WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Feb 24, 2026 – 10:17 AM JST

PDB ID	:	9J9E / pdb_00009j9e
EMDB ID	:	EMD-61266
Title	:	Cryo-EM structure of the type VII CRISPR-Cas14 effector complex
Authors	:	Hiraizumi, M.; Yamashita, K.; Nishimasu, H.
Deposited on	:	2024-08-22
Resolution	:	2.97 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 (i) symbol.

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

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

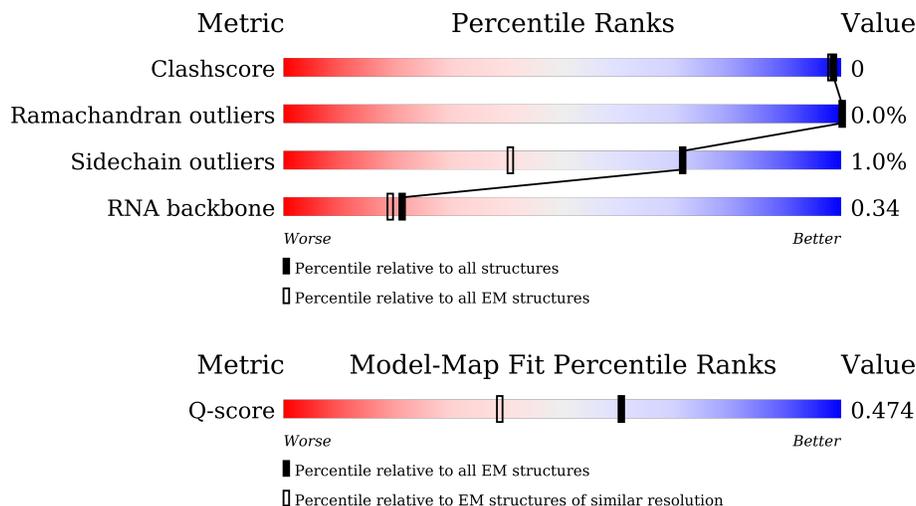|		
EMDB validation analysis	:	0.0.1.dev132
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.48.1

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 2.97 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.
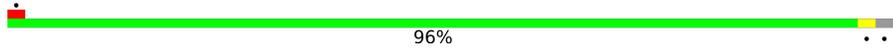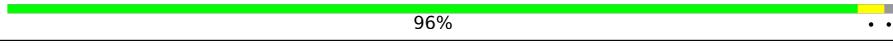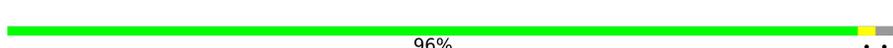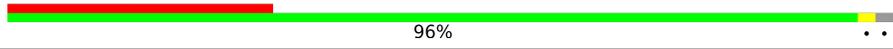
Metric	Percentile Ranks	Value
Clashscore		0
Ramachandran outliers		0.0%
Sidechain outliers		1.0%
RNA backbone		0.34

Worse ← → *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.474

Worse ← → *Better*

▮ Percentile relative to all EM structures
▯ Percentile relative to EM structures of similar resolution

Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
RNA backbone	6643	2191	-
Q-score	-	25397	13205 (2.47 - 3.47)

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	60	10%　38%　50%　12%
2	B	98	26%　14%　60%
3	C	240	95%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
4	D1	200	96%
4	D2	200	96%
4	D3	200	96%
4	D4	200	98%
4	D5	200	96%
4	D6	200	96%
4	D7	200	30% / 96%
4	D8	200	84% / 84% / 14%
5	E1	609	26% / 73%
5	E2	609	22% / 94%
5	E3	609	26% / 73%
5	E4	609	92%
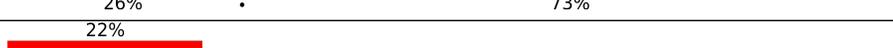
2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 28391 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called crRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	53	Total 1113	C 501	N 186	O 374	P 52	0	0

