WORLD WIDE
wwPDB
PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

Jun 25, 2025 – 12:12 pm BST

PDB ID	:	6SZU / pdb_00006szu
EMDB ID	:	EMD-10354
Title	:	Bat Influenza A polymerase pre-termination complex with pyrophosphate using 44-mer vRNA template with mutated oligo(U) sequence
Authors	:	Wandzik, J.M.; Kouba, T.; Cusack, S.
Deposited on	:	2019-10-02
Resolution	:	2.41 Å(reported)

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

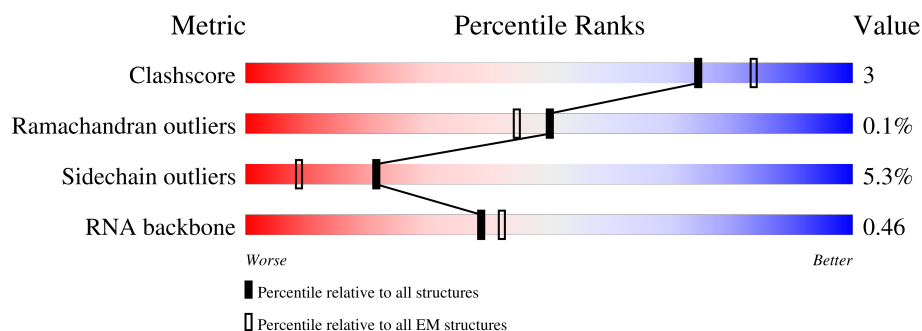|		
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1　Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.41 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	Percentile Ranks	Value
Clashscore		3
Ramachandran outliers		0.1%
Sidechain outliers		5.3%
RNA backbone		0.46

Worse　　　　　　　　　　　　　　　　　　*Better*

▌ Percentile relative to all structures

▯ Percentile relative to all EM structures

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

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

Mol	Chain	Length	Quality of chain
1	A	738	23% / 83% / 11% · ·
2	B	776	5% / 85% / 10% · ·
3	C	809	· / 26% · · / 69%
4	V	44	27% / 66% / 32% ·
5	M	10	100%

2   Entity composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 15245 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 Polymerase acidic protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	705	5761	3664	974	1086	37	1	0

There are 25 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	GLY	-	expression tag	UNP H6QM92
A	-12	SER	-	expression tag	UNP H6QM92
A	-11	HIS	-	expression tag	UNP H6QM92
A	-10	HIS	-	expression tag	UNP H6QM92
A	-9	HIS	-	expression tag	UNP H6QM92
A	-8	HIS	-	expression tag	UNP H6QM92
A	-7	HIS	-	expression tag	UNP H6QM92
A	-6	HIS	-	expression tag	UNP H6QM92
A	-5	HIS	-	expression tag	UNP H6QM92
A	-4	HIS	-	expression tag	UNP H6QM92
A	-3	GLY	-	expression tag	UNP H6QM92
A	-2	SER	-	expression tag	UNP H6QM92
A	-1	GLY	-	expression tag	UNP H6QM92
A	0	SER	-	expression tag	UNP H6QM92
A	714	GLY	-	expression tag	UNP H6QM92
A	715	SER	-	expression tag	UNP H6QM92
A	716	GLY	-	expression tag	UNP H6QM92
A	717	SER	-	expression tag	UNP H6QM92
A	718	GLY	-	expression tag	UNP H6QM92
A	719	GLU	-	expression tag	UNP H6QM92
A	720	ASN	-	expression tag	UNP H6QM92
A	721	LEU	-	expression tag	UNP H6QM92
A	722	TYR	-	expression tag	UNP H6QM92
A	723	PHE	-	expression tag	UNP H6QM92
A	724	GLN	-	expression tag	UNP H6QM92

- Molecule 2 is a protein called RNA-directed RNA polymerase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	745	Total 5964	C 3747	N 1063	O 1115	S 39	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-8	GLY	-	expression tag	UNP H6QM91
B	-7	SER	-	expression tag	UNP H6QM91
B	-6	GLY	-	expression tag	UNP H6QM91
B	-5	SER	-	expression tag	UNP H6QM91
B	-4	GLY	-	expression tag	UNP H6QM91
B	-3	SER	-	expression tag	UNP H6QM91
B	-2	GLY	-	expression tag	UNP H6QM91
B	-1	SER	-	expression tag	UNP H6QM91
B	0	GLY	-	expression tag	UNP H6QM91
B	757	GLY	-	expression tag	UNP H6QM91
B	758	SER	-	expression tag	UNP H6QM91
B	759	GLY	-	expression tag	UNP H6QM91
B	760	SER	-	expression tag	UNP H6QM91
B	761	GLY	-	expression tag	UNP H6QM91
B	762	GLU	-	expression tag	UNP H6QM91
B	763	ASN	-	expression tag	UNP H6QM91
B	764	LEU	-	expression tag	UNP H6QM91
B	765	TYR	-	expression tag	UNP H6QM91
B	766	PHE	-	expression tag	UNP H6QM91
B	767	GLN	-	expression tag	UNP H6QM91

- Molecule 3 is a protein called Polymerase basic protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	249	Total 2022	C 1271	N 364	O 371	S 16	1	0

There are 49 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-8	GLY	-	expression tag	UNP H6QM90
C	-7	SER	-	expression tag	UNP H6QM90
C	-6	GLY	-	expression tag	UNP H6QM90
C	-5	SER	-	expression tag	UNP H6QM90
C	-4	GLY	-	expression tag	UNP H6QM90
C	-3	SER	-	expression tag	UNP H6QM90
C	-2	GLY	-	expression tag	UNP H6QM90

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-1	SER	-	expression tag	UNP H6QM90
C	0	GLY	-	expression tag	UNP H6QM90
C	761	GLY	-	expression tag	UNP H6QM90
C	762	TRP	-	expression tag	UNP H6QM90
C	763	SER	-	expression tag	UNP H6QM90
C	764	HIS	-	expression tag	UNP H6QM90
C	765	PRO	-	expression tag	UNP H6QM90
C	766	GLN	-	expression tag	UNP H6QM90
C	767	PHE	-	expression tag	UNP H6QM90
C	768	GLU	-	expression tag	UNP H6QM90
C	769	LYS	-	expression tag	UNP H6QM90
C	770	GLY	-	expression tag	UNP H6QM90
C	771	GLY	-	expression tag	UNP H6QM90
C	772	GLY	-	expression tag	UNP H6QM90
C	773	SER	-	expression tag	UNP H6QM90
C	774	GLY	-	expression tag	UNP H6QM90
C	775	GLY	-	expression tag	UNP H6QM90
C	776	GLY	-	expression tag	UNP H6QM90
C	777	SER	-	expression tag	UNP H6QM90
C	778	GLY	-	expression tag	UNP H6QM90
C	779	GLY	-	expression tag	UNP H6QM90
C	780	SER	-	expression tag	UNP H6QM90
C	781	ALA	-	expression tag	UNP H6QM90
C	782	TRP	-	expression tag	UNP H6QM90
C	783	SER	-	expression tag	UNP H6QM90
C	784	HIS	-	expression tag	UNP H6QM90
C	785	PRO	-	expression tag	UNP H6QM90
C	786	GLN	-	expression tag	UNP H6QM90
C	787	PHE	-	expression tag	UNP H6QM90
C	788	GLU	-	expression tag	UNP H6QM90
C	789	LYS	-	expression tag	UNP H6QM90
C	790	GLY	-	expression tag	UNP H6QM90
C	791	ARG	-	expression tag	UNP H6QM90
C	792	SER	-	expression tag	UNP H6QM90
C	793	GLY	-	expression tag	UNP H6QM90
C	794	GLY	-	expression tag	UNP H6QM90
C	795	GLU	-	expression tag	UNP H6QM90
C	796	ASN	-	expression tag	UNP H6QM90
C	797	LEU	-	expression tag	UNP H6QM90
C	798	TYR	-	expression tag	UNP H6QM90
C	799	PHE	-	expression tag	UNP H6QM90
C	800	GLN	-	expression tag	UNP H6QM90

- Molecule 4 is a RNA chain called vRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	V	44	Total 929	C 415	N 157	O 313	P 44	0	0

- Molecule 5 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	M	10	Total 217	C 97	N 44	O 66	P 10	0	0

