



Full wwPDB EM Validation Report ⓘ

Mar 20, 2026 – 05:44 AM UTC

PDB ID : 8ONZ / pdb_00008onz
EMDB ID : EMD-17003
Title : Chaetomium thermophilum Methionine Aminopeptidase 2 at the 80S ribosome
Authors : Klein, M.A.; Wild, K.; Kisonaite, M.; Sinning, I.
Deposited on : 2023-04-04
Resolution : 2.94 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

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>.

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

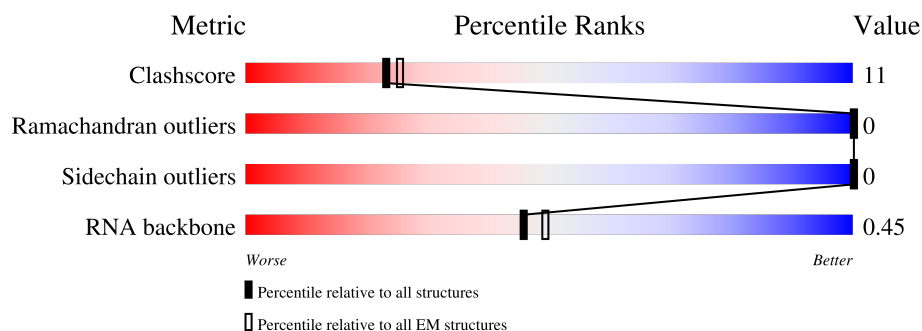
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : **NOT EXECUTED**
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance

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

The reported resolution of this entry is 2.94 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	229148	23984
Ramachandran outliers	224038	23583
Sidechain outliers	223484	23102
RNA backbone	8273	3508

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 $\leq 5\%$. 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	LR	2898	5% 5% 95%
2	LX	156	70% 58% 19% 22%
3	LY	138	85% 74% 23%
4	Lh	935	12% 11% 87%
5	Lk	94	78% 67% 14% 19%
6	1	3337	7% 92%
7	2	156	33% 19% 15% 62%

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Mol	Chain	Length	Quality of chain
8	A	444	83% 53% 34% 13%

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 14990 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 Ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	LR	153	Total	C	N	O	S	0	0
			1251	776	267	204	4		

- Molecule 2 is a protein called 60S ribosomal protein L25-like protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	LX	121	Total	C	N	O	0	0
			965	620	175	170		

- Molecule 3 is a protein called 60S ribosomal protein L26-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	LY	134	Total	C	N	O	S	0	0
			1065	664	215	184	2		

- Molecule 4 is a protein called dolichyl-diphosphooligosaccharide--protein glycotransferase.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	Lh	122	Total	C	N	O	0	0
			1003	637	198	168		

- Molecule 5 is a protein called 60S ribosomal protein L38-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	Lk	76	Total	C	N	O	S	0	0
			632	400	121	109	2		

- Molecule 6 is a RNA chain called 28S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	1	270	Total	C	N	O	P	0	0
			5777	2575	1047	1885	270		

- Molecule 7 is a RNA chain called 5.8S rRNA.

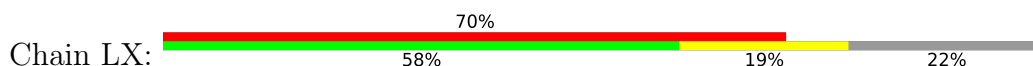
Mol	Chain	Residues	Atoms					AltConf	Trace
7	2	59	Total	C	N	O	P	0	0
			1261	565	230	407	59		

- Molecule 8 is a protein called Methionine aminopeptidase 2.

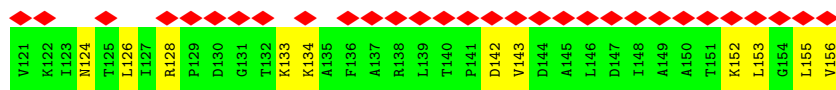
Mol	Chain	Residues	Atoms					AltConf	Trace
8	A	385	Total	C	N	O	S	0	0
			3036	1914	541	574	7		



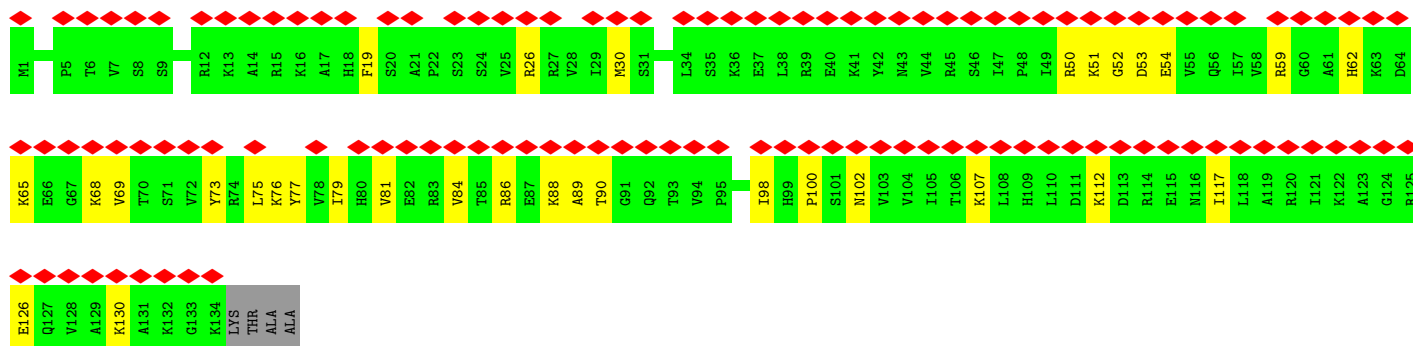
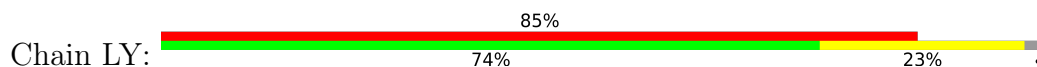
- Molecule 2: 60S ribosomal protein L25-like protein



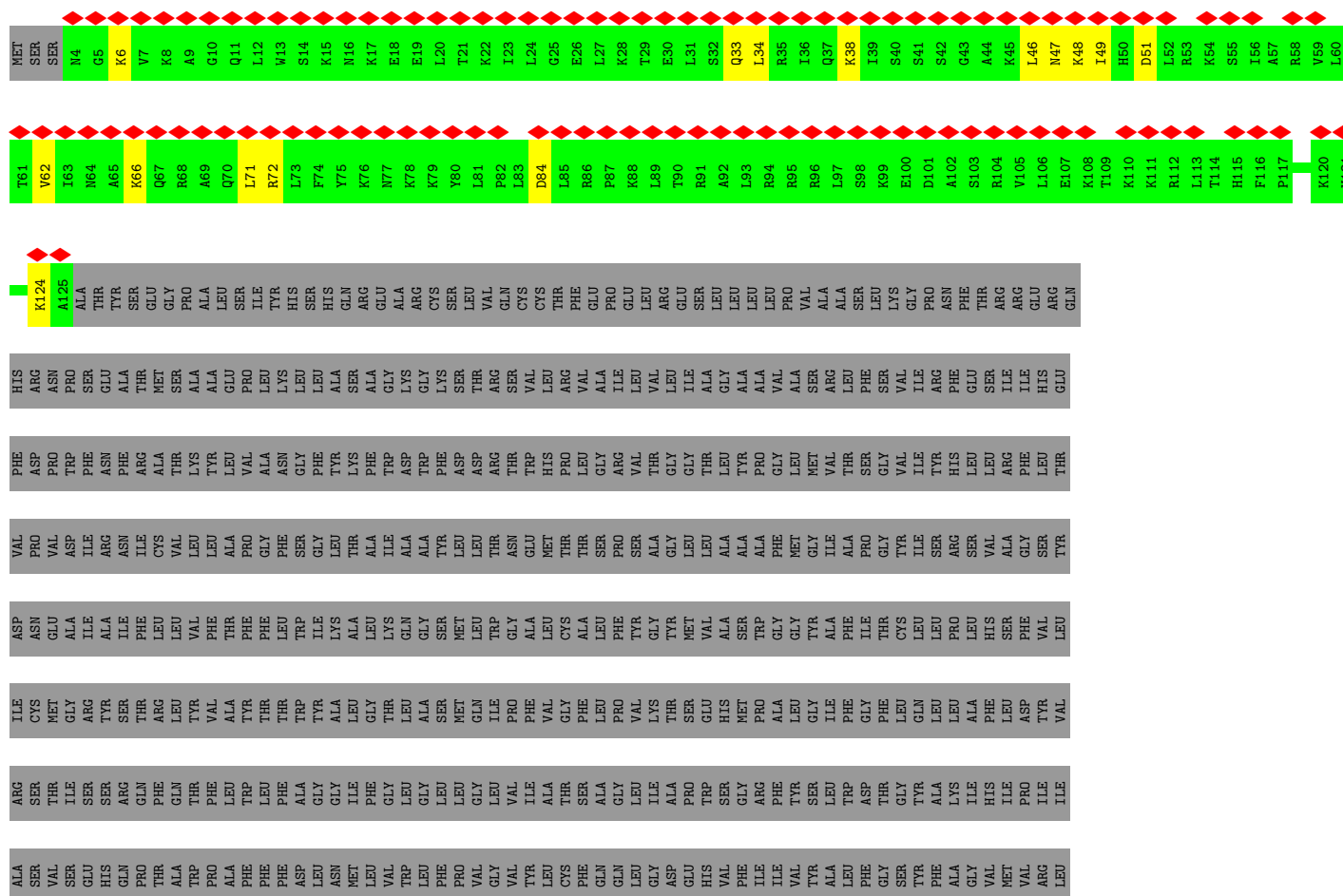
Met	Pro	Ala	Asp	Val	Lys	Lys	Gly	Gly	Ser	Lys	Ala	Lys	Gly	Ala	Gln	Lys	Lys	Ala	Ala	Gln	Ala	Ala	Lys	Lys	Lys	Leu	Gly	Val	His	Ser	His	Lys	X36	X37	X38	X39	R40	R41	S42	T43	T44	F45	H46	R47	P48	X49	T50	L51	V52	L53	S54	R55	A56	P57	X58	V59	P60
R61	K62	S63	I64	P65	H66	E67	P68	R69	L70	D71	E72	H73	K74	I75	I76	I77	H78	P79	L80	N81	T82	E83	G84	A85	L86	K87	K88	I89	E90	E91	Q92	F97	I98	V99	D100	V101	K102	A103	M104	K105	A106	I108	K109	Q110	A111	L112	K113	K114	L115	Y116	D117	L118	D119	D120			