- Molecule 2 is a RNA chain called tgRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	39	Total 829	C 372	N 148	O 270	P 39	0	0

- Molecule 3 is a protein called Cas5.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	239	Total 1902	C 1234	N 311	O 351	S 6	0	0

- Molecule 4 is a protein called Cas7.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D1	197	Total 1533	C 956	N 275	O 294	S 8	0	0
4	D2	198	Total 1542	C 962	N 277	O 295	S 8	0	0
4	D3	198	Total 1542	C 962	N 277	O 295	S 8	0	0
4	D4	198	Total 1542	C 962	N 277	O 295	S 8	0	0
4	D5	197	Total 1533	C 956	N 275	O 294	S 8	0	0
4	D6	197	Total 1533	C 956	N 275	O 294	S 8	0	0
4	D7	197	Total 1533	C 956	N 275	O 294	S 8	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D8	171	Total 1322	C 828	N 232	O 254	S 8	0	0

- Molecule 5 is a protein called Cas14.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E1	165	Total 1399	C 898	N 236	O 258	S 7	0	0
5	E2	601	Total 4897	C 3106	N 827	O 946	S 18	0	0
5	E3	165	Total 1399	C 898	N 236	O 258	S 7	0	0
5	E4	583	Total 4759	C 3028	N 803	O 912	S 16	0	0

- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

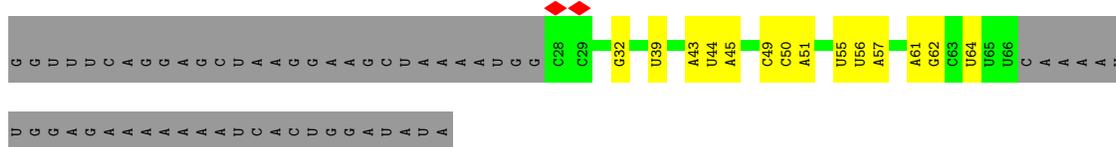| Mol	Chain	Residues	Atoms		AltConf
6	C	1	Total 1	Zn 1	0
6	D1	1	Total 1	Zn 1	0
6	D2	1	Total 1	Zn 1	0
6	D3	1	Total 1	Zn 1	0
6	D4	1	Total 1	Zn 1	0
6	D5	1	Total 1	Zn 1	0
6	D6	1	Total 1	Zn 1	0
6	D7	1	Total 1	Zn 1	0
6	D8	1	Total 1	Zn 1	0
6	E2	2	Total 2	Zn 2	0
6	E4	2	Total 2	Zn 2	0

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: crRNA

Chain A:

- Molecule 2: tgRNA

Chain B:

- Molecule 3: Cas5

Chain C:

- Molecule 4: Cas7

Chain D1:

- Molecule 4: Cas7

Chain D2:

MET ALA K3 F51 D72 D102 D131 N152 T195 K200

• Molecule 4: Cas7

Chain D3: 96%

MET ALA K3 F51 D72 D102 E111 R115 E187 K200

• Molecule 4: Cas7

Chain D4: 98%

MET ALA K3 D27 K28 E29 Q32 F51 D102 K200

• Molecule 4: Cas7

Chain D5: 96%

MET ALA LYS T4 F51 R56 R124 S130 K200

• Molecule 4: Cas7

Chain D6: 96%

MET ALA LYS T4 D27 F51 D102 E123 F133 K200

• Molecule 4: Cas7

Chain D7: 30% 96%

MET ALA LYS T4 E22 R25 E26 D27 K28 E29 A30 A31 Q32 K33 R34 V35 N36 F37 R40 K41 F51 K66 G67 E68 N69 D72 T73 G74 R83 D108 T109 K110 R115 E116 S117 T118 H119 L120 R121 I122 E123 R124 Q125 T126 K127 S128 A129 S130 D131 T132 F133