- Molecule 6 is 5-oxidanyl-4-oxidanylidene-1-[(1-pyrrolo[2,3-b]pyridin-1-ylcyclopentyl)methyl] pyridine-3-carboxylic acid (CCD ID: M4H) (formula: $C_{19}H_{19}N_3O_4$).
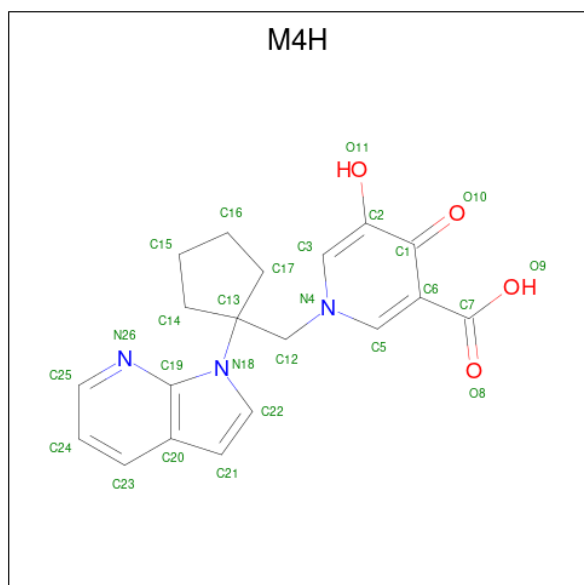
Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total 26	C 19	N 3	O 4	0

- Molecule 7 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
7	A	2	Total 2	Mg 2	0
7	B	2	Total 2	Mg 2	0
7	V	1	Total 1	Mg 1	0

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Mol	Chain	Residues	Atoms		AltConf
7	M	1	Total 1	Mg 1	0

- Molecule 8 is PYROPHOSPHATE 2- (CCD ID: POP) (formula: $H_2O_7P_2$).
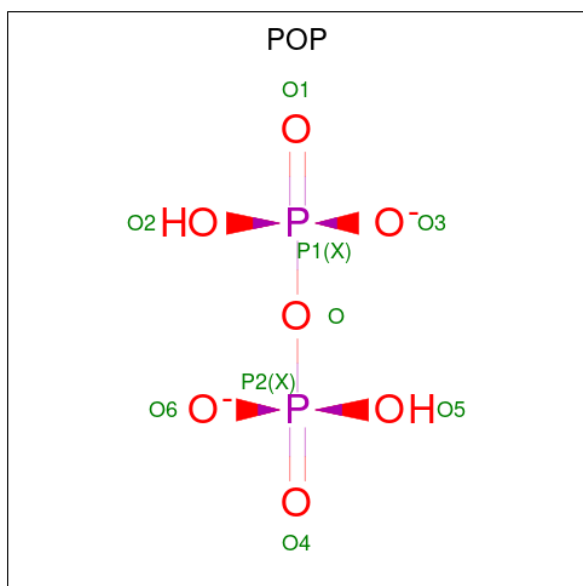
Mol	Chain	Residues	Atoms			AltConf
8	B	1	Total 9	O 7	P 2	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		AltConf
9	A	93	Total 93	O 93	0
9	B	136	Total 136	O 136	0
9	C	10	Total 10	O 10	0
9	V	64	Total 64	O 64	0
9	M	8	Total 8	O 8	0

3 Residue-property plots ⓘ

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: Polymerase acidic protein

• Molecule 2: RNA-directed RNA polymerase catalytic subunit

L509 F512 S520 A521 D522 P541 Y559 R560 E569 R572 T573 N600 L601 R602 D619 N626 P630 E636 V637 E638 S639 T640 N641 LEU ALA VAL VAL MET PRO ALA HIS GLY PRO ALA K653 S654 L655 T663 R672 Q679 Q694 V695 F696 E697

S703 T704 Y705 R706 S713 D716 D729 G733 R734 I735 S736 S737 Q738 D739 F740 S741 E742 K748 A749 L753 K754 R755 Q756 GLY SER GLY SER GLY GLU ASN LEU TYR PHE GLN

• Molecule 3: Polymerase basic protein 2

Chain C:

26%　　　　　　　　　　　　　69%

GLY SER GLY SER GLY GLY S-1 G0 M1 E2 V11 K12 R15 S24 M28 E40 K41 L45 M51 I57 R62 I63 R64 E65 K82 D83 A84 G85 S86 N87 R88 V91 W99 P104 D107 L125 K134 K143 N148 P149 G150

H151 K152 E165 R175 T176 L177 S178 S179 D180 A181 Q182 L183 T184 E191 E192 L193 K194 N195 I201 T215 R216 F217 I220 T224 T235 Q242 Q243 G247 GLU ALA GLU ASN ASP LEU ASP GLN THR LEU ILE ALA SER ARG ASN ILE VAL ARG ARG

SER ILE VAL ALA ILE ASP PRO LEU ALA SER LEU LEU SER MET CYS HIS THR THR SER ILE SER SER GLU PRO LEU VAL GLU ILE LEU LEU ARG ASN PRO THR ASP GLU GLN ALA VAL ASN ILE CYS LYS ALA ALA LEU GLY ILE LEU ARG ILE ASN ASN SER PHE SER PHE GLY GLY TYR ASN

PHE LYS ARG VAL LYS GLY SER SER GLN ARG THR GLU LYS ALA VAL LEU THR GLY ASN LEU GLN THR LEU THR MET THR ILE PHE GLU GLY LYS GLU TYR GLU GLU PHE ASN VAL SER GLY LYS ARG ALA SER ALA VAL LEU LYS LYS GLY ALA GLN ARG LEU ILE GLN ALA ILE ILE GLY GLY ARG

THR LEU GLU ASP ILE LEU ASN MET LEU THR ILE LEU MET VAL PHE SER GLN GLU GLY LYS MET LEU LYS ALA VAL ARG GLY ASP LEU ASN PHE VAL ASN ARG ALA ASN GLN ARG LEU ASN PRO MET TYR GLN LEU LEU ARG HIS PHE GLN LYS ASP SER SER THR LEU LEU LYS ASN TRP

GLY THR GLU GLU ILE ASP PRO ILE MET GLY ILE ALA GLY ILE MET PRO ASP GLY THR ILE ASN LYS THR GLN GLY THR LEU MET GLY VAL ARG LEU SER GLN GLY GLY VAL ASP GLU GLU SER PHE ASN GLY ARG ILE ARG VAL ASN ILE ASP LYS TYR LEU ARG VAL ARG ASN GLU LYS GLY

GLU LEU LEU ILE SER PRO GLU GLU VAL SER GLU ALA GLN ILE GLY ILE MET PRO ASP GLY LYS LEU PRO ILE ASN TYR ASN SER SER LEU MET TRP GLU VAL ASN GLY PRO GLU SER ILE LEU THR ASN THR TYR HIS TRP ILE ILE LYS ASN TRP GLU LEU LEU LYS THR GLN TRP MET THR ASP PRO THR

VAL LEU TYR ASN ARG ILE GLU PHE GLU PRO PHE GLN SER LEU ILE PRO LYS ALA ALA ILE SER TYR GLY PHE THR ARG LEU ILE PHE ASN ILE LYS GLY LEU ASN VAL PHE ASN THR GLN ILE MET ARG ASP GLU GLY THR PHE ASP SER ILE GLN ILE ILE LYS LEU LEU PRO PHE SER ALA HIS PRO PRO SER LEU GLY

ARG THR GLN PHE SER SER PHE THR LEU ASN ILE ARG GLY ALA PRO LEU ARG LEU LEU ILE ARG GLY SER LEU GLN VAL PHE ASN THR GLN MET LEU ASN GLY LYS GLU GLY ILE ASP THR VAL LEU GLY ILE LYS ARG ASP SER ILE LEU THR ASP SER SER GLN SER GLN THR

VAL LEU ARG GLY PHE LEU ILE LEU GLY LYS ALA ASN SER LYS TYR GLY PRO VAL LEU THR ILE GLY LEU GLU LEU ASP LYS LEU GLY ARG GLY LYS ALA ASN VAL LEU ILE GLY GLN GLY ASP THR VAL LEU VAL MET LYS ARG LYS ARG ASP SER SER ILE LEU THR ASP SER GLN THR

ALA LEU LYS ARG ILE ARG LEU GLU GLU LYS GLY SER LYS GLY TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER GLY ALA TRP SER HIS PRO GLN PHE GLU LYS SER GLY ARG SER GLY GLU GLU ASN LEU TYR PHE GLN

• Molecule 4: vRNA

27%

Chain V:

66%　　　　　　　32%

A1 A4 A8 A11 G14 A17 G21 U28 C29 G30 C31 C32 U33 C34 U35 G36 C37 U38 U39 C40 U41 G42 C43 U44

• Molecule 5: mRNA

Chain M: 100%

There are no outlier residues recorded for this chain.

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	257175	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	39	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.212	Depositor
Minimum map value	-0.096	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	253.5624, 253.5624, 253.5624	wwPDB
Map dimensions	312, 312, 312	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8127, 0.8127, 0.8127	Depositor

5　Model quality ⓘ

5.1　Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: POP, MG, M4H

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	A	0.31	0/5883	0.47	1/7919 (0.0%)
2	B	0.34	0/6078	0.51	0/8197
3	C	0.29	0/2063	0.50	0/2784
4	V	0.39	0/1035	0.47	0/1607
5	M	0.35	0/243	0.34	0/377
All	All	0.33	0/15302	0.49	1/20884 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	79	ILE	N-CA-C	-5.92	107.05	112.96

There are no chirality outliers.

There are no planarity outliers.

