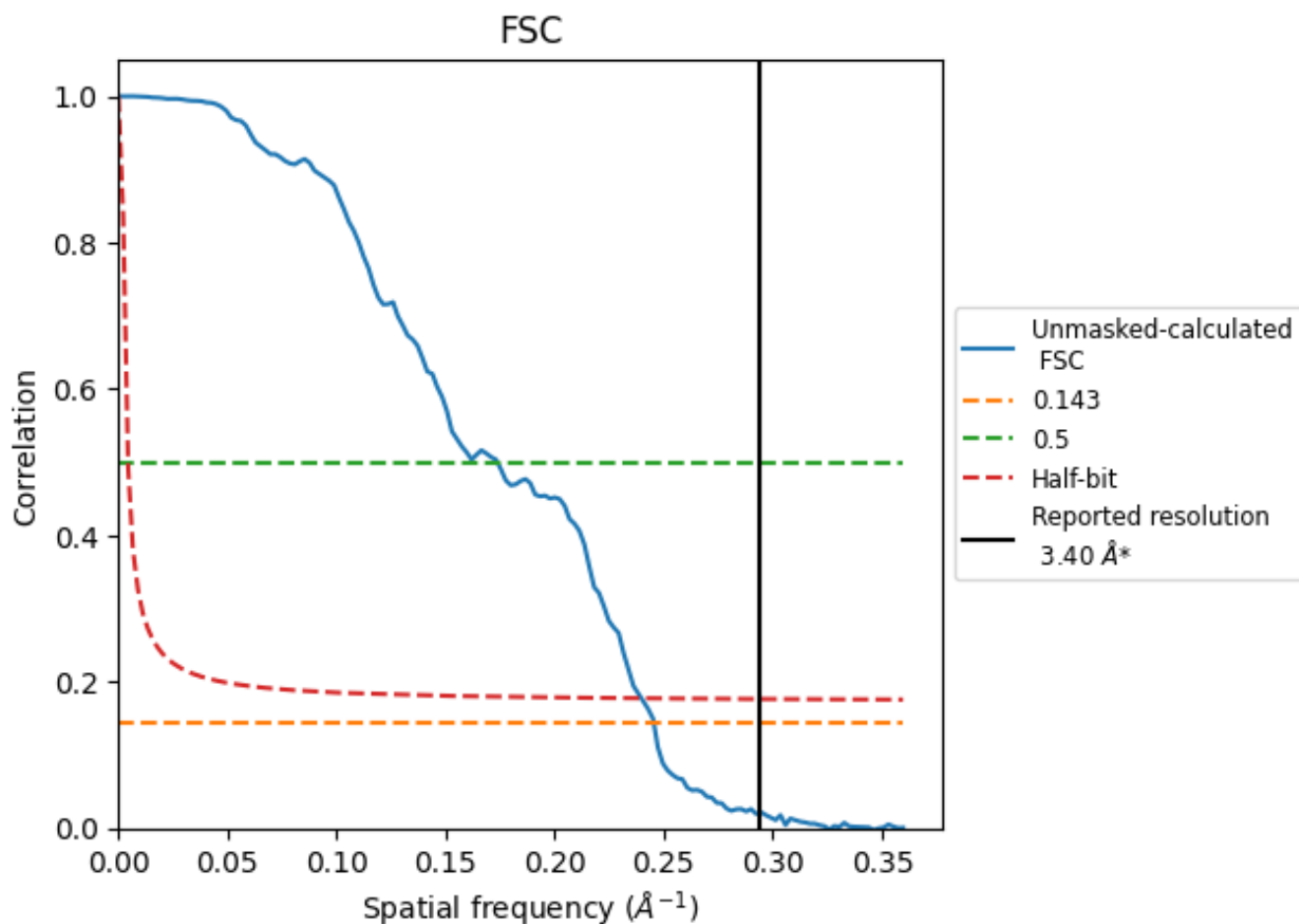


\*Reported resolution corresponds to spatial frequency of 0.294 Å<sup>-1</sup>

## 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 0.294 Å<sup>-1</sup>



## 8.2 Resolution estimates [i](#)

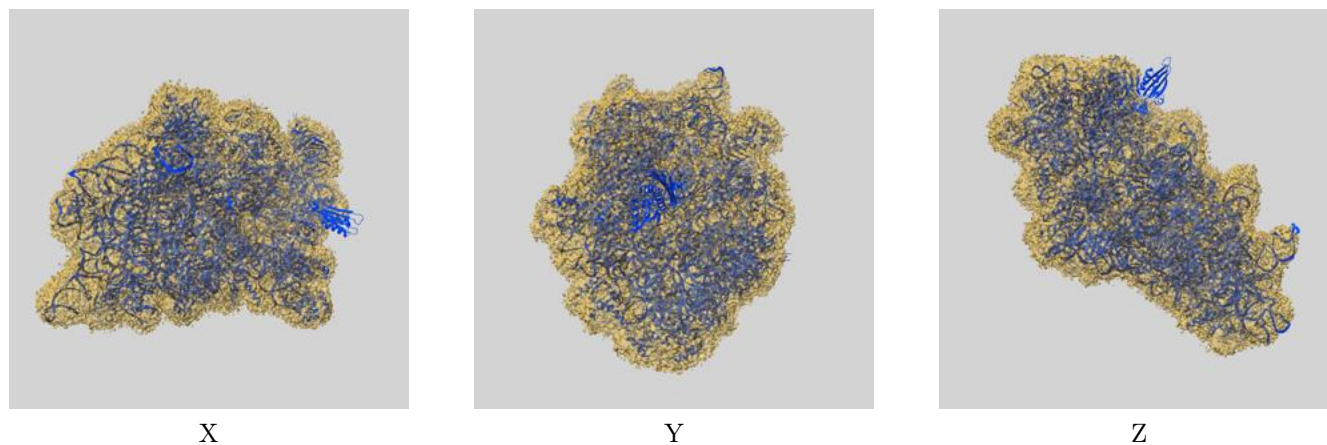
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.07	5.76	4.17

\*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 4.07 differs from the reported value 3.4 by more than 10 %