K134 G135 E136 E137 E140 G141 A142 N152 P153 Q154 E155 K156 E170 N171 G172 K179 R183 E187 V188 K189 K200

• Molecule 4: Cas7

Chain D8: 84% 84% 14%

MET ALA LYS T4 M5 K6 K7 I8 Y9 V10 T11 M12 K13 T14 L15 S16 P17 L18 Y19 T20 G21 E22 V23 R24 R25 E26 D27 LYS GLU ALA ALA GLN LYS ARG VAL N36 F37 P38 V39 R40 K41 T42 A43 T44 N45 K46 V47 L48 I49 P50 F51 K52 G53 A54 L55 R56 S57 A58 L59 E60

I61 M62 L63 K64 A65 K66 G67 E68 N69 V70 C71 D72 T73 G74 E75 S76 R77 A78 R79 P80 C81 G82 R83 C84 V85 T86 C87 S88 L89 F90 G91 S92 M93 G97 R98 A99 S100 V101 D102 F103 L104 I105 S106 N107 D108 T109 K110 E111 Q112 I113 V114 R115 E116 SER THR HIS LEU ARG ILE

GLU ARG GLN THR LYS SER ALA ASP THR PHE LYS G135 E136 E137 V138 I139 E140 G141 A142 T143 F144 T145 A146 I147 I148 T149 I150 S151 N152 P153 Q154 E155 K156 D157 L158 S159 L160 I161 Q162 S163 A164 L165 K166 F167 I168 E169 E170 N171 Q172 I173 G174 G175 W176 L177 N178 K179 G180 Y181 G182

R183 V184 S185 F186 E187 V188 K189 S190 E191 D192 V193 A194 T195 D196 R197 F198 L199 K200

• Molecule 5: Cas14

Chain E1: 26% · 73%

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

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

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

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

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

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

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

GLU ASN TYR SER GLN GLY LYS GLU ILE LEU ILE E432 D463 D464 D470 A491 GLU ASP PHE SER THR ASP GLN ASN GLU ASP SER MET ALA L505 K528 F538 A545 D573 K592 L609

• Molecule 5: Cas14

Chain E2: 22% 94%

M1 S9 Q33 E34 K35 G36 I37 E38 K39 D40 F97 E105 E106 N107 N108 D109 I110 D126 D169 L177 M178 D179 H203 D204 S205 S206 D207 R208 D209 E213 K216 T217 T218 C219 E220 N221 Q222 G223 K224 V225 L226 I227 P228 I232 G233 R234 L239 Y240

T241 N244 Y245 N246 F247 N248 Y252 I253 D254 M257 G258 K266 E267 Y268 N269 L272 K273 K274 R277 R278 I281 T282 D283 F286 N287 N288 K289 Y290 I291 A292 I293 N294 T295 S296 N297 Q298 S299 K300 E301 L302 S303 N304 S305 K306 E307 P308 A309 V310 I311 I312 S313 A314

S315 G316 M317 L318 E319 G320 G321 R322 I323 L324 N325 H326 L327 E328 Q329 I330 K331 N332 D333 E334 N335 S336 T337 L338 I339 F340 V341 G342 Y343 Q344 A345 Q346 N347 T348 R349 G350 R351 K352 I353 L354 D355 G356 E357 E358 K359 V360 R361 C362 R363 I364 E365 K366 L367 N368 S369 D375 Y423 SER

• Molecule 5: Cas14

Chain E3:

• Molecule 5: Cas14

Chain E4:

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	74619	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.401	Depositor
Minimum map value	-0.147	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	398.40015, 398.40015, 398.40015	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.106667, 1.106667, 1.106667	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	0.62	0/1242	0.93	0/1930
2	B	0.64	0/927	0.92	1/1441 (0.1%)
3	C	0.79	0/1937	1.26	5/2595 (0.2%)
4	D1	0.71	0/1552	1.34	4/2081 (0.2%)
4	D2	0.70	0/1561	1.35	5/2092 (0.2%)
4	D3	0.69	0/1561	1.32	4/2092 (0.2%)
4	D4	0.68	0/1561	1.34	4/2092 (0.2%)
4	D5	0.69	0/1552	1.33	1/2081 (0.0%)
4	D6	0.70	0/1552	1.30	4/2081 (0.2%)
4	D7	0.73	0/1552	1.32	3/2081 (0.1%)
4	D8	0.75	0/1337	1.32	3/1792 (0.2%)
5	E1	0.73	0/1430	1.32	4/1925 (0.2%)
5	E2	0.73	0/4986	1.30	11/6719 (0.2%)
5	E3	0.73	0/1430	1.33	1/1925 (0.1%)
5	E4	0.72	0/4846	1.28	13/6529 (0.2%)
All	All	0.71	0/29026	1.28	63/39456 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
5	E1	0	1

There are no bond length outliers.

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	D7	51	PHE	CA-CB-CG	7.08	120.88	113.80

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D8	51	PHE	CA-CB-CG	7.04	120.84	113.80
4	D3	102	ASP	CB-CA-C	6.91	121.92	109.83
4	D7	152	ASN	CB-CA-C	6.67	116.81	111.00
4	D1	51	PHE	CA-CB-CG	6.65	120.45	113.80
4	D8	152	ASN	CB-CA-C	6.58	116.72	111.00
4	D1	152	ASN	CB-CA-C	6.57	116.71	111.00
4	D4	102	ASP	CA-CB-CG	6.57	119.17	112.60
4	D5	51	PHE	CA-CB-CG	6.44	120.24	113.80
5	E2	375	ASP	CA-CB-CG	6.40	119.00	112.60
5	E2	493	ASP	CA-CB-CG	6.37	118.97	112.60
5	E4	375	ASP	CA-CB-CG	6.35	118.95	112.60
4	D3	51	PHE	CA-CB-CG	6.34	120.14	113.80
4	D6	51	PHE	CA-CB-CG	6.32	120.11	113.80
3	C	54	PHE	CA-CB-CG	6.28	120.08	113.80
4	D2	51	PHE	CA-CB-CG	6.26	120.06	113.80
5	E2	97	PHE	CA-CB-CG	6.25	120.05	113.80
5	E2	464	ASP	CA-CB-CG	6.13	118.73	112.60
4	D4	51	PHE	CA-CB-CG	6.12	119.92	113.80
5	E4	143	PHE	CA-CB-CG	6.09	119.89	113.80
4	D3	102	ASP	CA-CB-CG	6.03	118.63	112.60
4	D2	152	ASN	CB-CA-C	6.00	116.22	111.00
5	E4	97	PHE	CA-CB-CG	5.96	119.76	113.80
4	D7	140	GLU	N-CA-CB	5.95	118.74	110.17
5	E2	169	ASP	CA-CB-CG	5.91	118.51	112.60
5	E2	570	ASP	CA-CB-CG	5.86	118.46	112.60
3	C	147	ASN	CA-CB-CG	5.73	118.33	112.60
5	E4	442	ASP	CA-CB-CG	5.66	118.26	112.60
5	E4	511	ASP	CA-CB-CG	5.58	118.18	112.60
4	D6	133	PHE	CA-CB-CG	5.55	119.36	113.80
4	D4	102	ASP	CB-CA-C	5.50	119.45	109.83
5	E2	281	ILE	N-CA-C	-5.48	106.33	111.48
5	E1	470	ASP	CA-CB-CG	5.45	118.05	112.60
4	D1	196	ASP	CA-CB-CG	5.43	118.03	112.60
5	E4	66	ASP	CA-CB-CG	5.36	117.96	112.60
4	D2	131	ASP	CA-CB-CG	5.32	117.92	112.60
3	C	19	ASP	CA-CB-CG	5.31	117.91	112.60
5	E2	126	ASP	CA-CB-CG	5.30	117.90	112.60
5	E4	126	ASP	CA-CB-CG	5.30	117.90	112.60
4	D2	72	ASP	CA-CB-CG	5.29	117.89	112.60
5	E4	129	ASP	CA-CB-CG	5.26	117.86	112.60
3	C	171	ASP	CA-CB-CG	5.25	117.85	112.60
2	B	61	A	O3'-P-O5'	-5.21	96.18	104.00