5.2　Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5761	0	5688	44	0
2	B	5964	0	5975	38	0
3	C	2022	0	2051	19	0
4	V	929	0	472	6	0
5	M	217	0	111	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	26	0	0	0	0
7	A	2	0	0	0	0
7	B	2	0	0	0	0
7	M	1	0	0	0	0
7	V	1	0	0	0	0
8	B	9	0	0	0	0
9	A	93	0	0	0	0
9	B	136	0	0	2	0
9	C	10	0	0	0	0
9	M	8	0	0	0	0
9	V	64	0	0	0	0
All	All	15245	0	14297	89	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 3.

All (89) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:88:ARG:NH1	4:V:29:C:O2	2.29	0.65
2:B:630:PRO:HB2	3:C:63:ILE:HG13	1.80	0.62
1:A:445:VAL:HG22	1:A:636:LEU:HD22	1.82	0.61
2:B:268:GLN:NE2	2:B:439:ASP:OD1	2.36	0.59
1:A:55:ASP:OD2	1:A:59:ASN:ND2	2.37	0.58
3:C:143:LYS:HZ3	3:C:220:ILE:HB	1.69	0.58
1:A:10:ASN:N	1:A:10:ASN:OD1	2.36	0.57
2:B:602:ARG:HG3	3:C:125:LEU:HD21	1.86	0.57
3:C:165:GLU:OE1	3:C:175:ARG:NH2	2.38	0.57
2:B:378:LEU:HD22	2:B:386:LYS:HG3	1.86	0.56
1:A:426:ASP:OD1	2:B:600:ASN:ND2	2.39	0.55
2:B:302:ILE:HD12	2:B:449:LEU:HD23	1.88	0.55
2:B:272:PRO:HB3	2:B:414:MET:HE1	1.89	0.54
2:B:713:SER:HA	3:C:24:SER:HA	1.91	0.53
1:A:124:ARG:NH2	1:A:194:SER:O	2.42	0.52
1:A:300:GLU:O	4:V:42:G:N2	2.40	0.52
2:B:716:ASP:OD1	2:B:754:LYS:NZ	2.41	0.52
1:A:491[B]:ARG:HD2	4:V:44:U:H1'	1.92	0.52
1:A:150:PHE:HB3	1:A:179:ARG:HB2	1.91	0.52
2:B:697:GLU:HG3	2:B:703:SER:HB2	1.91	0.52
2:B:489:THR:HG22	2:B:498:ARG:HA	1.91	0.52
2:B:705:TYR:O	2:B:706:ARG:NH2	2.37	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:476:GLN:NE2	4:V:41:U:O4	2.44	0.51
2:B:572:ARG:NH2	9:B:924:HOH:O	2.44	0.51
3:C:180:ASP:O	3:C:184:THR:OG1	2.27	0.51
3:C:220:ILE:HG21	3:C:224:THR:HG22	1.93	0.51
2:B:137:GLN:HE21	2:B:141:THR:HG21	1.76	0.50
1:A:154:GLU:OE2	1:A:168:ARG:NH1	2.45	0.50
1:A:276:CYS:HB2	1:A:693:PRO:HG3	1.94	0.50
2:B:354:GLY:HA3	2:B:368:ILE:O	2.12	0.50
1:A:434:ALA:HB2	2:B:541:PRO:HB2	1.94	0.49
2:B:46:THR:HG22	2:B:405:PRO:HG2	1.95	0.48
1:A:230:LYS:HG3	2:B:323:LEU:HD22	1.96	0.48
3:C:148:ASN:HD22	3:C:150:GLY:H	1.61	0.48
2:B:88:VAL:HG21	2:B:317:ILE:HD12	1.95	0.48
1:A:109:LEU:HB2	1:A:118:ILE:HB	1.96	0.48
1:A:2:GLU:OE2	1:A:6:ARG:NE	2.45	0.48
1:A:331:ASN:HA	1:A:334:TYR:HD2	1.79	0.48
1:A:146:HIS:NE2	1:A:154:GLU:OE1	2.42	0.47
1:A:374:MET:HE2	1:A:374:MET:HB3	1.76	0.47
2:B:559:TYR:HA	3:C:51:MET:HE2	1.97	0.47
1:A:486:ASP:OD1	1:A:490:GLN:N	2.46	0.47
2:B:626:ASN:ND2	3:C:104:PRO:O	2.47	0.47
2:B:736:SER:OG	2:B:739:ASP:OD1	2.26	0.46
1:A:300:GLU:OE2	1:A:491[B]:ARG:NH2	2.49	0.46
2:B:122:LEU:HD21	2:B:250:GLY:HA2	1.98	0.46
2:B:737:SER:O	2:B:741:SER:OG	2.34	0.46
3:C:235:THR:HA	3:C:242:GLN:HB3	1.97	0.46
3:C:215:THR:O	3:C:216:ARG:NH1	2.46	0.46
1:A:63:LYS:HB3	1:A:64:GLU:H	1.65	0.45
1:A:571:LYS:HB2	3:C:45:LEU:HD13	1.98	0.45
2:B:522:ASP:OD2	2:B:559:TYR:OH	2.27	0.45
4:V:30:G:OP2	4:V:30:G:N2	2.47	0.45
2:B:109:GLU:OE2	2:B:265:ARG:NH2	2.50	0.45
1:A:127:VAL:HG12	1:A:155:MET:HB2	1.99	0.45
1:A:127:VAL:HG21	1:A:153:GLU:HB2	1.99	0.45
1:A:542:ASP:HB3	1:A:553:MET:HE3	1.98	0.45
1:A:578:ARG:NH2	2:B:512:PHE:O	2.43	0.45
1:A:224:LYS:HB3	1:A:224:LYS:HE3	1.70	0.44
1:A:4:PHE:O	1:A:8:ASN:ND2	2.46	0.44
3:C:57:ILE:HB	3:C:91:VAL:HB	2.00	0.44
1:A:271:PRO:HB3	1:A:395:LYS:HE3	1.99	0.44
1:A:151:ASP:OD1	1:A:179:ARG:NH1	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:582:GLN:HB2	2:B:509:LEU:HD11	2.00	0.43
2:B:260:ARG:NH1	4:V:21:G:OP1	2.47	0.43
1:A:142:ASN:OD1	1:A:142:ASN:N	2.51	0.43
1:A:460:ILE:HD11	1:A:480:ILE:HG23	2.00	0.43
1:A:176:PHE:HD1	1:A:176:PHE:HA	1.74	0.43
1:A:75:ARG:NE	1:A:111:ASP:OD1	2.52	0.43
1:A:371:PRO:O	2:B:365:ARG:NE	2.51	0.43
1:A:441:PHE:O	1:A:445:VAL:HB	2.18	0.43
3:C:177:LEU:HD22	3:C:182:GLN:HB3	2.00	0.43
2:B:413:ASN:ND2	9:B:928:HOH:O	2.49	0.43
2:B:129:TYR:OH	2:B:134:ASN:ND2	2.52	0.42
2:B:44:ILE:HG13	2:B:392:ILE:HD13	2.00	0.42
1:A:124:ARG:NH2	1:A:194:SER:OG	2.53	0.42
3:C:216:ARG:HA	3:C:216:ARG:HD3	1.83	0.42
1:A:3:ASN:O	1:A:7:THR:OG1	2.30	0.42
2:B:392:ILE:HD12	2:B:392:ILE:HA	1.83	0.42
1:A:50:ASP:O	1:A:52:HIS:ND1	2.49	0.41
2:B:663:THR:HG21	3:C:99:TRP:CD1	2.54	0.41
2:B:43:VAL:HG12	2:B:392:ILE:HD11	2.01	0.41
3:C:28:MET:HE2	3:C:28:MET:HB3	1.86	0.41
1:A:78:ILE:HA	1:A:109:LEU:HD23	2.02	0.41
1:A:707:LYS:HB3	1:A:707:LYS:HE2	1.76	0.41
2:B:266:LEU:HD13	2:B:421:VAL:HG11	2.03	0.41
2:B:638:GLU:H	2:B:638:GLU:HG3	1.44	0.40
1:A:55:ASP:HA	1:A:72:LEU:HD22	2.04	0.40
1:A:568:ILE:H	1:A:568:ILE:HG12	1.63	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	700/738 (95%)	653 (93%)	45 (6%)	2 (0%)	37	50
2	B	741/776 (96%)	719 (97%)	22 (3%)	0	100	100
3	C	248/809 (31%)	244 (98%)	4 (2%)	0	100	100
All	All	1689/2323 (73%)	1616 (96%)	71 (4%)	2 (0%)	50	64

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	125	ARG
1	A	612	ASN

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	632/657 (96%)	596 (94%)	36 (6%)	17	28
2	B	657/676 (97%)	627 (95%)	30 (5%)	23	37
3	C	225/706 (32%)	211 (94%)	14 (6%)	15	25
All	All	1514/2039 (74%)	1434 (95%)	80 (5%)	21	31