• Molecule 3: 60S ribosomal protein L26-like protein

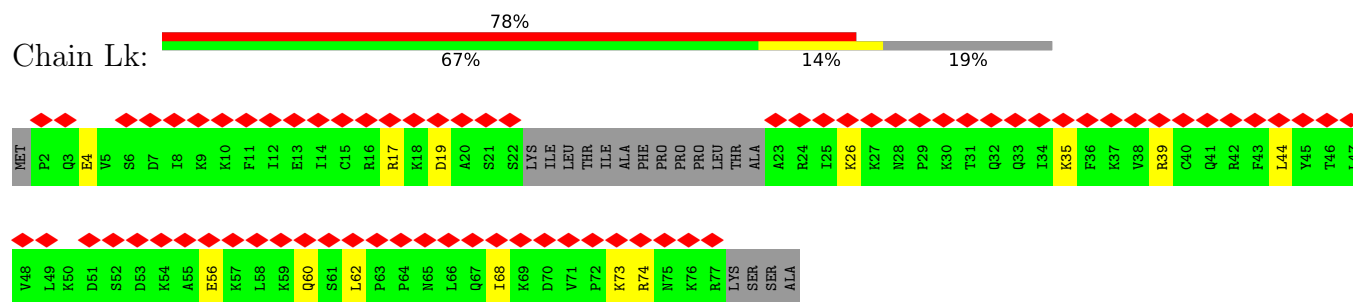


• Molecule 4: dolichyl-diphosphooligosaccharide--protein glycotransferase

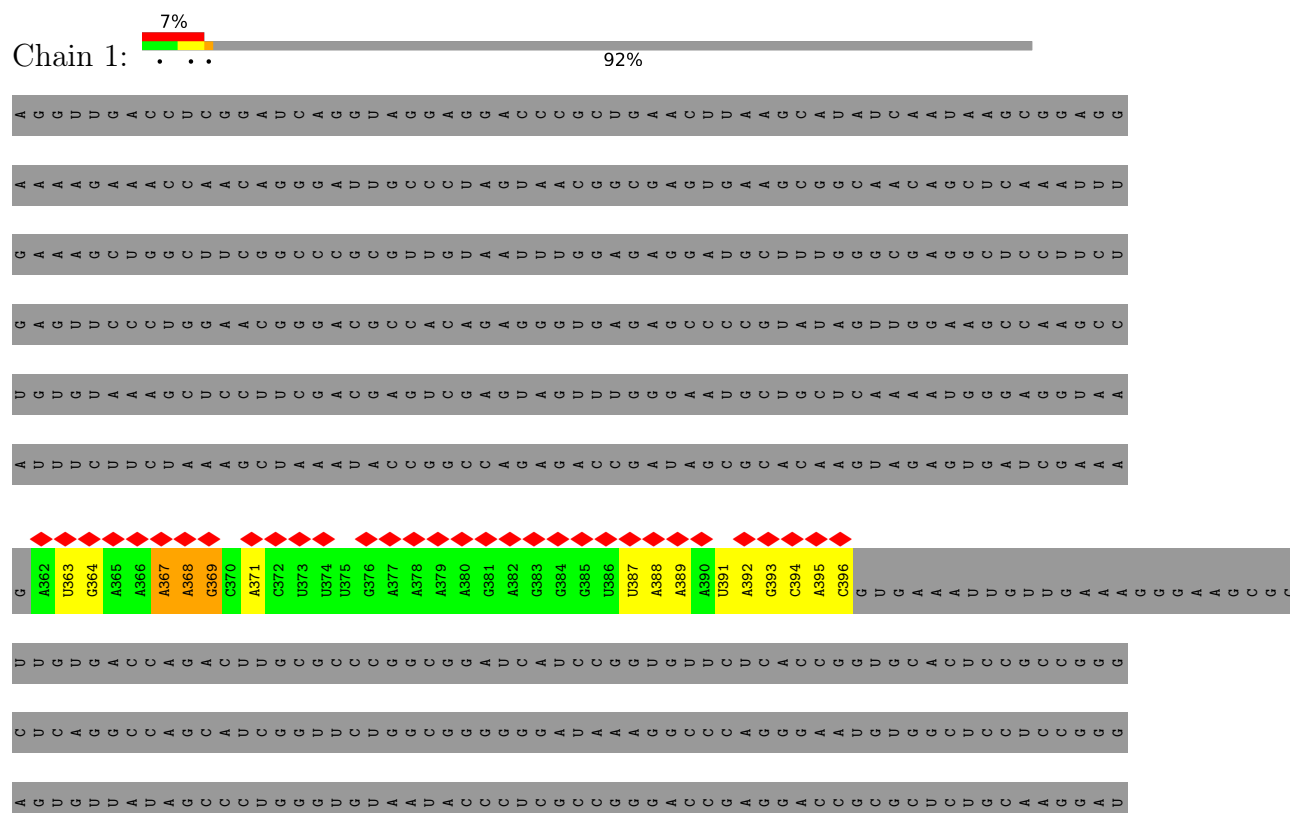


[illegible]

- Molecule 5: 60S ribosomal protein L38-like protein



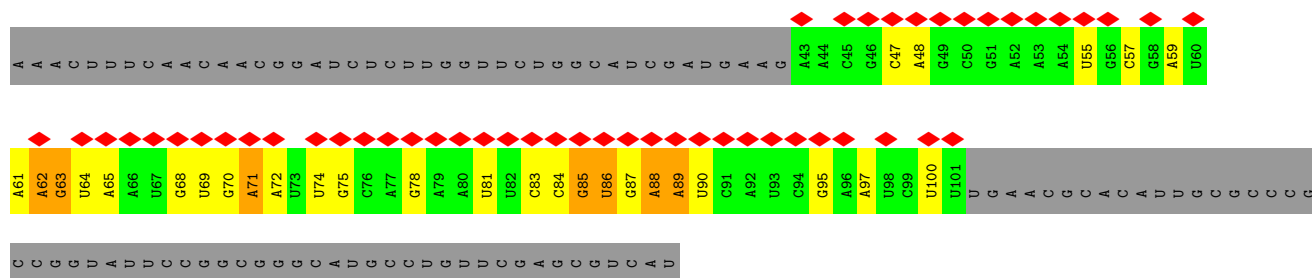
- Molecule 6: 28S rRNA



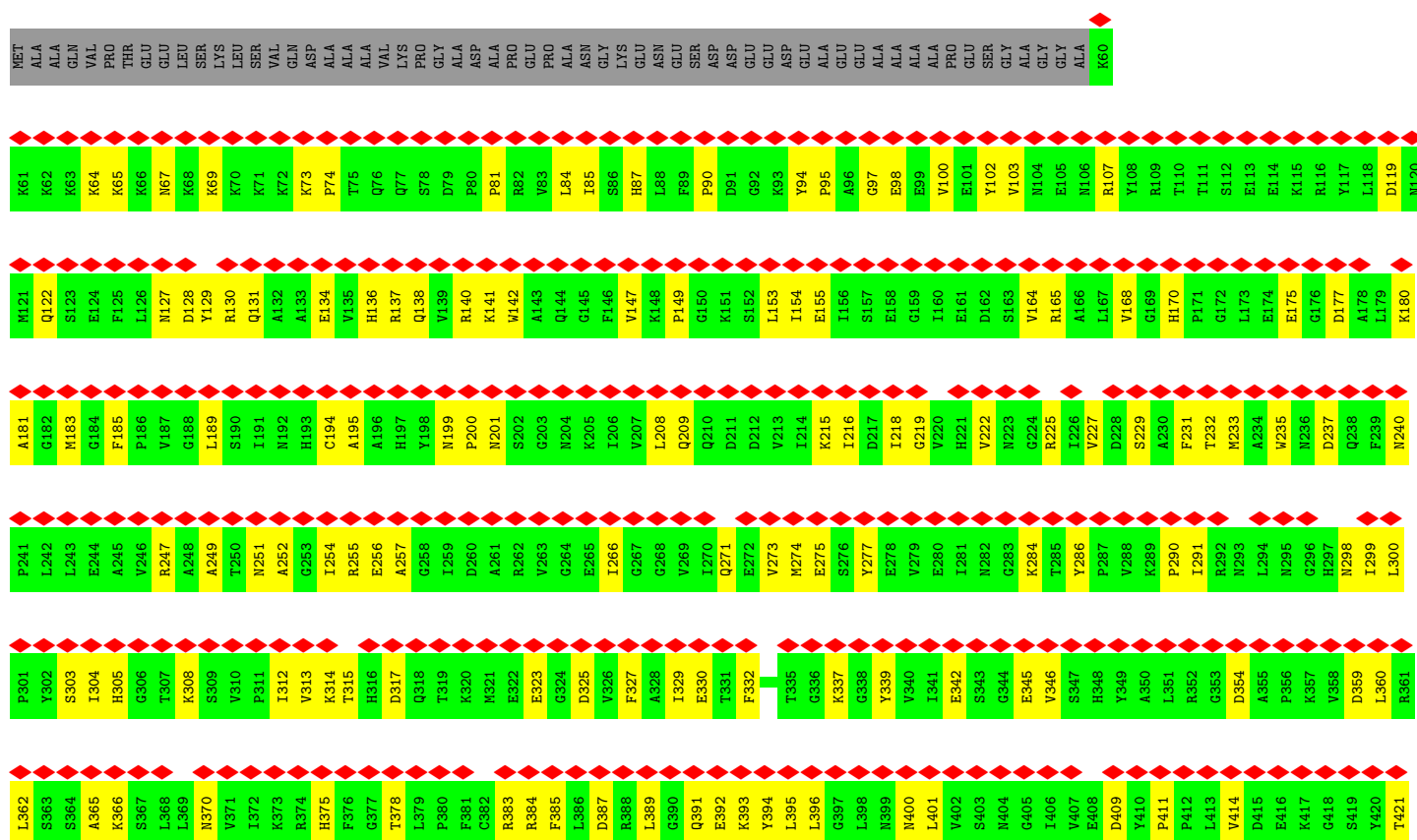
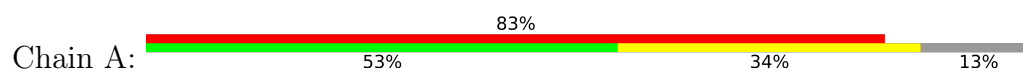




- Molecule 7: 5.8S rRNA



- Molecule 8: Methionine aminopeptidase 2



A422	Q423	F424	E425	H426	T427	I428	L429	I430	R431	P432	T433	V434	K435	E436	V437	I438	S439	R440	G441	D442	D443	Y444
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	61734	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 ($e^-/\text{\AA}^2$)	42.7	Depositor
Minimum defocus (nm)	1100	Depositor
Maximum defocus (nm)	2100	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	3.064	Depositor
Minimum map value	-1.380	Depositor
Average map value	-0.003	Depositor
Map value standard deviation	0.106	Depositor
Recommended contour level	0.45	Depositor
Map size (Å)	624.95996, 624.95996, 624.95996	wwPDB
Map dimensions	720, 720, 720	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.868, 0.868, 0.868	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	LR	0.17	0/1270	0.30	0/1693
2	LX	0.17	0/981	0.34	0/1324
3	LY	0.18	0/1079	0.30	0/1443
4	Lh	0.16	0/1014	0.34	0/1349
5	Lk	0.18	0/640	0.37	0/850
6	1	0.21	0/6454	0.48	4/10047 (0.0%)
7	2	0.20	0/1412	0.26	0/2198
8	A	0.16	0/3097	0.48	0/4178
All	All	0.19	0/15947	0.42	4/23082 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	1	2024	U	P-O3'-C3'	6.36	129.74	120.20
6	1	2028	C	P-O3'-C3'	5.79	128.89	120.20
6	1	2024	U	O3'-P-O5'	5.34	112.02	104.00
6	1	2029	A	C4'-C3'-O3'	5.17	120.75	113.00

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	LR	1251	0	1326	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	LX	965	0	1050	24	0
3	LY	1065	0	1156	29	0
4	Lh	1003	0	1116	12	0
5	Lk	632	0	693	12	0
6	1	5777	0	2925	102	0
7	2	1261	0	635	20	0
8	A	3036	0	3039	115	0
All	All	14990	0	11940	295	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 11.