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E2	179	ASP	CA-CB-CG	5.19	117.79	112.60
4	D2	102	ASP	CA-CB-CG	5.17	117.77	112.60
5	E2	333	ASP	CA-CB-CG	5.17	117.77	112.60
5	E1	573	ASP	CA-CB-CG	5.16	117.75	112.60
5	E2	501	ASP	CA-CB-CG	5.14	117.74	112.60
3	C	57	ASP	CA-CB-CG	5.13	117.73	112.60
4	D4	27	ASP	CA-CB-CG	5.10	117.70	112.60
5	E4	138	ASP	CA-CB-CG	5.10	117.70	112.60
4	D1	102	ASP	CA-CB-CG	5.09	117.69	112.60
4	D6	27	ASP	CA-CB-CG	5.08	117.68	112.60
4	D6	102	ASP	CA-CB-CG	5.07	117.67	112.60
5	E4	608	LYS	CB-CA-C	5.05	117.92	111.40
5	E4	179	ASP	CA-CB-CG	5.05	117.65	112.60
5	E3	475	ASP	CA-CB-CG	5.05	117.65	112.60
4	D3	72	ASP	CA-CB-CG	5.04	117.64	112.60
5	E4	507	ASP	CA-CB-CG	5.04	117.64	112.60
5	E1	464	ASP	CA-CB-CG	5.02	117.62	112.60
5	E1	463	ASP	CA-CB-CG	5.02	117.62	112.60
4	D8	140	GLU	N-CA-CB	5.01	117.40	110.04
5	E4	333	ASP	CA-CB-CG	5.01	117.61	112.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	E1	505	LEU	Peptide

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	1113	0	564	0	0
2	B	829	0	419	0	0
3	C	1902	0	1957	0	0
4	D1	1533	0	1568	0	0
4	D2	1542	0	1581	0	0
4	D3	1542	0	1581	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D4	1542	0	1581	0	0
4	D5	1533	0	1568	0	0
4	D6	1533	0	1568	0	0
4	D7	1533	0	1568	0	0
4	D8	1322	0	1345	0	0
5	E1	1399	0	1383	1	0
5	E2	4897	0	4870	3	0
5	E3	1399	0	1383	1	0
5	E4	4759	0	4758	2	0
6	C	1	0	0	0	0
6	D1	1	0	0	0	0
6	D2	1	0	0	0	0
6	D3	1	0	0	0	0
6	D4	1	0	0	0	0
6	D5	1	0	0	0	0
6	D6	1	0	0	0	0
6	D7	1	0	0	0	0
6	D8	1	0	0	0	0
6	E2	2	0	0	0	0
6	E4	2	0	0	0	0
All	All	28391	0	27694	8	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 0.