All (80) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	VAL
1	A	10	ASN
1	A	14	LEU
1	A	26	GLU
1	A	60	THR
1	A	62	VAL
1	A	64	GLU
1	A	97	MET
1	A	98	THR
1	A	129	ASP
1	A	141	GLU

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Mol	Chain	Res	Type
1	A	142	ASN
1	A	164	ASP
1	A	176	PHE
1	A	187	LEU
1	A	191	PHE
1	A	201	LEU
1	A	224	LYS
1	A	225	ASP
1	A	243	GLU
1	A	258	GLU
1	A	319	LYS
1	A	323	ILE
1	A	379	CYS
1	A	394	GLU
1	A	445	VAL
1	A	503	ARG
1	A	513	VAL
1	A	529	ILE
1	A	551	THR
1	A	552	ILE
1	A	568	ILE
1	A	578	ARG
1	A	613	ASP
1	A	616	ILE
1	A	618	GLU
2	B	48	ASP
2	B	116	GLN
2	B	118	ARG
2	B	120	ASP
2	B	135	ARG
2	B	148	GLU
2	B	171	LEU
2	B	181	VAL
2	B	183	THR
2	B	193	ASP
2	B	200	ILE
2	B	227	MET
2	B	367	GLN
2	B	392	ILE
2	B	429	ARG
2	B	434	ARG
2	B	443	SER

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Mol	Chain	Res	Type
2	B	520	SER
2	B	560	ARG
2	B	569	GLU
2	B	573	THR
2	B	619	ASP
2	B	638	GLU
2	B	679	GLN
2	B	694	GLN
2	B	695	VAL
2	B	704	THR
2	B	729	ASP
2	B	736	SER
2	B	741	SER
3	C	-1	SER
3	C	2	GLU
3	C	11	VAL
3	C	62	ARG
3	C	63	ILE
3	C	65	GLU
3	C	134	LYS
3	C	148	ASN
3	C	175	ARG
3	C	184	THR
3	C	201	ILE
3	C	216	ARG
3	C	217	PHE
3	C	243	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	59	ASN
1	A	85	ASN
1	A	96	ASN
1	A	256	GLN
1	A	278	GLN
1	A	369	GLN
1	A	425	ASN
1	A	582	GLN
2	B	134	ASN
2	B	137	GLN
2	B	216	ASN

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Mol	Chain	Res	Type
2	B	329	GLN
2	B	413	ASN
2	B	425	ASN
2	B	671	ASN
2	B	694	GLN
3	C	148	ASN
3	C	170	ASN
3	C	233	HIS
3	C	243	GLN

5.3.3   RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
4	V	43/44 (97%)	10 (23%)	0
5	M	9/10 (90%)	0	0
All	All	52/54 (96%)	10 (19%)	0

All (10) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
4	V	4	A
4	V	8	A
4	V	11	A
4	V	14	G
4	V	17	A
4	V	33	U
4	V	37	C
4	V	39	U
4	V	40	C
4	V	44	U

There are no RNA pucker outliers to report.

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 6 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
8	POP	B	803	7	6,8,8	1.00	0	13,13,13	0.83	0
6	M4H	A	801	7	27,29,29	1.22	1 (3%)	33,43,43	1.93	11 (33%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	POP	B	803	7	-	1/6/6/6	-
6	M4H	A	801	7	-	1/8/24/24	0/4/4/4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	801	M4H	C22-N18	-4.21	1.35	1.39

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	A	801	M4H	C22-N18-C13	-4.93	120.44	124.18
6	A	801	M4H	C5-C6-C1	-3.55	117.62	120.26
6	A	801	M4H	C17-C13-C12	-3.40	109.72	113.80
6	A	801	M4H	C15-C14-C13	3.16	108.82	104.37
6	A	801	M4H	C7-C6-C1	2.65	125.55	121.53
6	A	801	M4H	C25-N26-C19	2.56	119.94	116.77
6	A	801	M4H	O11-C2-C1	2.35	121.66	117.89
6	A	801	M4H	C21-C20-C19	2.23	111.62	105.30
6	A	801	M4H	C6-C1-C2	-2.18	116.01	118.80
6	A	801	M4H	C21-C20-C23	-2.10	129.39	136.72
6	A	801	M4H	C16-C17-C13	2.01	107.21	104.37

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	B	803	POP	P2-O-P1-O2
6	A	801	M4H	C1-C6-C7-O8

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand M4H A 801

Bond lengths

Bond angles

Torsions

Rings
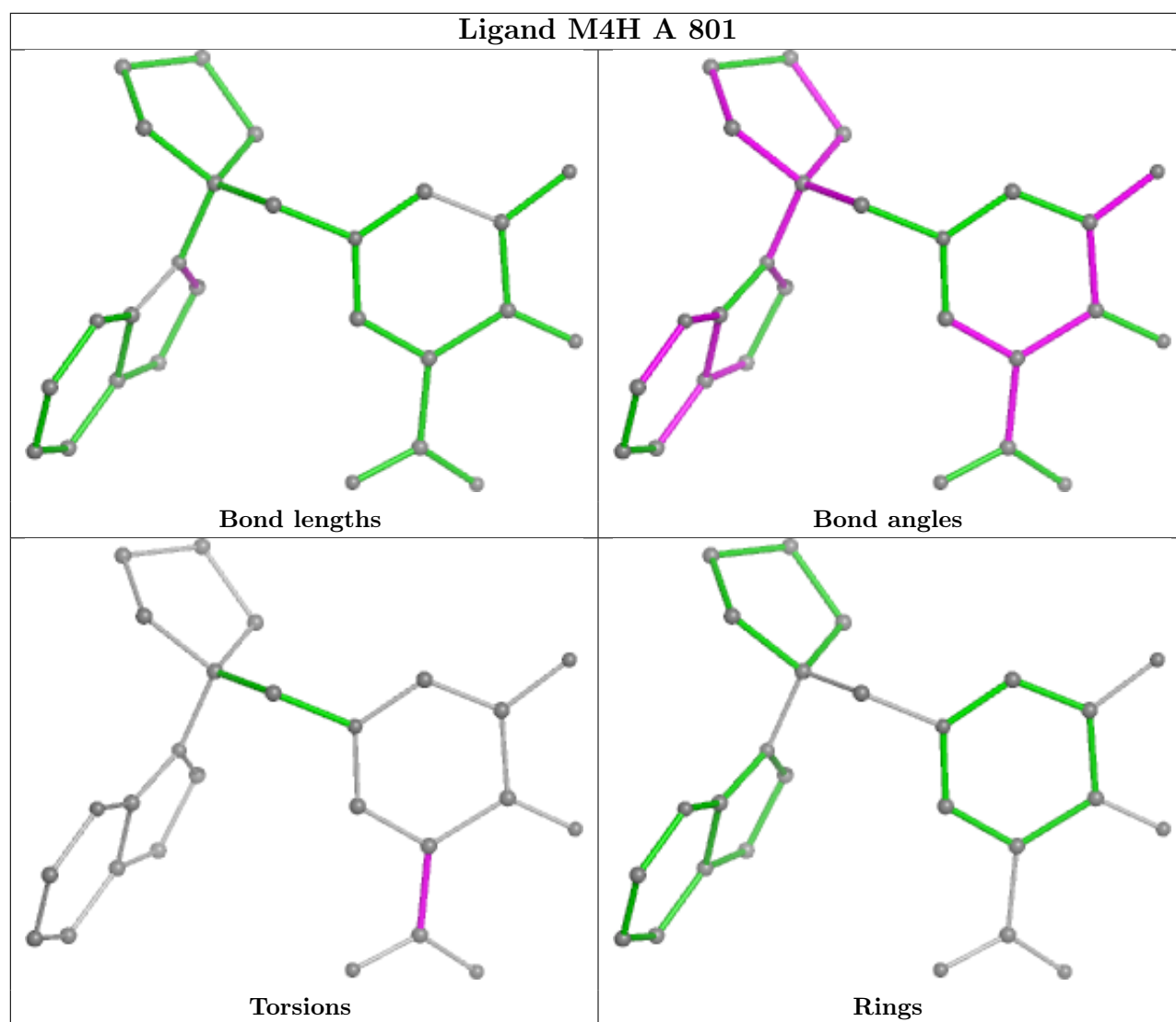
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-10354. 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 ⓘ
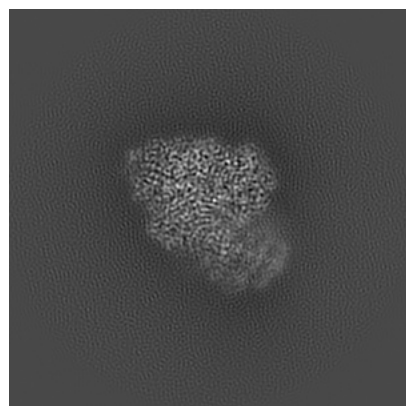
6.1.1 Primary map