All (295) 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)
6:1:1940:U:H3	6:1:2044:G:H1	1.17	0.91
8:A:85:ILE:HG21	8:A:131:GLN:HE21	1.35	0.90
8:A:128:ASP:OD2	8:A:225:ARG:NH2	2.06	0.89
6:1:1963:G:N2	6:1:2008:C:O2	2.07	0.87
6:1:1941:G:N1	6:1:2043:C:N3	2.23	0.86
6:1:1968:G:N2	6:1:2003:C:O2	2.09	0.86
6:1:1941:G:N2	6:1:2043:C:O2	2.09	0.85
6:1:1962:G:N2	6:1:2009:C:O2	2.09	0.85
8:A:254:ILE:O	8:A:435:LYS:NZ	2.11	0.83
6:1:2030:G:O2'	6:1:2031:G:OP1	1.98	0.81
8:A:200:PRO:O	8:A:384:ARG:NH1	2.13	0.81
6:1:1992:C:H41	8:A:65:LYS:HE3	1.46	0.80
6:1:1934:G:O6	6:1:2051:G:N2	2.14	0.80
6:1:1940:U:O2	6:1:2044:G:N2	2.14	0.80
6:1:1963:G:N1	6:1:2008:C:N3	2.33	0.77
6:1:1968:G:N1	6:1:2003:C:N3	2.29	0.73
6:1:1941:G:O6	6:1:2043:C:N4	2.23	0.72
2:LX:83:GLU:OE2	8:A:400:ASN:ND2	2.23	0.71
2:LX:90:GLU:HG3	2:LX:91:GLU:HG3	1.72	0.71
6:1:1743:U:O2	8:A:370:ASN:ND2	2.24	0.71
7:2:55:U:H3	7:2:62:A:H2	1.37	0.70
3:LY:62:HIS:HB3	3:LY:65:LYS:HD2	1.74	0.70
5:Lk:35:LYS:NZ	6:1:1730:A:OP2	2.24	0.69
8:A:431:ARG:NH1	8:A:433:THR:OG1	2.25	0.68
3:LY:73:TYR:OH	7:2:75:G:OP2	2.11	0.68
3:LY:54:GLU:HA	3:LY:68:LYS:HA	1.75	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:A:147:VAL:HG21	8:A:233:MET:HE3	1.76	0.66
1:LR:134:HIS:CE1	1:LR:136:ARG:HB3	2.31	0.66
6:1:1996:C:H2'	6:1:1997:G:C8	2.30	0.66
5:Lk:62:LEU:HD11	5:Lk:68:ILE:HD11	1.78	0.66
2:LX:155:LEU:HD12	2:LX:156:VAL:HG13	1.77	0.65
6:1:1988:C:H5''	8:A:69:LYS:HE2	1.78	0.65
2:LX:156:VAL:HG12	8:A:395:LEU:HD23	1.79	0.65
5:Lk:39:ARG:HD3	5:Lk:44:LEU:HD13	1.79	0.64
2:LX:86:LEU:HD13	8:A:396:LEU:HD11	1.79	0.64
6:1:1945:U:H1'	6:1:2029:A:H1'	1.79	0.64
2:LX:155:LEU:HD22	8:A:396:LEU:HD13	1.79	0.64
5:Lk:4:GLU:OE2	6:1:1726:C:O2'	2.12	0.64
8:A:134:GLU:HA	8:A:137:ARG:HE	1.63	0.63
8:A:134:GLU:OE2	8:A:138:GLN:NE2	2.31	0.63
8:A:94:TYR:O	8:A:130:ARG:NH2	2.32	0.63
2:LX:142:ASP:OD2	2:LX:143:VAL:HG13	1.99	0.62
6:1:2025:U:H2'	6:1:2026:A:H8	1.62	0.62
8:A:249:ALA:HB2	8:A:274:MET:HE3	1.81	0.62
3:LY:112:LYS:NZ	7:2:85:G:OP1	2.30	0.62
8:A:97:GLY:HA3	8:A:438:ILE:HA	1.81	0.62
8:A:360:LEU:HD23	8:A:365:ALA:HB1	1.82	0.62
8:A:329:ILE:HD11	8:A:428:ILE:HD13	1.83	0.61
8:A:102:TYR:HE1	8:A:435:LYS:HB2	1.66	0.61
3:LY:86:ARG:NH1	6:1:368:A:O2'	2.33	0.60
6:1:1933:G:H4'	6:1:1934:G:H5'	1.83	0.60
8:A:274:MET:HG3	8:A:290:PRO:HG3	1.83	0.60
8:A:149:PRO:HA	8:A:208:LEU:HD22	1.84	0.60
6:1:369:G:H1'	6:1:393:G:H21	1.65	0.60
6:1:1744:C:H3'	6:1:1745:U:H5''	1.84	0.60
6:1:2025:U:H2'	6:1:2026:A:C8	2.37	0.59
8:A:323:GLU:HG3	8:A:432:PRO:HA	1.85	0.59
6:1:1480:C:O2'	6:1:1582:A:N3	2.35	0.59
2:LX:124:ASN:HB3	6:1:1506:U:H1'	1.85	0.58
6:1:364:G:N1	6:1:367:A:OP2	2.36	0.58
8:A:81:PRO:HD3	8:A:142:TRP:CD1	2.38	0.58
3:LY:50:ARG:HG3	7:2:71:A:H5''	1.85	0.58
8:A:252:ALA:HA	8:A:255:ARG:HE	1.67	0.58
6:1:364:G:O2'	6:1:389:A:N6	2.34	0.58
6:1:1449:G:N2	6:1:1493:G:H5''	2.18	0.58
4:Lh:6:LYS:HG2	4:Lh:51:ASP:HB3	1.86	0.57
6:1:1956:G:H22	6:1:2019:A:H4'	1.70	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:2:69:U:H2'	7:2:70:G:O4'	2.05	0.57
8:A:127:ASN:OD1	8:A:128:ASP:N	2.38	0.57
4:Lh:72:ARG:NH2	7:2:97:A:OP1	2.30	0.56
8:A:138:GLN:HA	8:A:141:LYS:HE3	1.87	0.56
8:A:392:GLU:CD	8:A:393:LYS:H	2.12	0.56
3:LY:90:THR:HG22	6:1:371:A:H4'	1.87	0.56
8:A:300:LEU:HB3	8:A:303:SER:OG	2.04	0.56
8:A:215:LYS:HZ1	8:A:421:THR:C	2.13	0.56
5:Lk:60:GLN:OE1	5:Lk:60:GLN:N	2.38	0.56
5:Lk:26:LYS:HB3	5:Lk:35:LYS:HB2	1.87	0.56
7:2:88:A:O2'	7:2:89:A:O4'	2.23	0.56
7:2:63:G:H22	7:2:97:A:H2	1.54	0.55
8:A:134:GLU:HG3	8:A:138:GLN:HE22	1.71	0.55
1:LR:36:ASN:OD1	8:A:359:ASP:HB3	2.05	0.55
1:LR:105:LEU:HD12	1:LR:135:LYS:HE3	1.86	0.55
8:A:154:ILE:HG13	8:A:155:GLU:N	2.22	0.55
8:A:330:GLU:HB3	8:A:425:GLU:HG2	1.88	0.55
8:A:284:LYS:HG3	8:A:286:TYR:HE1	1.72	0.55
2:LX:88:LYS:HB3	2:LX:94:THR:OG1	2.07	0.55
5:Lk:44:LEU:HD22	6:1:1592:C:H5''	1.89	0.55
6:1:1957:C:H2'	6:1:1958:C:C6	2.42	0.55
8:A:85:ILE:HG21	8:A:131:GLN:NE2	2.15	0.54
6:1:1968:G:H2'	6:1:1969:A:C8	2.42	0.54
3:LY:30:MET:HB3	3:LY:100:PRO:HG2	1.90	0.54
2:LX:142:ASP:OD2	2:LX:143:VAL:N	2.40	0.54
6:1:1447:G:N2	6:1:1450:A:OP2	2.38	0.54
6:1:1976:C:N4	6:1:1996:C:N3	2.56	0.53
8:A:216:ILE:HG22	8:A:218:ILE:HD11	1.91	0.53
8:A:74:PRO:HG2	8:A:87:HIS:HB3	1.90	0.53
8:A:119:ASP:HA	8:A:122:GLN:NE2	2.24	0.53
3:LY:53:ASP:HB2	3:LY:107:LYS:O	2.08	0.53
4:Lh:84:ASP:OD1	4:Lh:84:ASP:N	2.43	0.53
8:A:360:LEU:HD21	8:A:401:LEU:HD21	1.90	0.53
1:LR:7:GLN:HG3	1:LR:41:ILE:HD11	1.90	0.52
8:A:314:LYS:NZ	8:A:315:THR:O	2.42	0.52
8:A:165:ARG:HE	8:A:183:MET:HE1	1.75	0.52
6:1:1741:C:O2'	6:1:1745:U:O4	2.23	0.52
8:A:175:GLU:OE1	8:A:375:HIS:HD2	1.93	0.52
8:A:194:CYS:HA	8:A:414:VAL:HG12	1.91	0.52
3:LY:86:ARG:HH22	6:1:387:U:P	2.33	0.52
3:LY:52:GLY:H	3:LY:69:VAL:HG23	1.74	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:LY:19:PHE:O	3:LY:26:ARG:NH2	2.44	0.51
4:Lh:47:ASN:OD1	4:Lh:48:LYS:N	2.44	0.51
8:A:215:LYS:NZ	8:A:421:THR:O	2.43	0.51
1:LR:134:HIS:HE1	1:LR:136:ARG:HB3	1.74	0.51
6:1:1741:C:O2'	6:1:1743:U:OP2	2.29	0.51
2:LX:103:ALA:O	2:LX:133:LYS:NZ	2.37	0.51
8:A:330:GLU:CB	8:A:425:GLU:HG2	2.41	0.51
1:LR:76:ARG:NH2	6:1:2065:U:OP2	2.43	0.51
6:1:2030:G:HO2'	6:1:2031:G:P	2.31	0.51
8:A:201:ASN:ND2	8:A:345:GLU:OE2	2.44	0.51
8:A:129:TYR:HD1	8:A:225:ARG:HB3	1.75	0.51
8:A:227:VAL:HG13	8:A:427:THR:HG21	1.92	0.51
8:A:291:ILE:HD12	8:A:332:PHE:HB3	1.92	0.51
8:A:136:HIS:NE2	8:A:229:SER:HB3	2.26	0.50
8:A:354:ASP:OD1	8:A:354:ASP:N	2.42	0.50
7:2:57:C:H4'	7:2:63:G:N7	2.26	0.50
2:LX:63:SER:HB2	4:Lh:71:LEU:HD13	1.93	0.50
6:1:1966:C:H2'	6:1:1967:A:N3	2.26	0.50
6:1:2006:C:H2'	6:1:2007:A:C8	2.47	0.50
4:Lh:34:LEU:HB3	4:Lh:49:ILE:HG22	1.93	0.50
8:A:342:GLU:HB2	8:A:411:PRO:HG2	1.94	0.50
6:1:2050:C:O2'	6:1:2051:G:H5'	2.11	0.50
8:A:232:THR:H	8:A:424:PHE:HE1	1.58	0.49
6:1:1925:A:H2'	6:1:1926:A:H8	1.76	0.49
6:1:2030:G:O5'	6:1:2030:G:H8	1.94	0.49
8:A:73:LYS:HD2	8:A:90:PRO:HB3	1.94	0.49
5:Lk:39:ARG:HE	6:1:1592:C:P	2.35	0.49
6:1:1956:G:N2	6:1:2019:A:H4'	2.27	0.49
8:A:103:VAL:HA	8:A:107:ARG:HE	1.77	0.49
8:A:130:ARG:HA	8:A:438:ILE:HD11	1.95	0.49
3:LY:126:GLU:O	3:LY:130:LYS:HG2	2.13	0.49
6:1:1576:C:H2'	6:1:1577:C:C6	2.48	0.49
4:Lh:38:LYS:HG3	4:Lh:46:LEU:HD21	1.93	0.49
5:Lk:17:ARG:NH1	5:Lk:19:ASP:OD2	2.45	0.49
4:Lh:34:LEU:HD21	4:Lh:48:LYS:HD2	1.94	0.49
6:1:1997:G:H1'	6:1:1998:G:N7	2.28	0.49
8:A:298:ASN:OD1	8:A:299:ILE:N	2.46	0.49
8:A:391:GLN:O	8:A:392:GLU:HG3	2.13	0.49
8:A:199:ASN:OD1	8:A:384:ARG:NH1	2.41	0.48
6:1:1968:G:H2'	6:1:1969:A:H8	1.77	0.48
7:2:78:G:N2	7:2:89:A:OP1	2.45	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:A:137:ARG:HA	8:A:140:ARG:HE	1.78	0.48
2:LX:128:ARG:HD2	2:LX:134:LYS:HB2	1.94	0.48
5:Lk:26:LYS:NZ	6:1:1731:G:OP1	2.45	0.48
6:1:1990:G:OP2	8:A:67:ASN:ND2	2.47	0.48
6:1:2015:U:O2'	6:1:2019:A:OP1	2.30	0.48
6:1:2024:U:H2'	6:1:2025:U:H6	1.79	0.48
6:1:1997:G:H1'	6:1:1998:G:C8	2.49	0.48