All (8) 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)
5:E2:177:LEU:O	5:E2:272:LEU:HA	2.19	0.43
5:E2:225:VAL:N	5:E2:309:ALA:O	2.50	0.43
4:D3:111:GLU:O	4:D3:115:ARG:NH2	2.51	0.42
5:E4:225:VAL:N	5:E4:309:ALA:O	2.50	0.42
5:E2:538:PHE:HA	5:E2:545:ALA:HB2	2.02	0.41
5:E3:538:PHE:HA	5:E3:545:ALA:HB2	2.03	0.41
5:E1:538:PHE:HA	5:E1:545:ALA:HB2	2.03	0.41
5:E4:538:PHE:HA	5:E4:545:ALA:HB2	2.04	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	
3	C	237/240 (99%)	225 (95%)	12 (5%)	0	100	100
4	D1	195/200 (98%)	192 (98%)	3 (2%)	0	100	100
4	D2	196/200 (98%)	194 (99%)	2 (1%)	0	100	100
4	D3	196/200 (98%)	194 (99%)	2 (1%)	0	100	100
4	D4	196/200 (98%)	194 (99%)	2 (1%)	0	100	100
4	D5	195/200 (98%)	193 (99%)	2 (1%)	0	100	100
4	D6	195/200 (98%)	193 (99%)	2 (1%)	0	100	100
4	D7	195/200 (98%)	191 (98%)	3 (2%)	1 (0%)	25	59
4	D8	165/200 (82%)	161 (98%)	4 (2%)	0	100	100
5	E1	161/609 (26%)	158 (98%)	3 (2%)	0	100	100
5	E2	597/609 (98%)	552 (92%)	45 (8%)	0	100	100
5	E3	161/609 (26%)	156 (97%)	5 (3%)	0	100	100
5	E4	577/609 (95%)	541 (94%)	36 (6%)	0	100	100
All	All	3266/4276 (76%)	3144 (96%)	121 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D7	74	GLY

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	
3	C	208/209 (100%)	202 (97%)	6 (3%)	37	68
4	D1	168/170 (99%)	167 (99%)	1 (1%)	84	92
4	D2	169/170 (99%)	168 (99%)	1 (1%)	84	92
4	D3	169/170 (99%)	168 (99%)	1 (1%)	84	92
4	D4	169/170 (99%)	169 (100%)	0	100	100
4	D5	168/170 (99%)	165 (98%)	3 (2%)	54	79
4	D6	168/170 (99%)	168 (100%)	0	100	100
4	D7	168/170 (99%)	168 (100%)	0	100	100
4	D8	145/170 (85%)	145 (100%)	0	100	100
5	E1	156/558 (28%)	153 (98%)	3 (2%)	52	77
5	E2	550/558 (99%)	540 (98%)	10 (2%)	54	79
5	E3	156/558 (28%)	154 (99%)	2 (1%)	65	84
5	E4	535/558 (96%)	532 (99%)	3 (1%)	84	92
All	All	2929/3801 (77%)	2899 (99%)	30 (1%)	71	87

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	2	LYS
3	C	112	GLU
3	C	114	LYS
3	C	125	GLU
3	C	147	ASN
3	C	209	LYS
4	D1	13	LYS
4	D2	195	THR
4	D3	187	GLU
4	D5	56	ARG
4	D5	124	ARG
4	D5	130	SER
5	E1	505	LEU
5	E1	528	LYS
5	E1	592	LYS
5	E2	9	SER
5	E2	274	LYS
5	E2	330	ILE
5	E2	432	GLU
5	E2	464	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	E2	492	GLU
5	E2	514	ILE
5	E2	532	LYS
5	E2	578	LYS
5	E2	609	LEU
5	E3	434	LYS
5	E3	485	MET
5	E4	330	ILE
5	E4	439	ILE
5	E4	529	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
4	D1	162	GLN
4	D2	119	HIS
4	D2	162	GLN
4	D3	152	ASN
4	D3	162	GLN
4	D4	162	GLN
4	D5	162	GLN
4	D6	45	ASN
4	D6	162	GLN
4	D8	152	ASN
4	D8	162	GLN
4	D8	171	ASN
5	E1	438	ASN
5	E1	440	ASN
5	E1	488	GLN
5	E2	98	ASN
5	E2	101	GLN
5	E2	132	ASN
5	E2	163	ASN
5	E2	269	ASN
5	E2	438	ASN
5	E2	446	ASN
5	E2	472	ASN
5	E2	529	ASN
5	E2	600	ASN
5	E3	438	ASN
5	E3	574	ASN
5	E4	42	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	E4	98	ASN
5	E4	160	HIS
5	E4	175	GLN
5	E4	287	ASN
5	E4	298	GLN
5	E4	329	GLN
5	E4	440	ASN
5	E4	446	ASN
5	E4	585	ASN