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

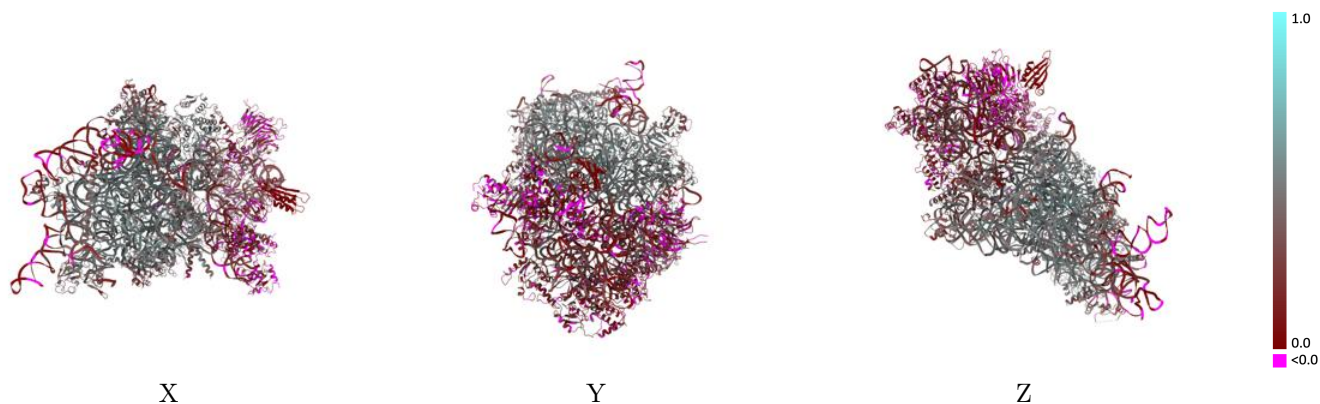
This section contains information regarding the fit between EMDB map EMD-4214 and PDB model 6FAI. Per-residue inclusion information can be found in section 3 on page 11.

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



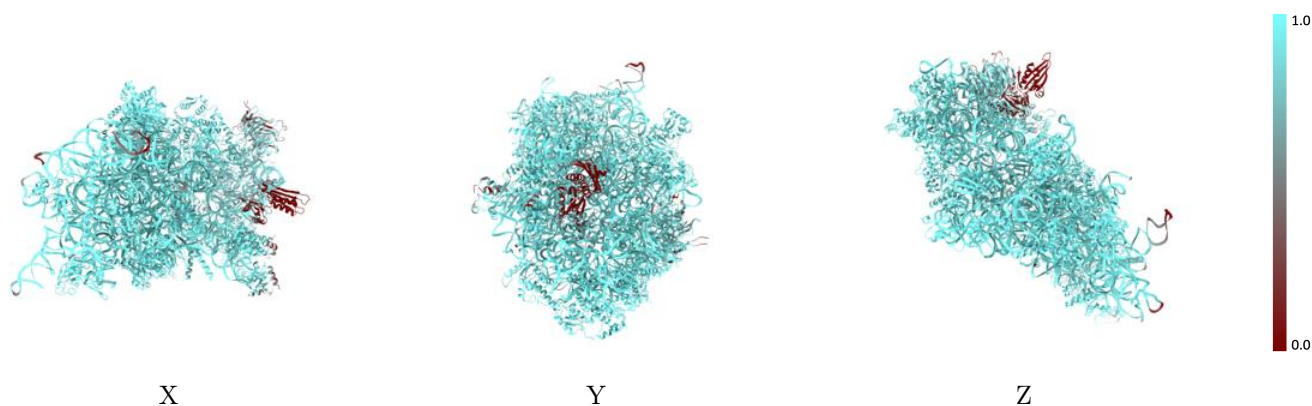
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