8:A:177:ASP:HA	8:A:180:LYS:NZ	2.29	0.48
8:A:375:HIS:ND1	8:A:389:LEU:HD13	2.28	0.48
8:A:387:ASP:OD1	8:A:394:TYR:OH	2.20	0.48
6:1:2051:G:O2'	6:1:2052:G:H3'	2.13	0.48
6:1:2019:A:H2'	6:1:2020:G:C8	2.49	0.47
6:1:1958:C:H6	6:1:1958:C:O5'	1.98	0.47
2:LX:89:ILE:HG12	2:LX:95:LEU:HD23	1.96	0.47
6:1:2046:C:H2'	6:1:2047:G:H8	1.79	0.47
8:A:129:TYR:CD1	8:A:225:ARG:HB3	2.48	0.47
7:2:57:C:H4'	7:2:63:G:C8	2.49	0.47
8:A:304:ILE:HG23	8:A:305:HIS:CD2	2.50	0.47
6:1:1962:G:N1	6:1:2009:C:N3	2.50	0.47
8:A:149:PRO:HD3	8:A:235:TRP:CE2	2.49	0.47
8:A:170:HIS:CD2	8:A:181:ALA:HB3	2.50	0.46
8:A:315:THR:HG23	8:A:317:ASP:H	1.80	0.46
3:LY:30:MET:SD	3:LY:77:TYR:HA	2.56	0.46
8:A:136:HIS:HE1	8:A:218:ILE:HB	1.80	0.46
6:1:1977:U:H3	6:1:1994:G:H1	1.62	0.46
1:LR:5:ARG:HG3	6:1:1454:U:H5''	1.98	0.46
7:2:47:C:H1'	7:2:61:A:H2'	1.96	0.46
8:A:257:ALA:HB3	8:A:435:LYS:NZ	2.31	0.46
8:A:385:PHE:O	8:A:389:LEU:HG	2.16	0.46
6:1:2006:C:H2'	6:1:2007:A:H8	1.81	0.46
8:A:165:ARG:NE	8:A:183:MET:HE1	2.30	0.46
6:1:1454:U:H2'	6:1:1455:G:H8	1.81	0.46
8:A:247:ARG:NH2	8:A:444:TYR:HA	2.31	0.46
8:A:251:ASN:O	8:A:255:ARG:HG3	2.15	0.46
6:1:1933:G:H4'	6:1:1934:G:C5'	2.46	0.45
3:LY:117:ILE:HD11	7:2:70:G:H5''	1.98	0.45
6:1:1452:C:OP1	6:1:1453:U:H5	2.00	0.45
3:LY:73:TYR:HE2	3:LY:76:LYS:HD2	1.81	0.45
8:A:98:GLU:OE1	8:A:100:VAL:HG13	2.16	0.45
6:1:1956:G:N2	6:1:2019:A:OP2	2.39	0.45
8:A:391:GLN:HB2	8:A:394:TYR:CD2	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:Lh:124:LYS:HE2	4:Lh:124:LYS:HB3	1.83	0.45
6:1:1584:U:H2'	6:1:1585:A:O4'	2.17	0.45
1:LR:69:ALA:HB1	1:LR:74:ARG:HB2	1.98	0.45
2:LX:153:LEU:HD23	2:LX:156:VAL:HG23	1.98	0.45
4:Lh:46:LEU:O	4:Lh:49:ILE:HG12	2.16	0.45
8:A:271:GLN:CD	8:A:313:VAL:HG23	2.42	0.45
3:LY:89:ALA:O	6:1:371:A:H1'	2.17	0.44
6:1:1751:G:H2'	6:1:1752:U:O4'	2.15	0.44
8:A:128:ASP:OD1	8:A:129:TYR:N	2.51	0.44
1:LR:88:ARG:NE	6:1:2066:U:OP1	2.51	0.44
2:LX:75:ILE:HD13	2:LX:107:GLN:HB3	1.99	0.44
2:LX:78:HIS:HD2	2:LX:79:PRO:O	1.99	0.44
6:1:2033:U:N3	6:1:2035:C:O2	2.50	0.44
2:LX:100:ASP:OD2	2:LX:101:VAL:N	2.51	0.44
8:A:431:ARG:HB3	8:A:434:VAL:O	2.17	0.44
7:2:70:G:H1'	7:2:88:A:N6	2.33	0.44
7:2:72:A:O2'	7:2:88:A:N3	2.44	0.44
1:LR:105:LEU:HA	1:LR:108:LYS:NZ	2.32	0.44
8:A:291:ILE:O	8:A:312:ILE:HD11	2.18	0.44
1:LR:21:LYS:HE3	1:LR:55:VAL:HA	2.00	0.43
6:1:1974:C:OP2	8:A:64:LYS:NZ	2.51	0.43
2:LX:126:LEU:HD22	6:1:1505:U:H3'	2.00	0.43
6:1:367:A:H1'	6:1:368:A:H5''	2.00	0.43
6:1:1577:C:H2'	6:1:1578:G:C8	2.53	0.43
8:A:140:ARG:HD3	8:A:443:ASP:OD2	2.18	0.43
2:LX:86:LEU:HB3	8:A:396:LEU:HD21	2.00	0.43
6:1:369:G:H1'	6:1:393:G:N2	2.31	0.43
6:1:2035:C:H1'	6:1:2036:G:C2	2.53	0.43
6:1:1583:A:H5''	6:1:1584:U:OP2	2.18	0.43
6:1:1974:C:O5'	6:1:1974:C:H6	2.01	0.43
6:1:1988:C:H2'	6:1:1989:C:C6	2.53	0.43
3:LY:69:VAL:HA	3:LY:81:VAL:HA	1.99	0.43
8:A:360:LEU:HD23	8:A:365:ALA:CB	2.46	0.43
8:A:346:VAL:HG21	8:A:409:ASP:HB2	1.99	0.43
3:LY:86:ARG:HD3	6:1:368:A:H1'	2.01	0.43
6:1:1746:G:H2'	6:1:1747:U:C6	2.53	0.43
8:A:164:VAL:O	8:A:168:VAL:HG22	2.19	0.43
8:A:271:GLN:O	8:A:275:GLU:OE1	2.37	0.43
6:1:1454:U:H2'	6:1:1455:G:C8	2.53	0.43
7:2:64:U:H2'	7:2:65:A:H8	1.83	0.43
8:A:136:HIS:CE1	8:A:218:ILE:HB	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:1:1447:G:H22	6:1:1450:A:P	2.42	0.43
8:A:325:ASP:HB3	8:A:327:PHE:HE1	1.84	0.43
6:1:1480:C:H2'	6:1:1481:A:C8	2.54	0.42
6:1:1988:C:H2'	6:1:1989:C:H6	1.84	0.42
6:1:1939:U:H2'	6:1:1940:U:C6	2.54	0.42
6:1:1946:U:H2'	6:1:1947:U:H6	1.83	0.42
8:A:362:LEU:O	8:A:366:LYS:HG2	2.19	0.42
1:LR:8:LYS:HD2	6:1:1455:G:OP1	2.19	0.42
8:A:84:LEU:HD12	8:A:87:HIS:CE1	2.54	0.42
8:A:153:LEU:HB3	8:A:200:PRO:HG3	2.01	0.42
8:A:298:ASN:HD22	8:A:308:LYS:NZ	2.17	0.42
1:LR:32:ILE:HG12	1:LR:44:LEU:HD13	2.01	0.42
3:LY:50:ARG:HG2	3:LY:51:LYS:N	2.33	0.42
2:LX:86:LEU:HD23	2:LX:89:ILE:HD12	2.01	0.42
3:LY:59:ARG:HB2	3:LY:102:ASN:HB3	2.01	0.42
3:LY:86:ARG:NH2	6:1:387:U:OP1	2.53	0.42
8:A:95:PRO:HG2	8:A:134:GLU:OE1	2.19	0.42
5:Lk:56:GLU:O	5:Lk:60:GLN:OE1	2.38	0.42
8:A:131:GLN:OE1	8:A:222:VAL:HG21	2.19	0.42
8:A:201:ASN:HB3	8:A:383:ARG:NH1	2.35	0.42
8:A:208:LEU:HD23	8:A:209:GLN:O	2.20	0.42
8:A:396:LEU:HA	8:A:396:LEU:HD12	1.78	0.42
8:A:337:LYS:HE3	8:A:339:TYR:CZ	2.54	0.42
3:LY:84:VAL:HG23	3:LY:84:VAL:O	2.20	0.42
3:LY:88:LYS:HE2	3:LY:88:LYS:HB3	1.83	0.42
6:1:1444:A:H2'	6:1:1445:A:H8	1.85	0.42
8:A:153:LEU:HD23	8:A:189:LEU:HB3	2.01	0.42
4:Lh:33:GLN:OE1	4:Lh:33:GLN:N	2.53	0.41
8:A:237:ASP:HA	8:A:240:ASN:ND2	2.35	0.41
6:1:1925:A:H2'	6:1:1926:A:C8	2.54	0.41
7:2:68:G:H2'	7:2:69:U:C6	2.55	0.41
1:LR:110:ARG:HE	1:LR:110:ARG:HB3	1.66	0.41
6:1:1746:G:H2'	6:1:1747:U:H6	1.85	0.41
3:LY:79:ILE:HG12	3:LY:98:ILE:O	2.21	0.41
8:A:337:LYS:HE3	8:A:339:TYR:CE2	2.55	0.41
2:LX:116:TYR:HB2	2:LX:118:ILE:HG12	2.03	0.41
8:A:185:PHE:CE2	8:A:219:GLY:HA3	2.56	0.41
8:A:195:ALA:O	8:A:215:LYS:HD2	2.21	0.41
2:LX:49:LYS:HA	2:LX:49:LYS:HD3	1.87	0.41
3:LY:51:LYS:HA	3:LY:69:VAL:HG23	2.02	0.41
3:LY:73:TYR:HD1	7:2:74:U:C4	2.39	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:LY:75:LEU:HD23	3:LY:75:LEU:HA	1.92	0.41
8:A:119:ASP:OD2	8:A:431:ARG:NH2	2.53	0.41
3:LY:54:GLU:HG3	3:LY:68:LYS:HB3	2.03	0.41
8:A:180:LYS:HB2	8:A:180:LYS:HE2	1.80	0.41
8:A:273:VAL:O	8:A:277:TYR:HD1	2.04	0.41
4:Lh:62:VAL:O	4:Lh:66:LYS:HG3	2.21	0.41
6:1:2019:A:H2'	6:1:2020:G:H8	1.85	0.41
8:A:256:GLU:OE1	8:A:266:ILE:HA	2.21	0.41
1:LR:5:ARG:NH2	6:1:1495:U:O3'	2.53	0.41
2:LX:116:TYR:O	2:LX:152:LYS:HE2	2.21	0.41
6:1:1451:A:H2'	6:1:1452:C:C6	2.56	0.41
1:LR:28:GLU:HG3	1:LR:49:LEU:HD11	2.03	0.41
5:Lk:73:LYS:NZ	5:Lk:74:ARG:HG3	2.36	0.41
8:A:431:ARG:HG2	8:A:432:PRO:HD2	2.03	0.40
8:A:119:ASP:HB2	8:A:432:PRO:HG2	2.04	0.40
6:1:2038:C:H2'	6:1:2039:C:C6	2.57	0.40
1:LR:10:LEU:HD23	1:LR:10:LEU:HA	1.93	0.40
6:1:1936:A:H2'	6:1:1937:C:O4'	2.21	0.40
7:2:85:G:H5''	7:2:86:U:C5	2.57	0.40
8:A:378:THR:HG22	8:A:378:THR:O	2.21	0.40
6:1:1945:U:H2'	6:1:1946:U:H6	1.87	0.40
7:2:88:A:H2'	7:2:89:A:C8	2.57	0.40
8:A:231:PHE:HA	8:A:424:PHE:HD1	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	LR	151/2898 (5%)	150 (99%)	1 (1%)	0	100	100
2	LX	119/156 (76%)	116 (98%)	3 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	LY	132/138 (96%)	130 (98%)	2 (2%)	0	100	100
4	Lh	120/935 (13%)	118 (98%)	2 (2%)	0	100	100
5	Lk	74/94 (79%)	72 (97%)	2 (3%)	0	100	100
8	A	383/444 (86%)	371 (97%)	12 (3%)	0	100	100
All	All	979/4665 (21%)	957 (98%)	22 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	LR	129/2396 (5%)	129 (100%)	0	100	100
2	LX	108/129 (84%)	108 (100%)	0	100	100
3	LY	117/119 (98%)	117 (100%)	0	100	100
4	Lh	109/781 (14%)	109 (100%)	0	100	100
5	Lk	73/88 (83%)	73 (100%)	0	100	100
8	A	329/368 (89%)	329 (100%)	0	100	100
All	All	865/3881 (22%)	865 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	LR	121	HIS
2	LX	46	HIS
2	LX	124	ASN
3	LY	62	HIS
3	LY	92	GLN
3	LY	109	HIS
4	Lh	67	GLN