5.3.3　RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	52/60 (86%)	24 (46%)	19 (36%)
2	B	38/98 (38%)	12 (31%)	3 (7%)
All	All	90/158 (56%)	36 (40%)	22 (24%)

All (36) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	8	A
1	A	9	C
1	A	10	U
1	A	11	A
1	A	15	U
1	A	16	U
1	A	17	U
1	A	22	C
1	A	23	A
1	A	28	C
1	A	29	C
1	A	33	U
1	A	34	U
1	A	35	A
1	A	38	U
1	A	39	G
1	A	41	C
1	A	44	C
1	A	45	U
1	A	46	C
1	A	47	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	51	A
1	A	52	A
1	A	53	G
2	B	32	G
2	B	39	U
2	B	43	A
2	B	44	U
2	B	45	A
2	B	50	C
2	B	51	A
2	B	55	U
2	B	56	U
2	B	57	A
2	B	62	G
2	B	64	U

All (22) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	8	A
1	A	9	C
1	A	10	U
1	A	14	C
1	A	16	U
1	A	20	A
1	A	22	C
1	A	26	G
1	A	28	C
1	A	32	A
1	A	33	U
1	A	34	U
1	A	38	U
1	A	40	A
1	A	44	C
1	A	45	U
1	A	46	C
1	A	50	U
1	A	52	A
2	B	43	A
2	B	49	C
2	B	55	U

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 ⓘ

Of 13 ligands modelled in this entry, 13 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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-61266. 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
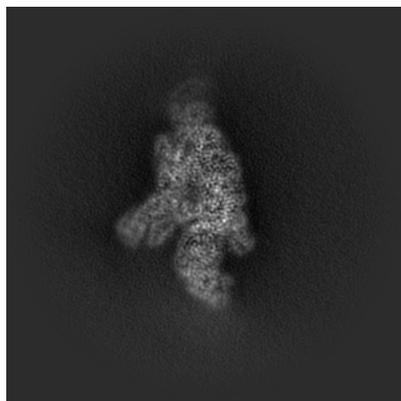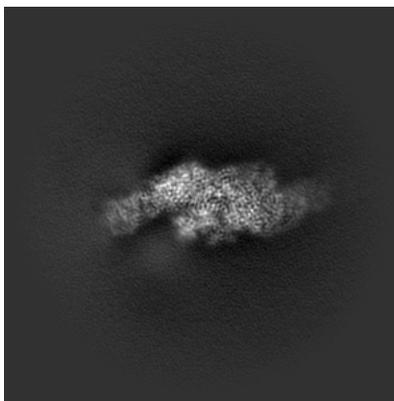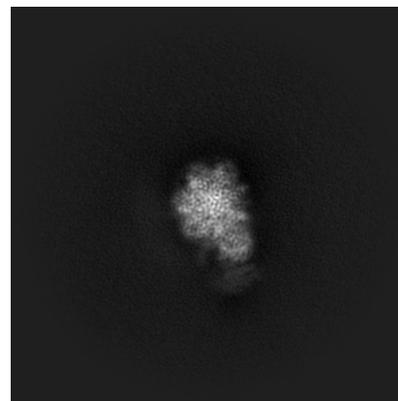
| X | Y | Z |