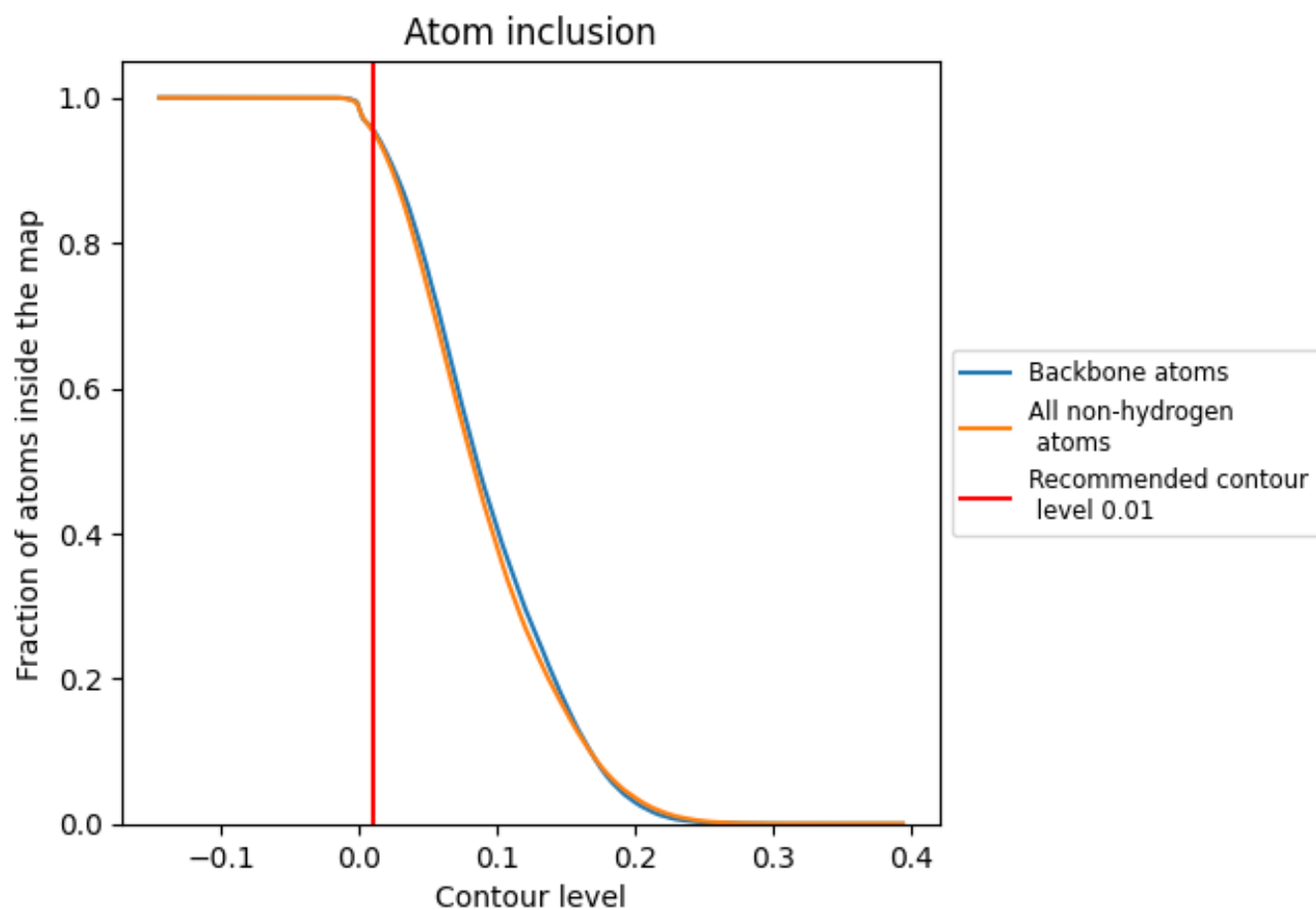
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.01).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 95% 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 (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9545	 0.3280
2	 0.9855	 0.3450
A	 0.9936	 0.4650
B	 0.9869	 0.4070
C	 0.9913	 0.4910
D	 0.1163	 0.0110
E	 0.9906	 0.5140
F	 0.9809	 0.1790
G	 0.9934	 0.4050
H	 0.9883	 0.3830
I	 0.9937	 0.4530
J	 0.9896	 0.4900
L	 0.9954	 0.5100
M	 0.7853	 0.0600
N	 0.9861	 0.4620
O	 0.9922	 0.3990
P	 0.9732	 0.2270
Q	 0.9774	 0.1420
R	 0.9753	 0.2020
S	 0.9824	 0.1630
T	 0.9898	 0.1610
U	 0.7998	 0.0910
V	 0.9925	 0.4870
W	 0.9940	 0.5380
X	 0.9653	 0.4560
Y	 0.9923	 0.4780
Z	 0.9677	 0.1420
b	 0.9917	 0.4760
c	 0.9727	 0.1660
d	 0.8288	 0.0570
e	 0.9592	 0.3900
g	 0.7238	 0.0850
h	 0.9815	 0.3650
i	 0.9612	 0.0920
j	 0.6564	 0.0400



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Chain	Atom inclusion	Q-score
k	 0.9779	 0.3780
l	 0.9550	 0.1840