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Mol	Chain	Res	Type
8	A	87	HIS
8	A	122	GLN
8	A	131	GLN
8	A	138	GLN
8	A	391	GLN
8	A	400	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	1	263/3337 (7%)	72 (27%)	8 (3%)
7	2	58/156 (37%)	16 (27%)	0
All	All	321/3493 (9%)	88 (27%)	8 (2%)

All (88) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	1	363	U
6	1	368	A
6	1	369	G
6	1	388	A
6	1	391	U
6	1	392	A
6	1	394	C
6	1	395	A
6	1	396	C
6	1	1483	G
6	1	1484	U
6	1	1485	G
6	1	1491	C
6	1	1495	U
6	1	1505	U
6	1	1506	U
6	1	1576	C
6	1	1582	A
6	1	1583	A
6	1	1587	U
6	1	1730	A
6	1	1731	G
6	1	1733	G
6	1	1736	C

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Mol	Chain	Res	Type
6	1	1737	G
6	1	1738	A
6	1	1739	C
6	1	1740	A
6	1	1743	U
6	1	1745	U
6	1	1746	G
6	1	1750	G
6	1	1753	C
6	1	1928	G
6	1	1932	G
6	1	1934	G
6	1	1936	A
6	1	1937	C
6	1	1942	G
6	1	1943	G
6	1	1944	C
6	1	1946	U
6	1	1952	G
6	1	1955	C
6	1	1956	G
6	1	1996	C
6	1	1997	G
6	1	1998	G
6	1	2015	U
6	1	2020	G
6	1	2025	U
6	1	2028	C
6	1	2029	A
6	1	2030	G
6	1	2031	G
6	1	2034	U
6	1	2035	C
6	1	2036	G
6	1	2037	G
6	1	2040	G
6	1	2041	U
6	1	2042	C
6	1	2045	G
6	1	2051	G
6	1	2052	G
6	1	2053	U

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Mol	Chain	Res	Type
6	1	2054	U
6	1	2055	A
6	1	2057	C
6	1	2063	A
6	1	2064	C
6	1	2066	U
7	2	48	A
7	2	59	A
7	2	62	A
7	2	63	G
7	2	71	A
7	2	81	U
7	2	83	C
7	2	84	C
7	2	85	G
7	2	86	U
7	2	87	G
7	2	88	A
7	2	89	A
7	2	90	U
7	2	95	G
7	2	100	U

All (8) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
6	1	367	A
6	1	1942	G
6	1	1945	U
6	1	2024	U
6	1	2028	C
6	1	2029	A
6	1	2030	G
6	1	2040	G

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

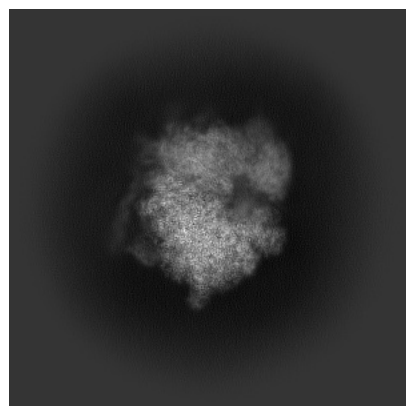
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-17003. These allow visual inspection of the internal detail of the map and identification of artifacts.

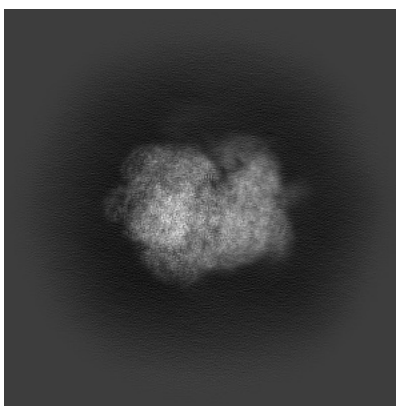
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

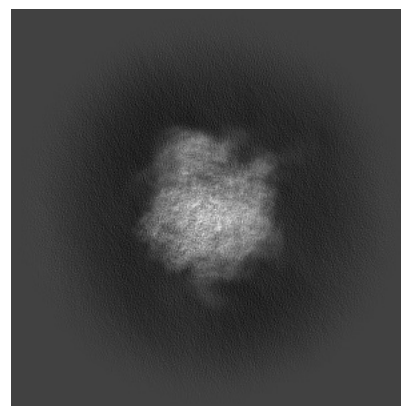
6.1.1 Primary map



X

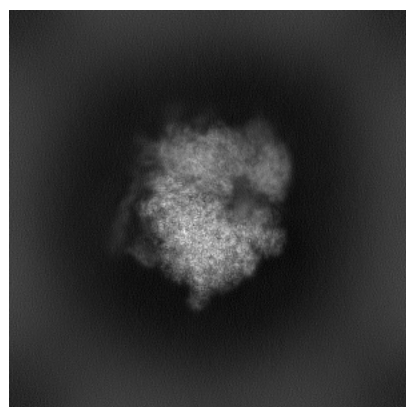


Y

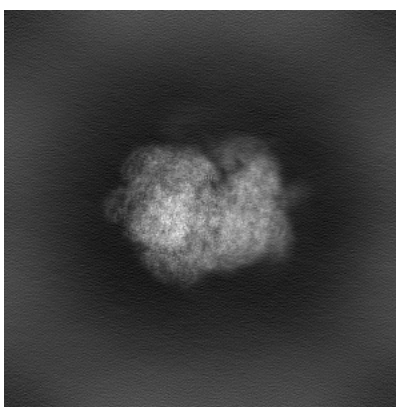


Z

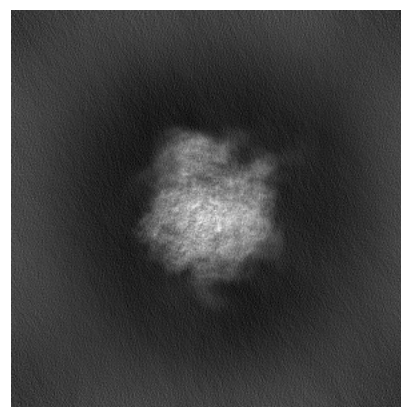
6.1.2 Raw map



X



Y

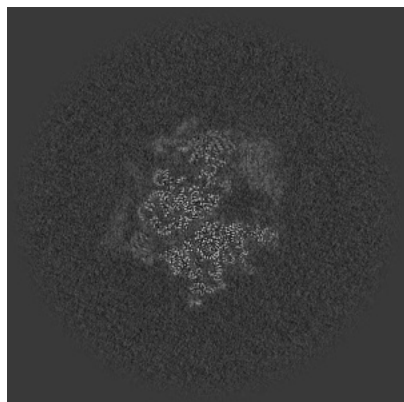


Z

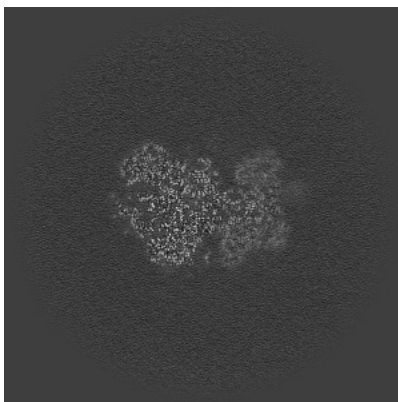
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