X
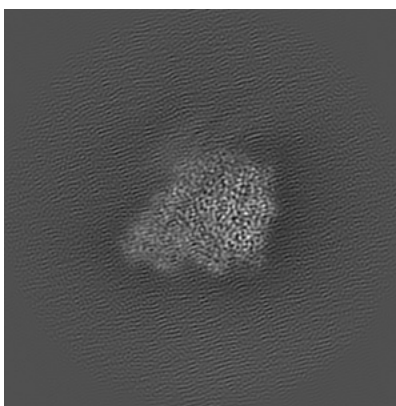
Y
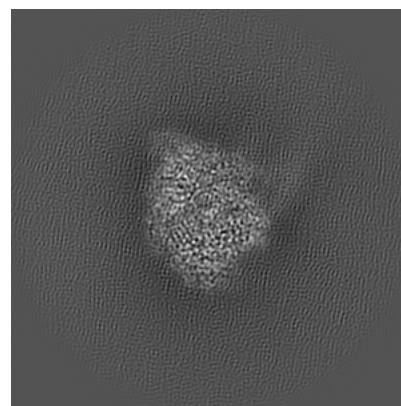
Z

6.1.2 Raw map

X

Y

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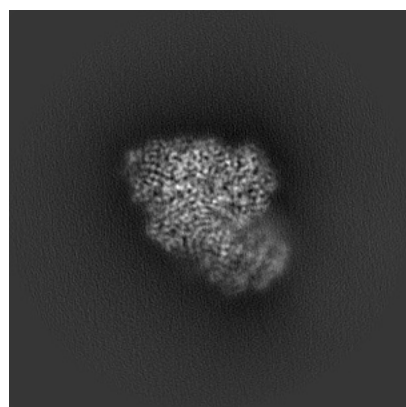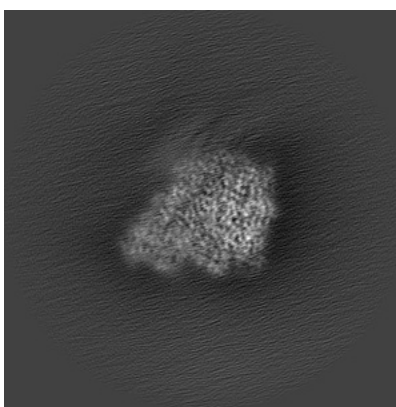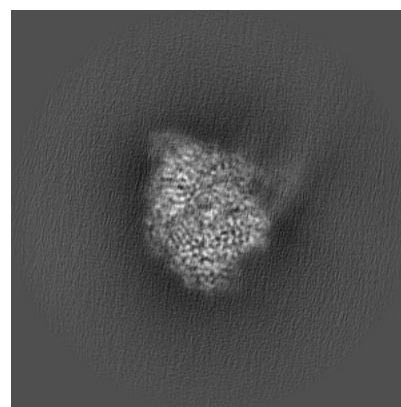
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
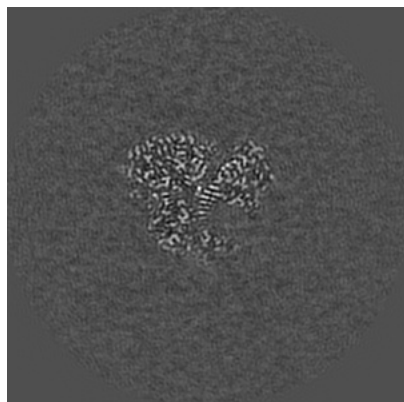
6.2.1 Primary map
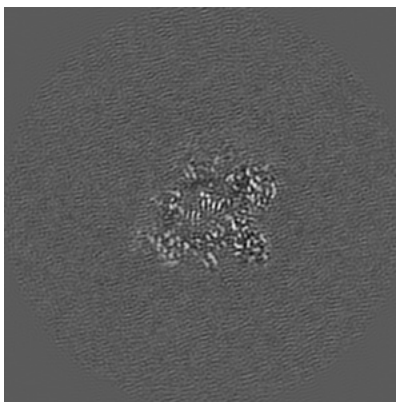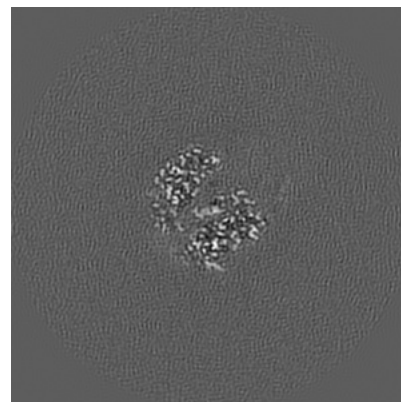
X Index: 156   Y Index: 156   Z Index: 156

6.2.2 Raw map
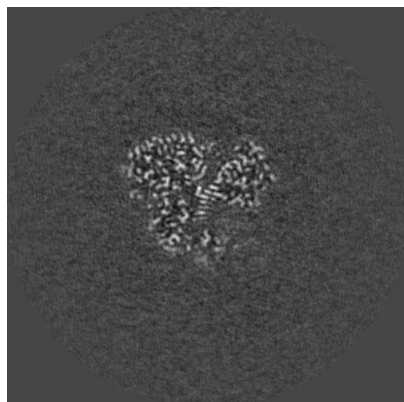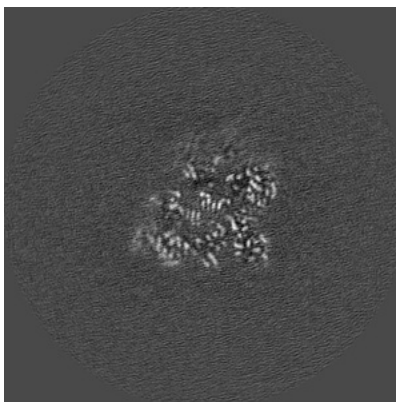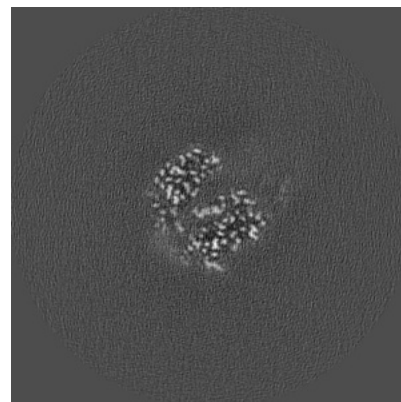
X Index: 156   Y Index: 156   Z Index: 156