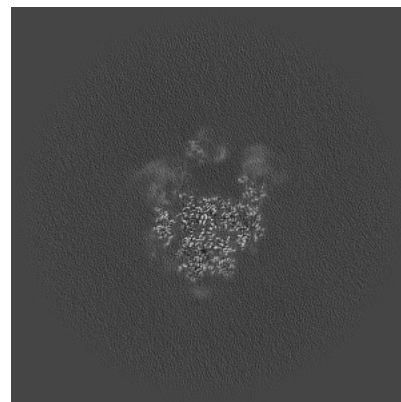
6.2.1 Primary map



X Index: 360

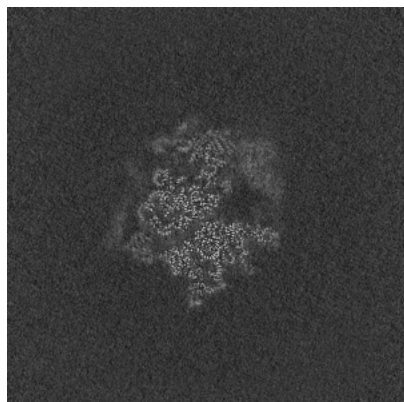


Y Index: 360

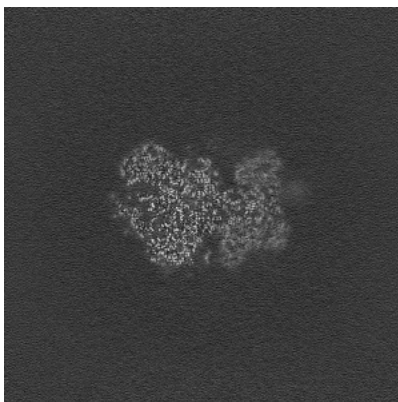


Z Index: 360

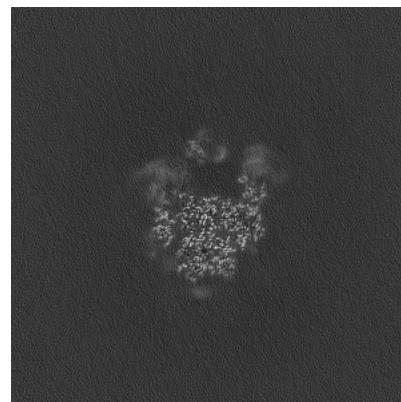
6.2.2 Raw map



X Index: 360



Y Index: 360

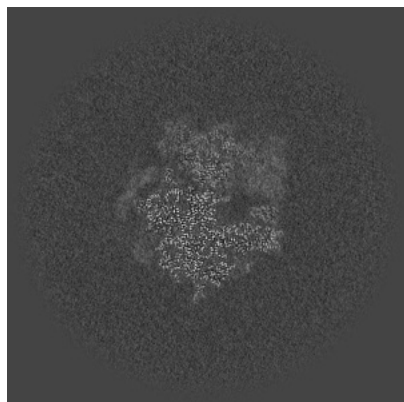


Z Index: 360

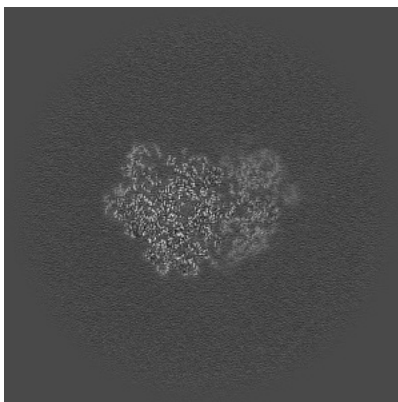
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

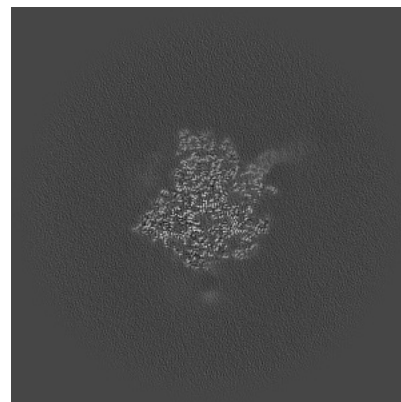
6.3.1 Primary map



X Index: 337

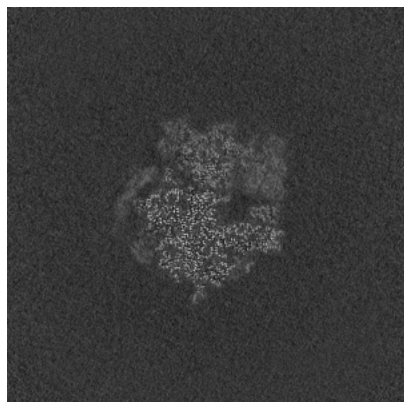


Y Index: 345

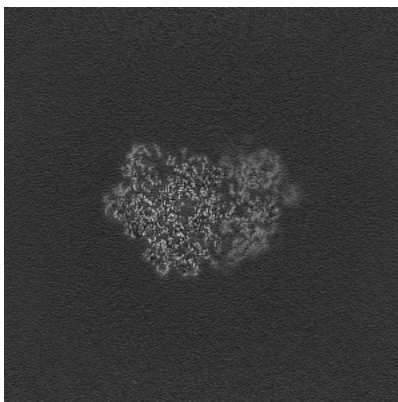


Z Index: 319

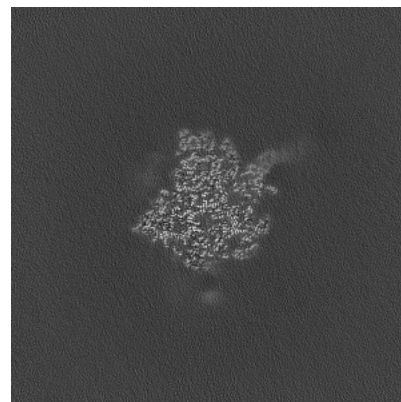
6.3.2 Raw map



X Index: 337



Y Index: 345

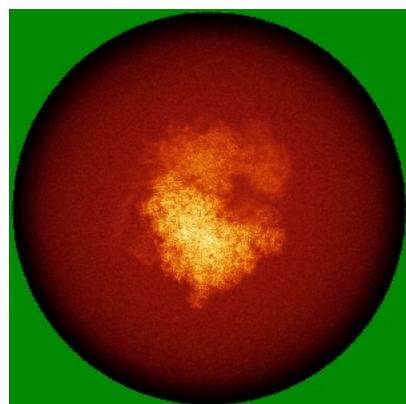


Z Index: 319

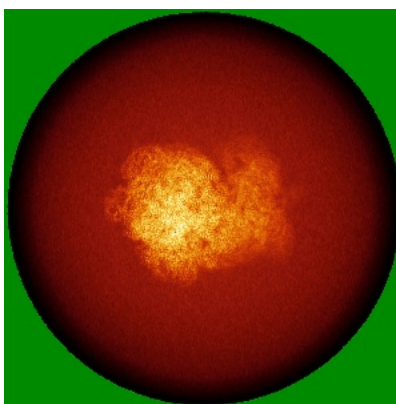
The images above show the largest variance slices of the map in three orthogonal directions.

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

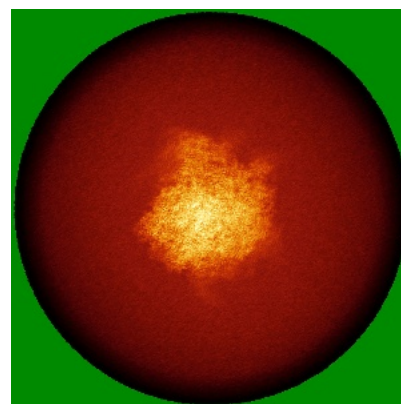
6.4.1 Primary map



X

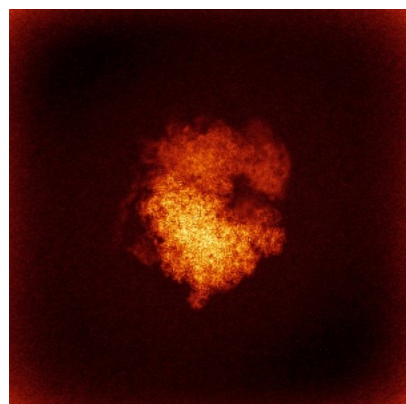


Y

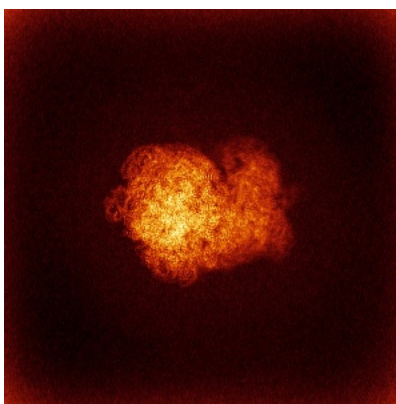


Z

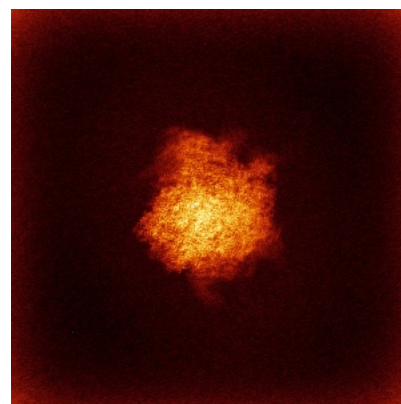
6.4.2 Raw map



X



Y

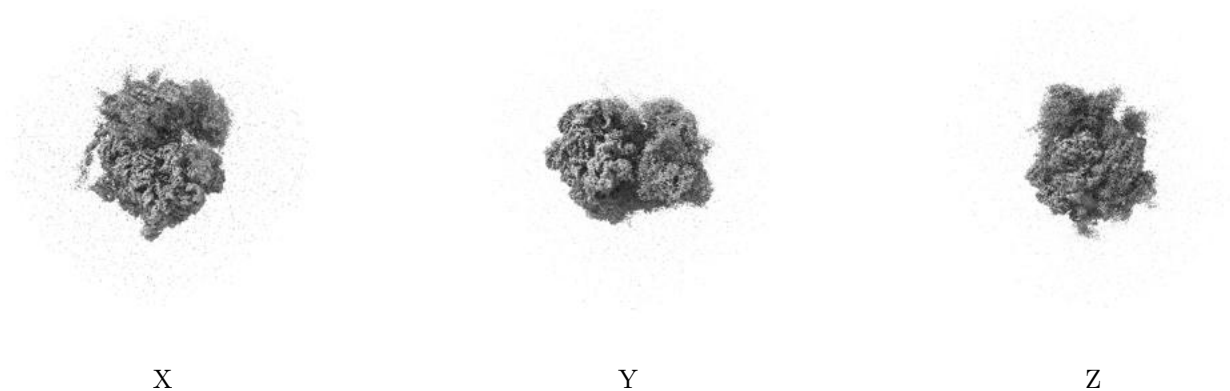


Z

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

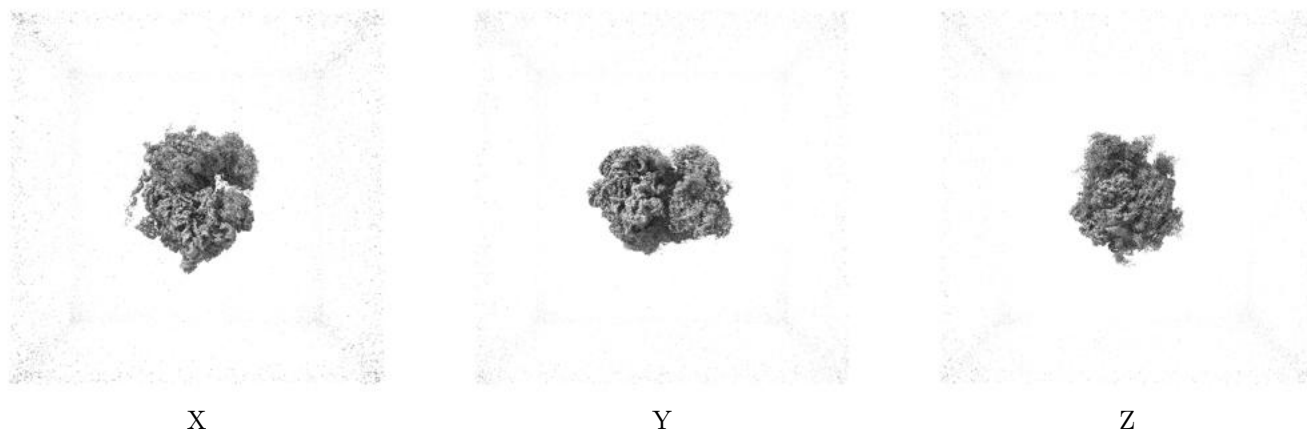
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.45. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

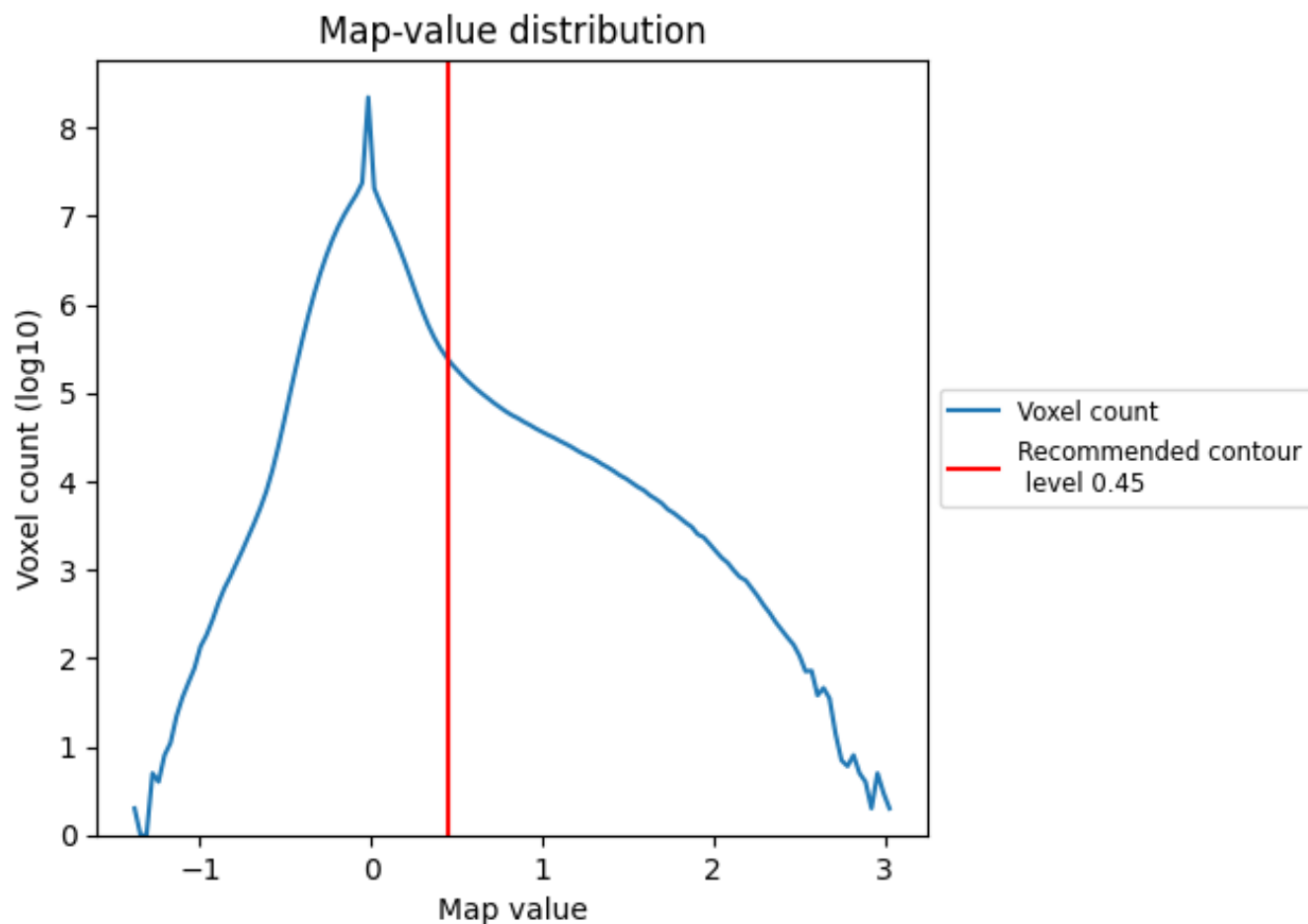
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

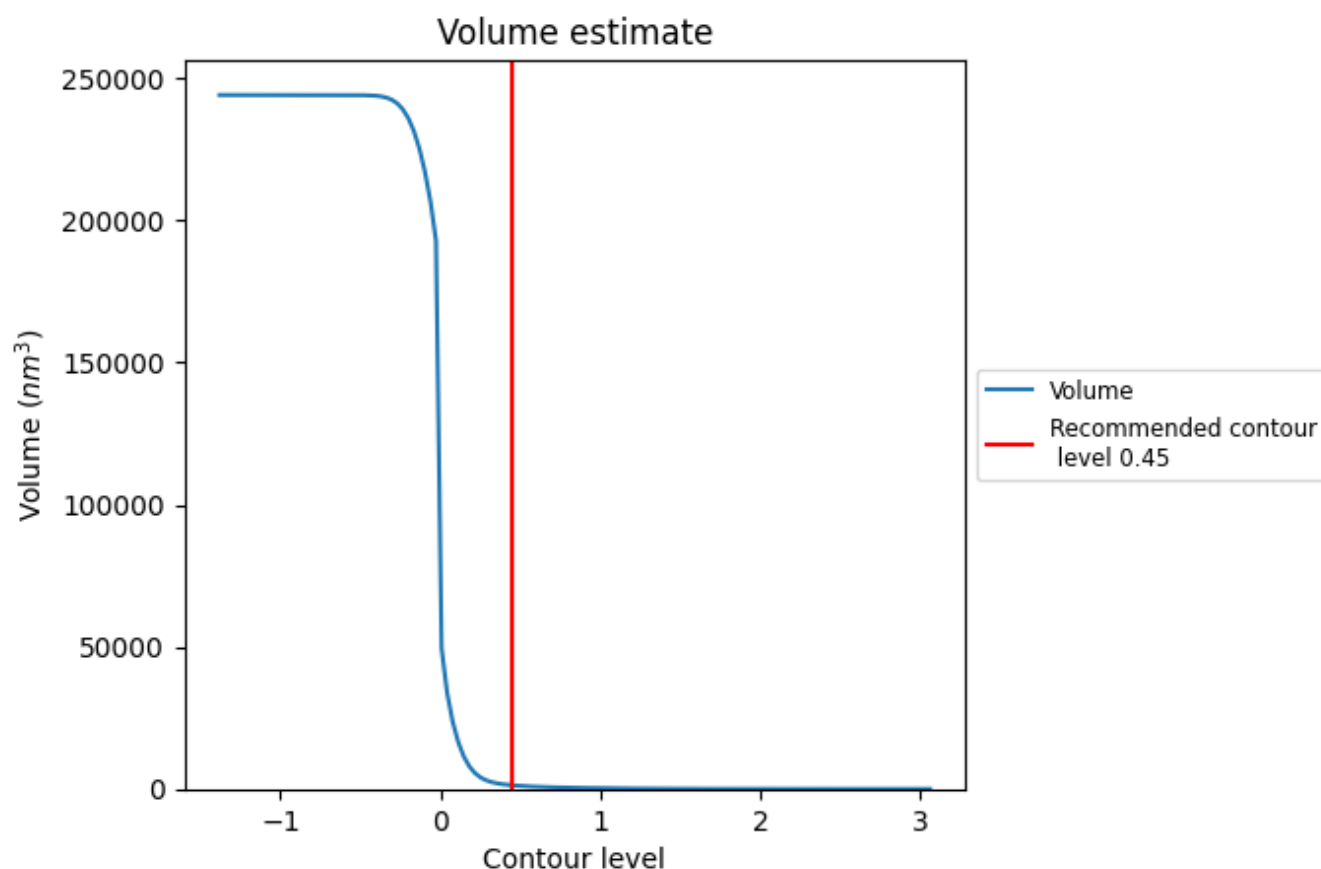
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

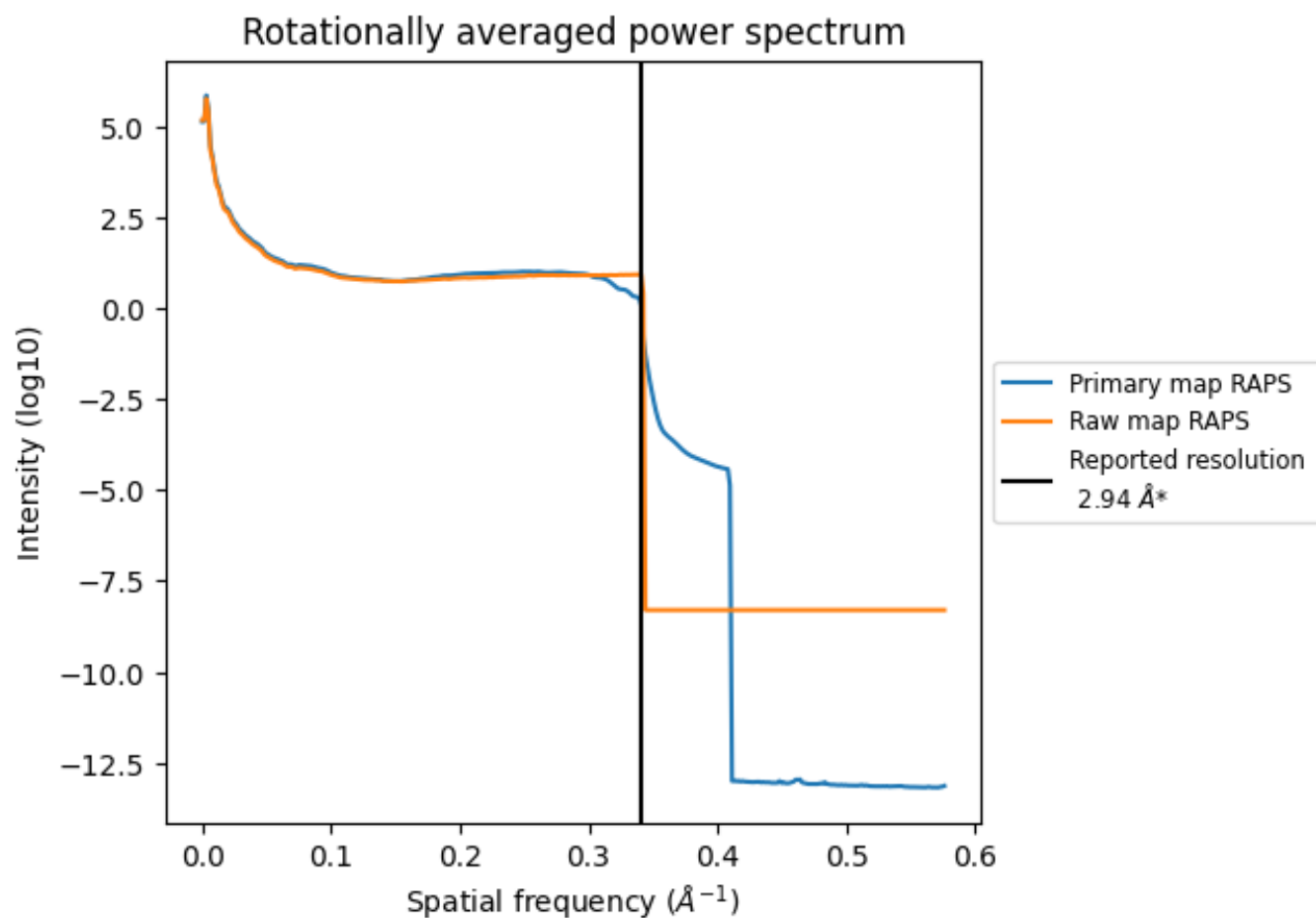
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1302 nm^3 ; this corresponds to an approximate mass of 1176 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