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
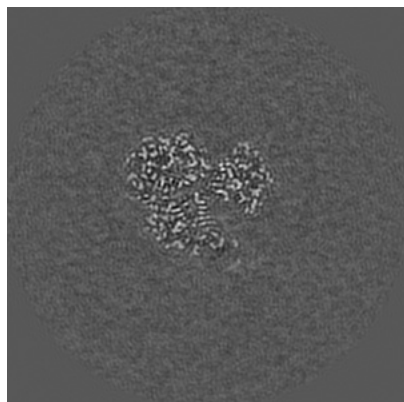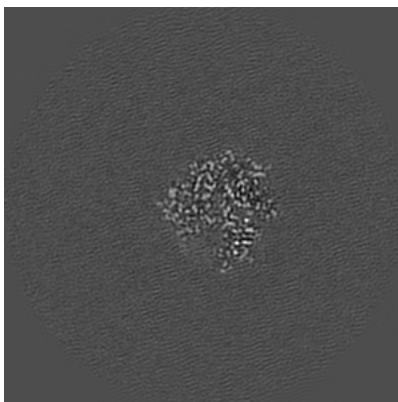
X Index: 152	Y Index: 134	Z Index: 188
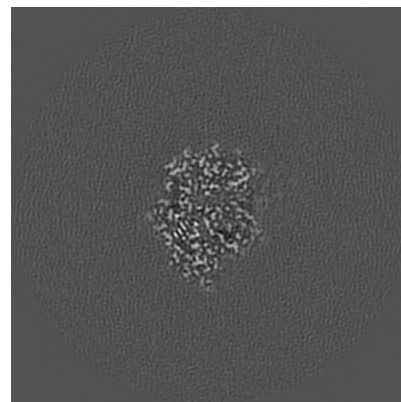
6.3.2 Raw map
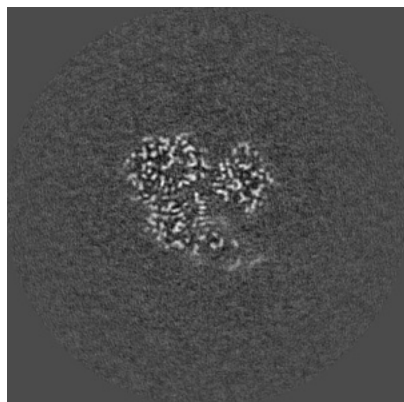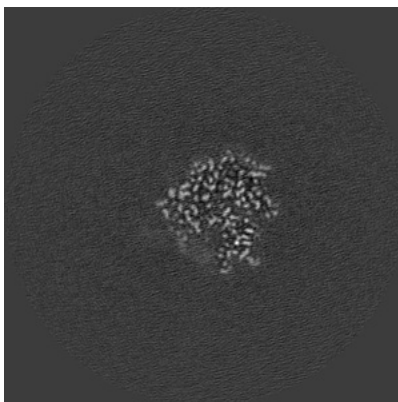
X Index: 152	Y Index: 135	Z Index: 174
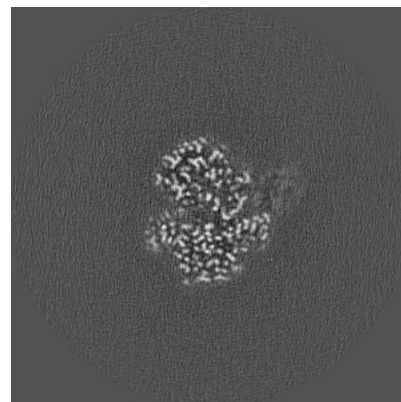
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map
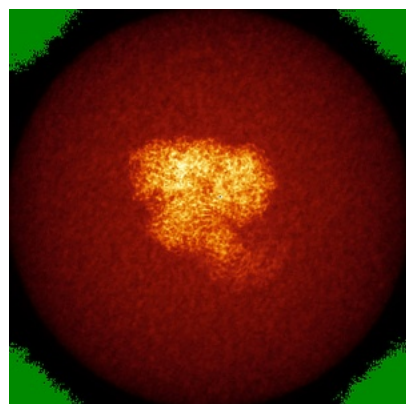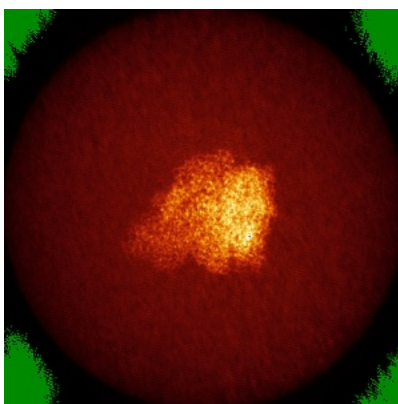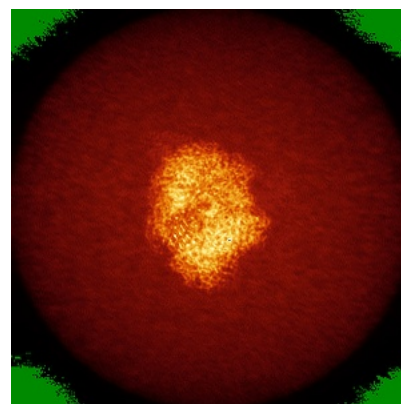
X   Y   Z

6.4.2 Raw map

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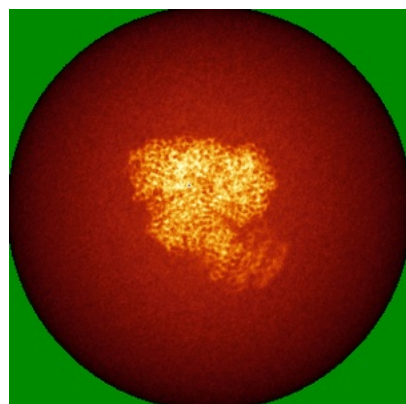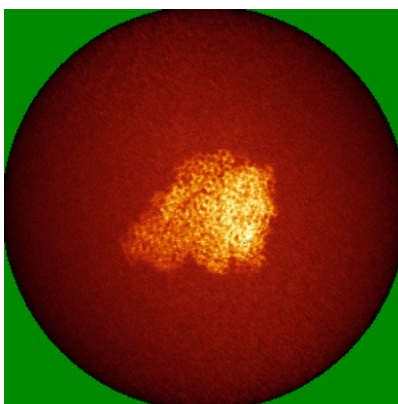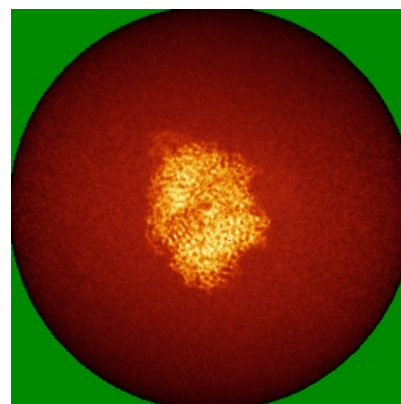
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5　Orthogonal surface views　(i)

6.5.1　Primary map
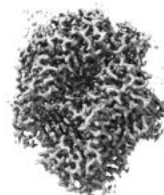
The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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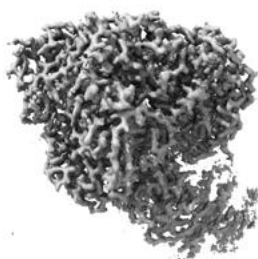
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6　Mask visualisation　(i)

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

7 Map analysis ⓘ

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

7.1 Map-value distribution ⓘ

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)
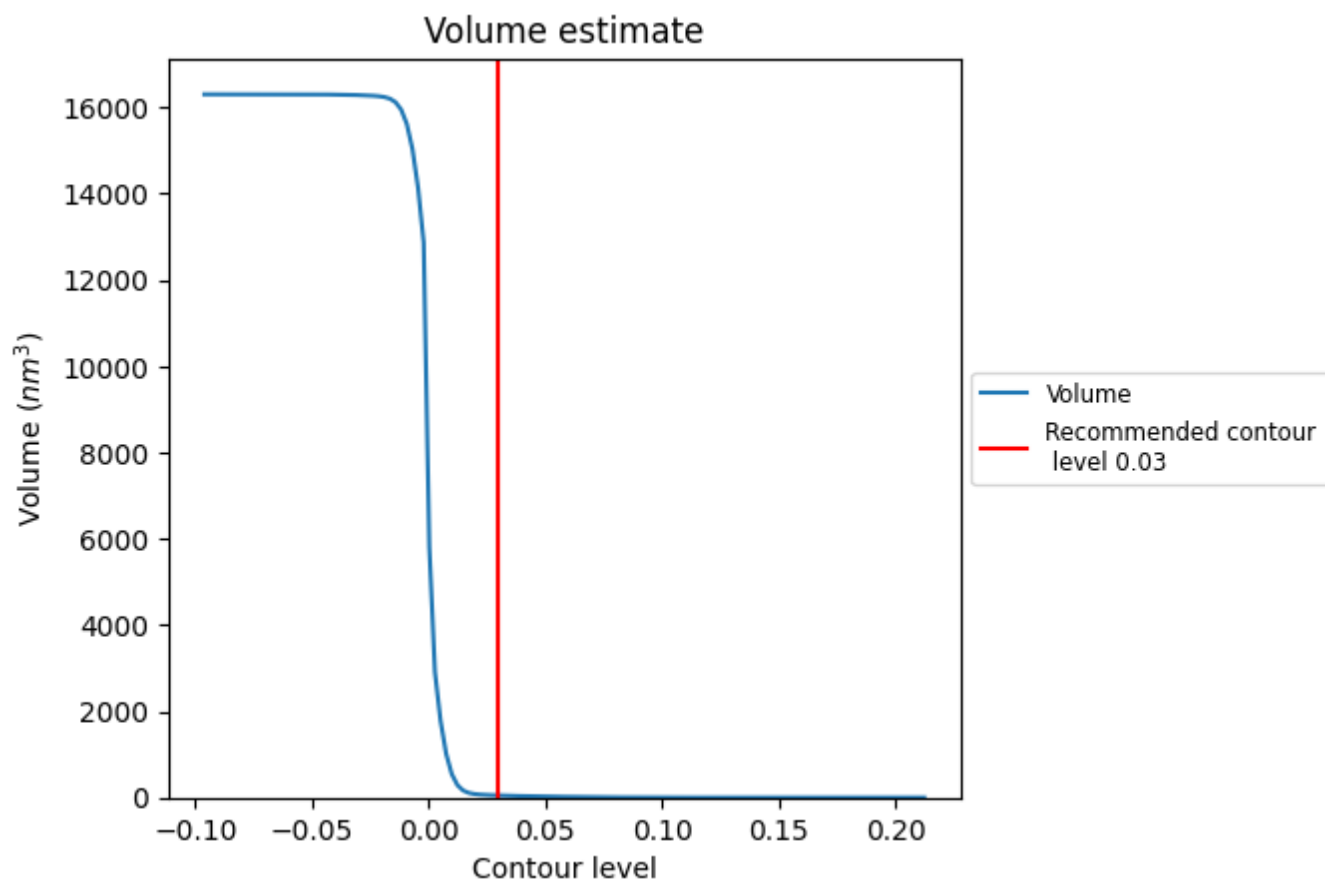
The volume at the recommended contour level is 49 nm^3; this corresponds to an approximate mass of 44 kDa.