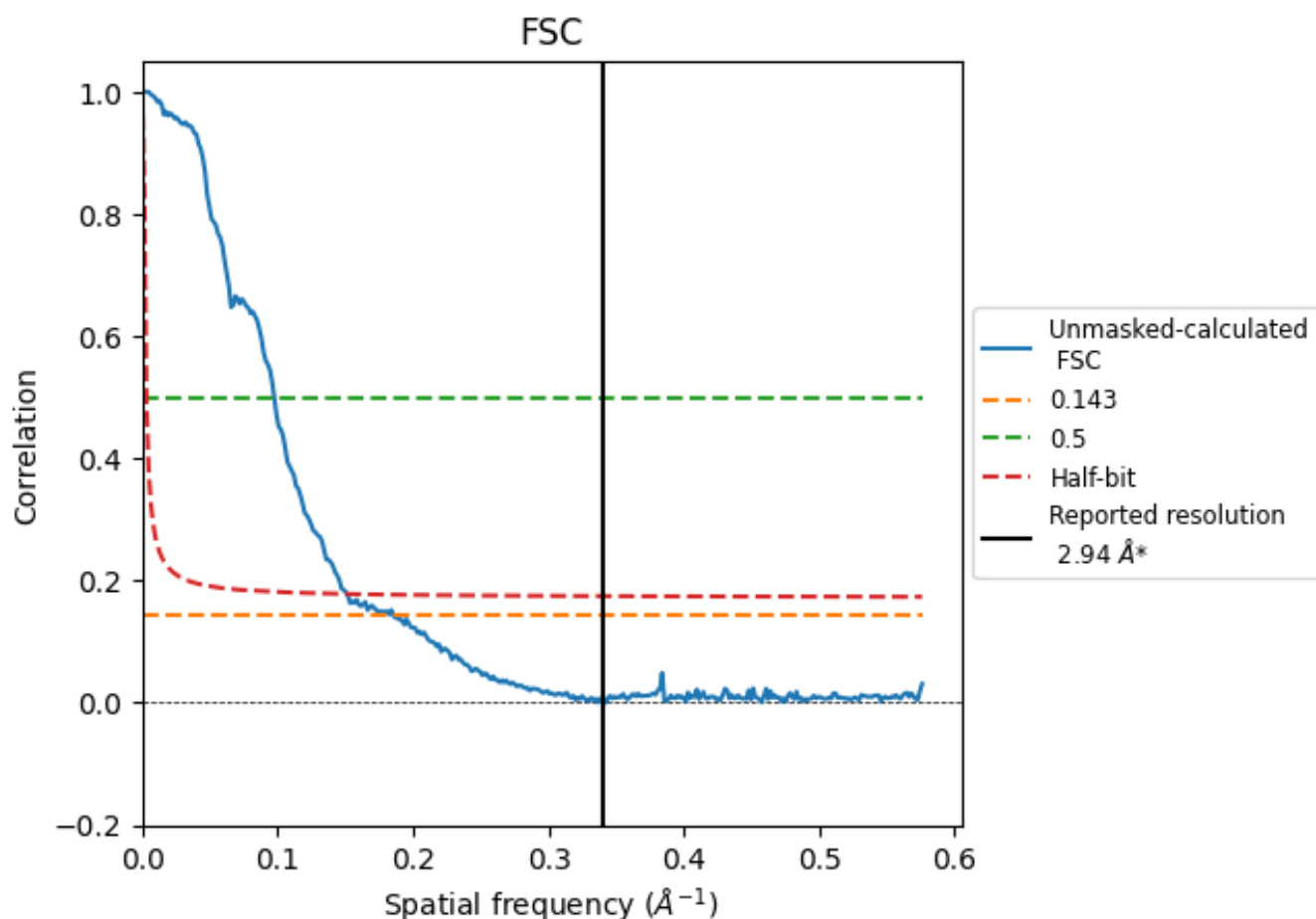


*Reported resolution corresponds to spatial frequency of 0.340 $\text{\AA}^{-1}$

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 0.340 Å⁻¹

8.2 Resolution estimates [i](#)

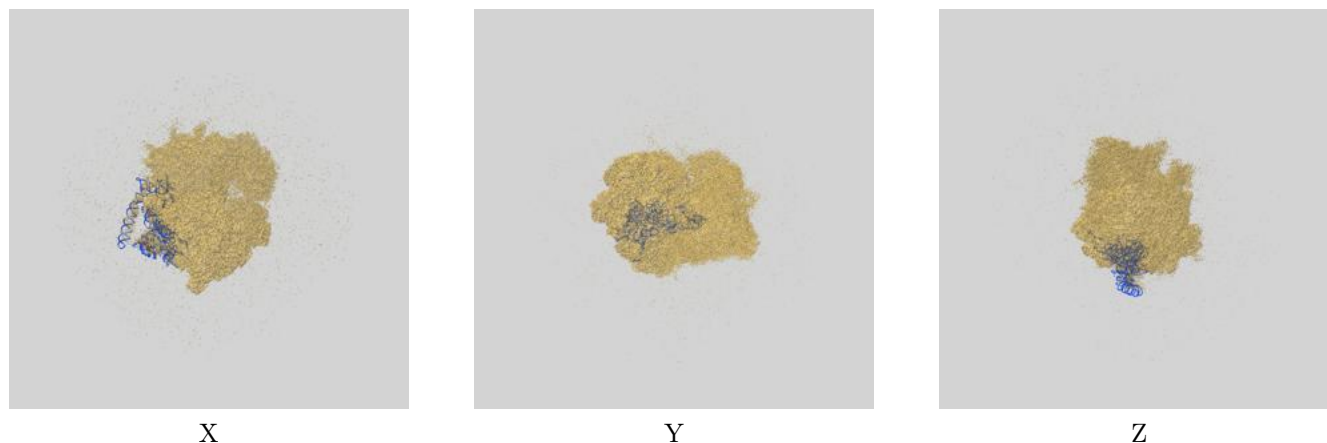
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.94	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	5.39	10.27	6.62

*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 5.39 differs from the reported value 2.94 by more than 10 %

9 Map-model fit [i](#)

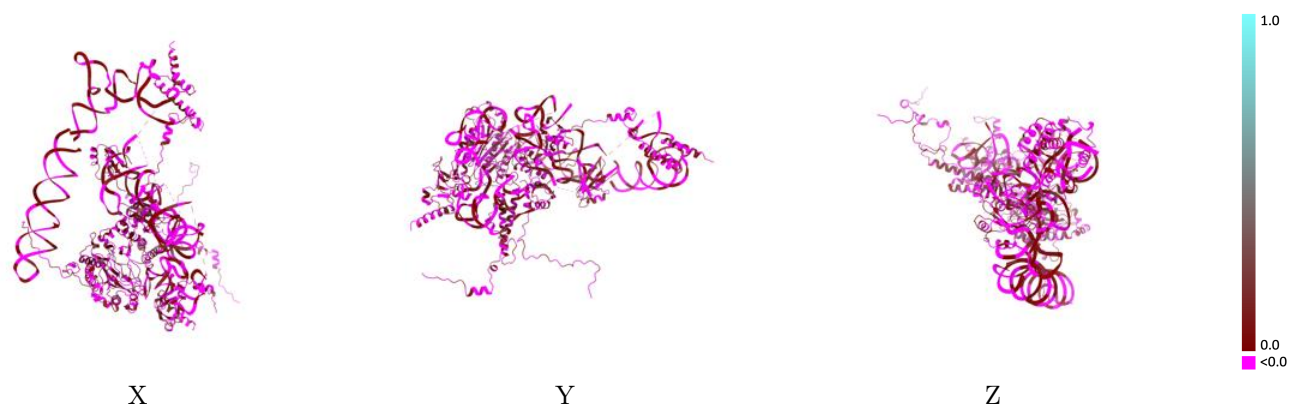
This section contains information regarding the fit between EMDB map EMD-17003 and PDB model 8ONZ. Per-residue inclusion information can be found in section [3](#) on page [6](#).

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.45 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](#)



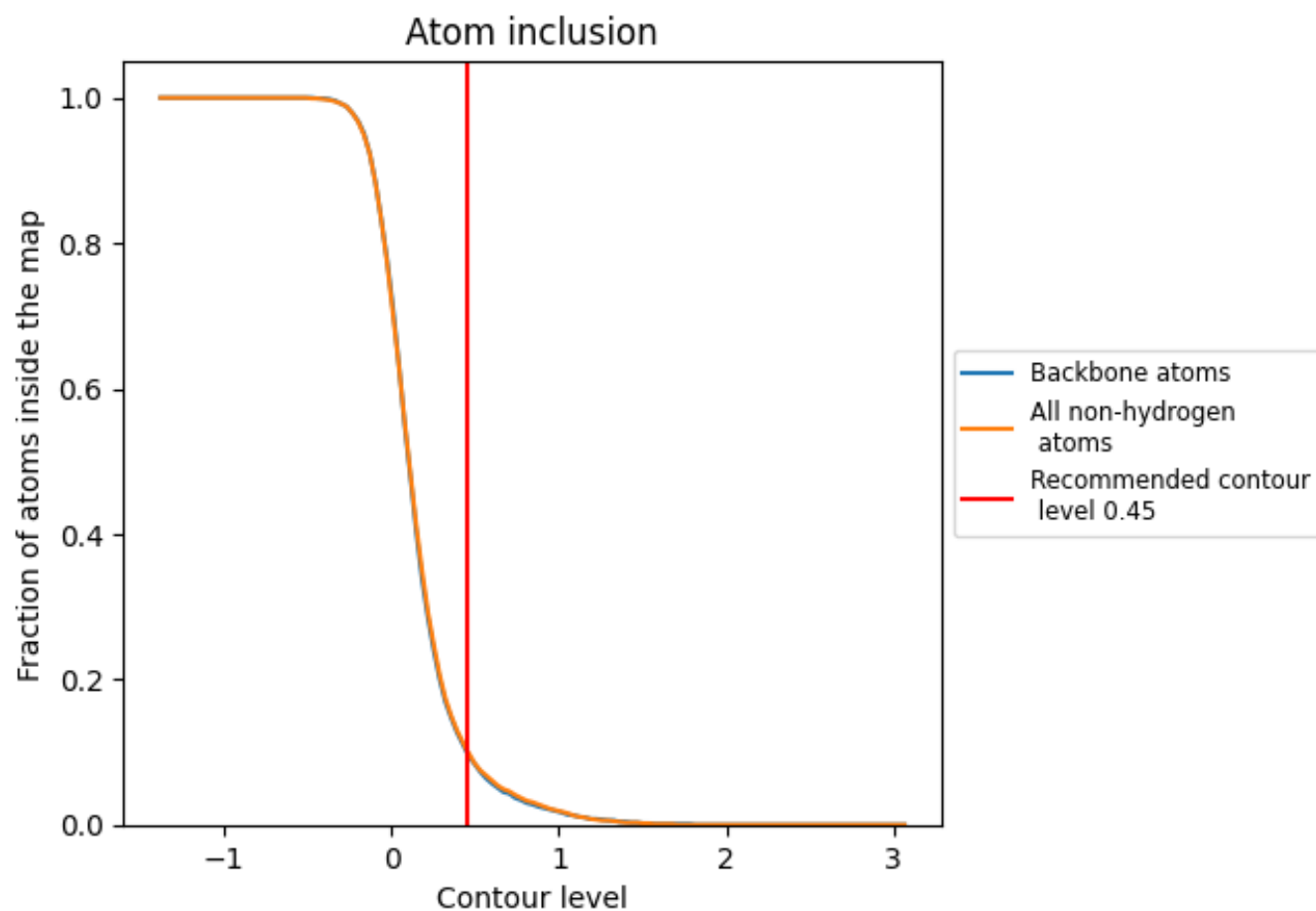
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.45).

9.4 Atom inclusion ⓘ



At the recommended contour level, 10% of all backbone atoms, 10% 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 (0.45) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.1020	0.0000
1	0.1040	0.0040
2	0.1800	-0.0130
A	0.0490	0.0060
LR	0.1470	-0.0240
LX	0.1260	-0.0060
LY	0.1230	-0.0070
Lh	0.0800	-0.0020
Lk	0.0570	0.0370