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 ⓘ
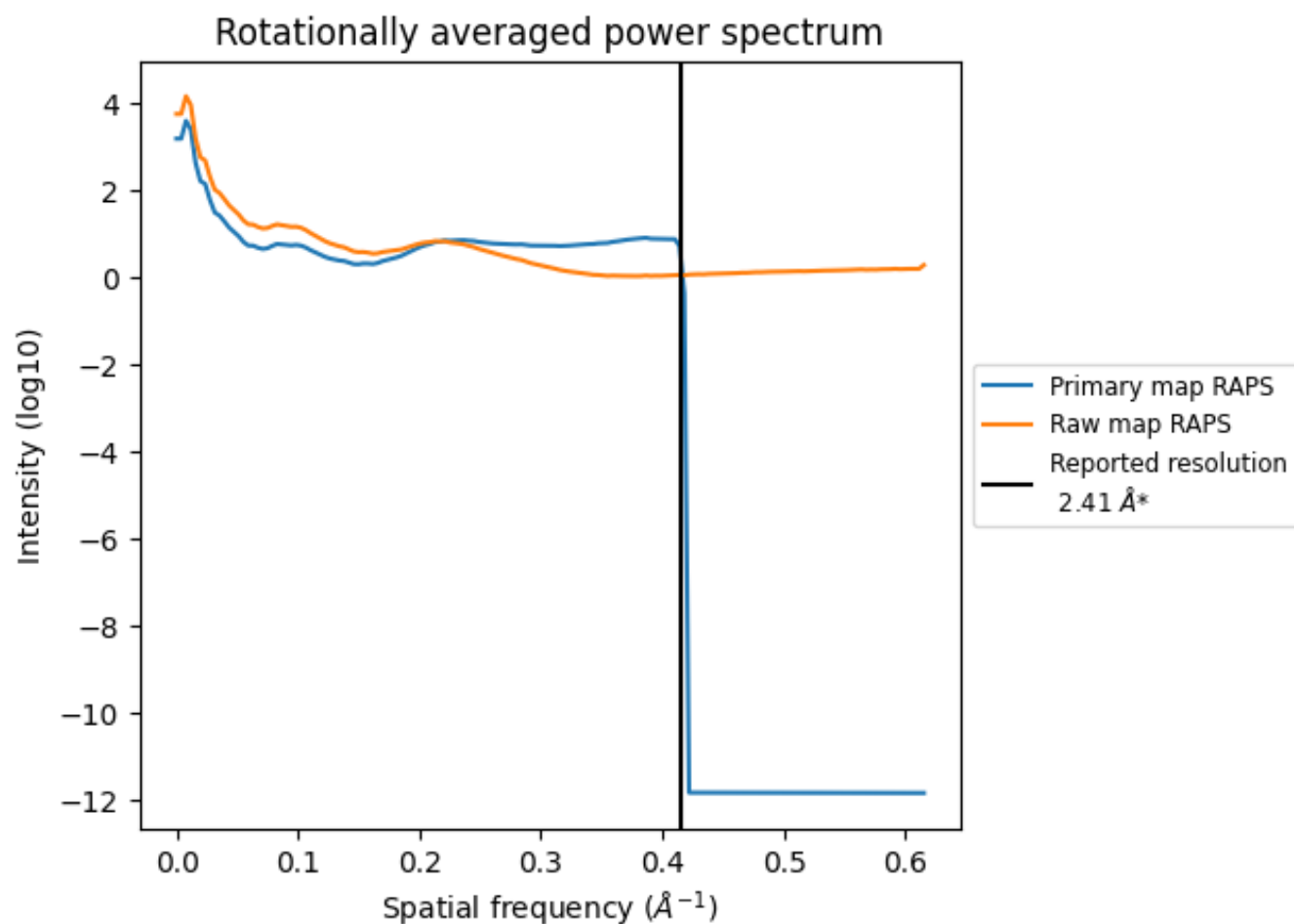
*Reported resolution corresponds to spatial frequency of 0.415 Å^{-1}

8 Fourier-Shell correlation ⓘ

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 ⓘ
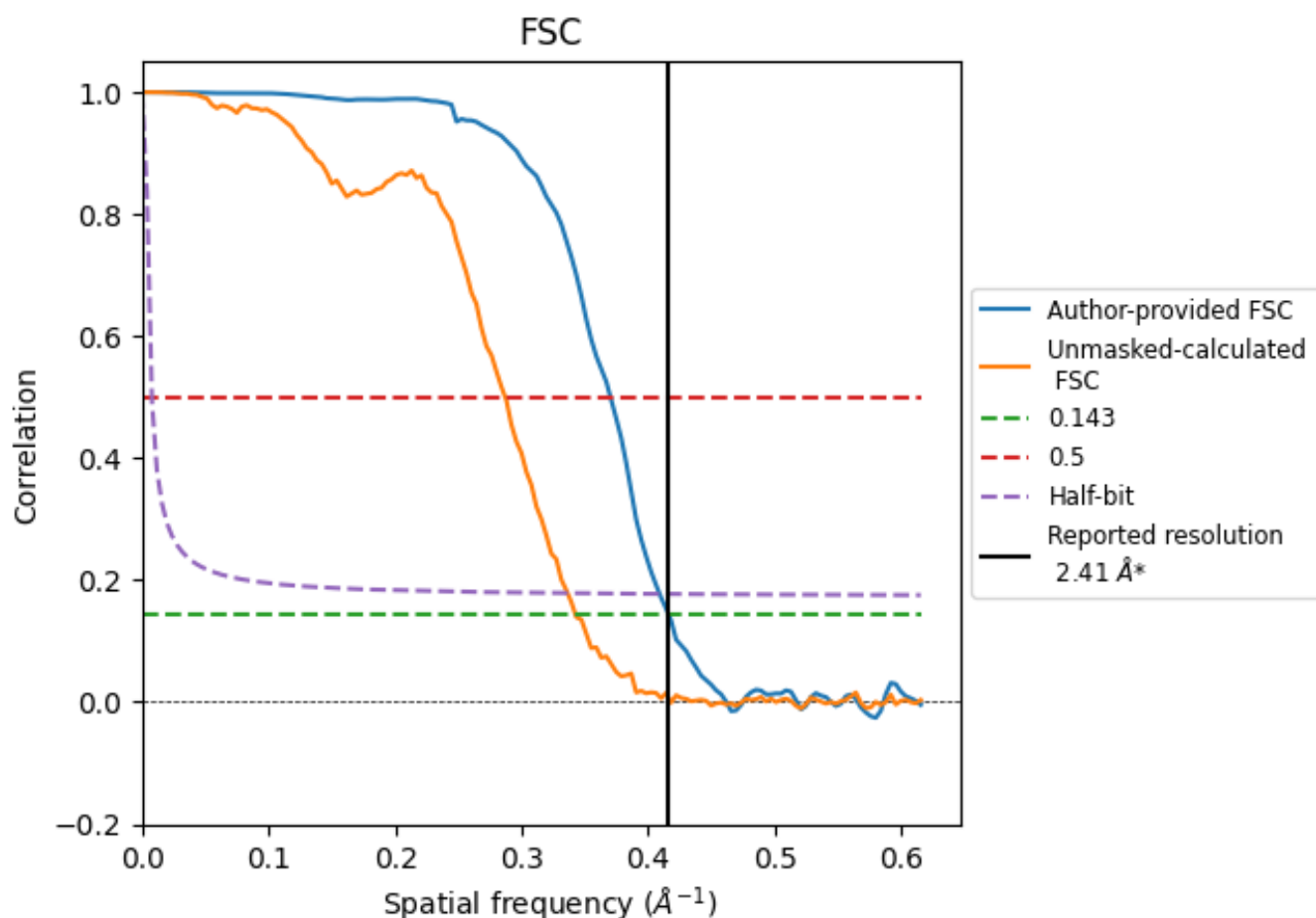
*Reported resolution corresponds to spatial frequency of 0.415 Å^{-1}

8.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.41	-	-
Author-provided FSC curve	2.40	2.70	2.45
Unmasked-calculated*	2.92	3.49	2.97

*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 2.92 differs from the reported value 2.41 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-10354 and PDB model 6SZU. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay ⓘ


X   Y   Z
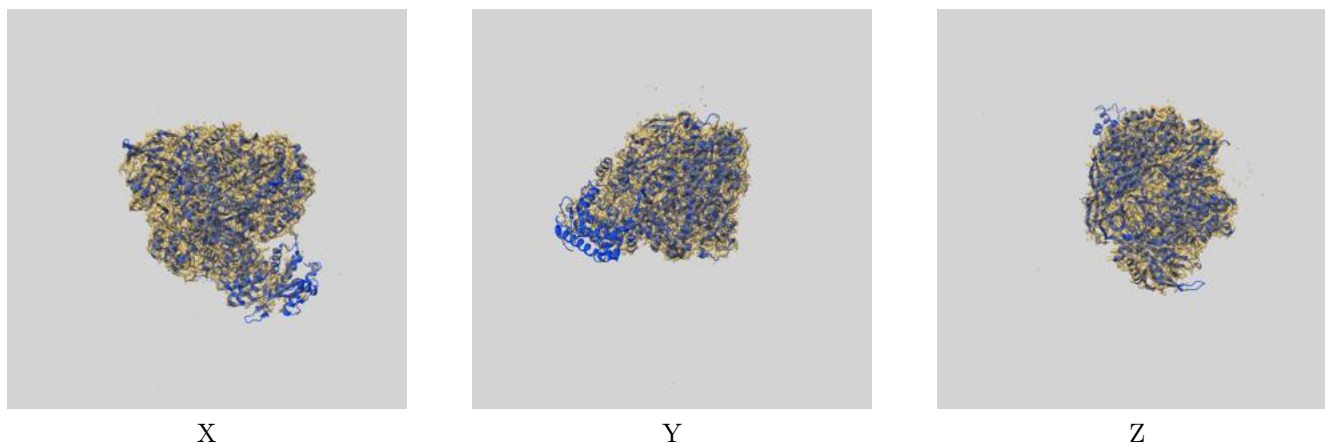
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2　Q-score mapped to coordinate model ⓘ

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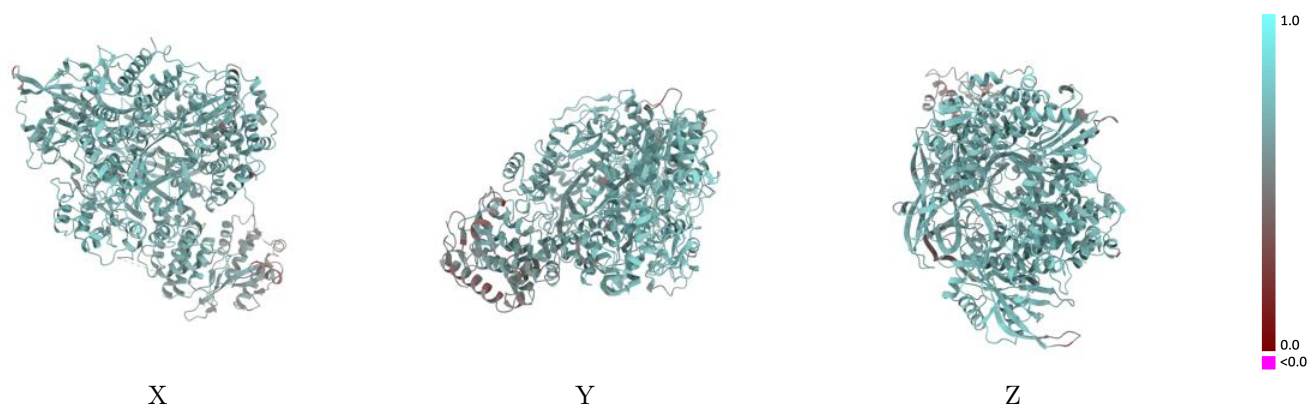
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3　Atom inclusion mapped to coordinate model ⓘ

X　　　　　　　　　　Y　　　　　　　　　　Z
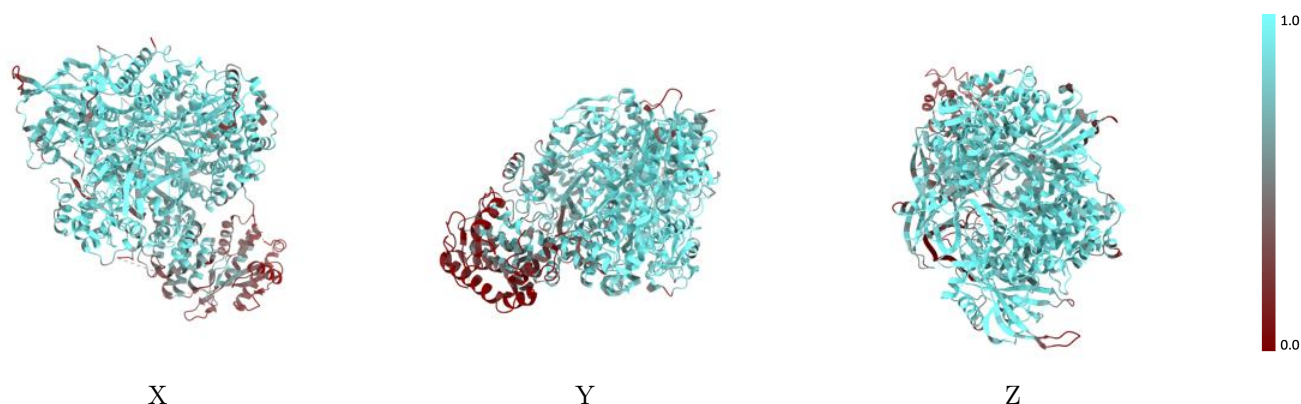
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.03).

9.4   Atom inclusion ⓘ
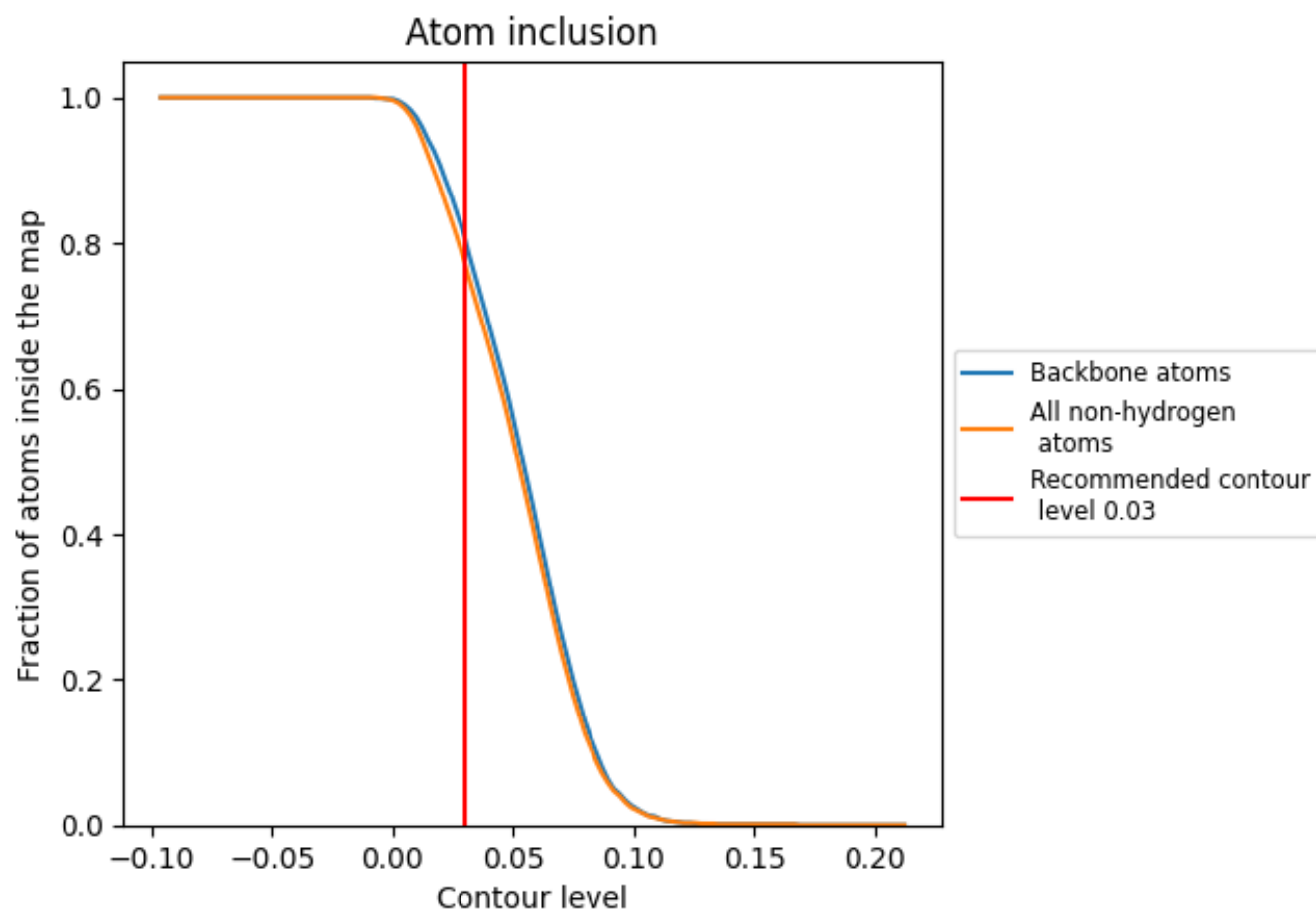
At the recommended contour level, 81% of all backbone atoms, 77% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7740	0.6650
A	0.6970	0.6460
B	0.8670	0.6890
C	0.7710	0.6650
M	0.8720	0.6850
V	0.7090	0.6270

1.0

0.0
<0.0