6.1.2 Raw map

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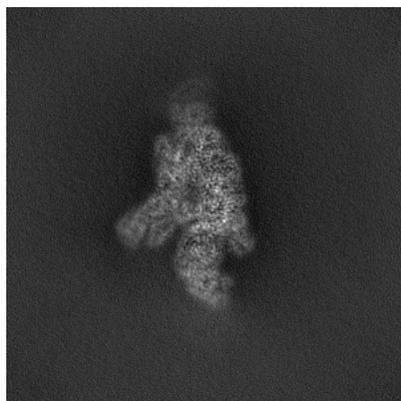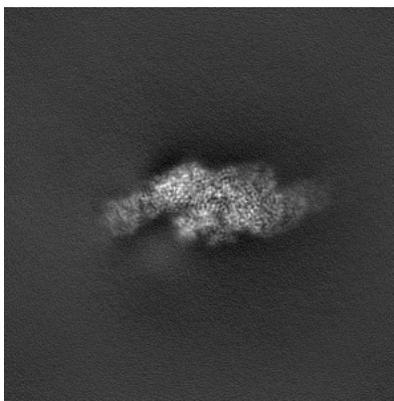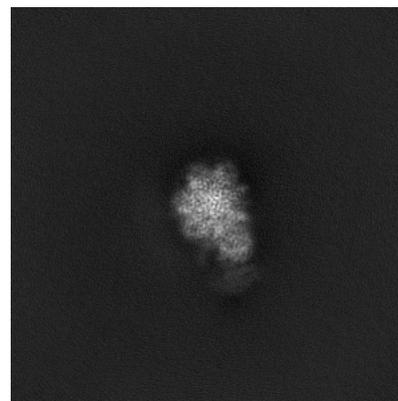
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
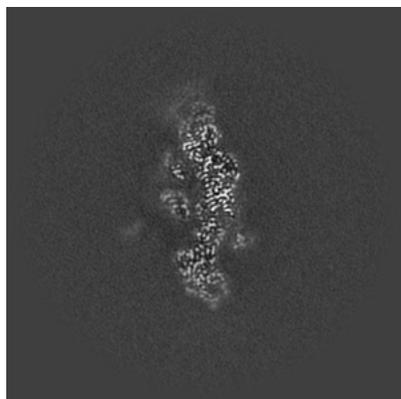
6.2.1 Primary map

X Index: 180
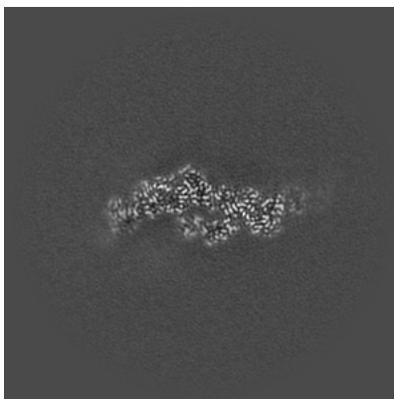
Y Index: 180
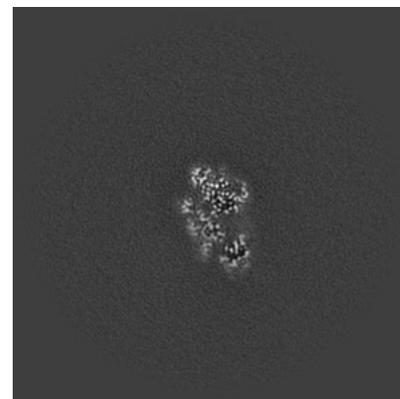
Z Index: 180

6.2.2 Raw map
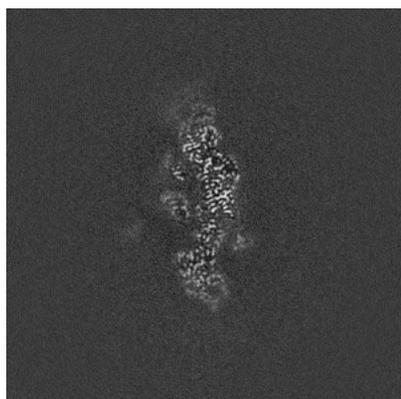
X Index: 180
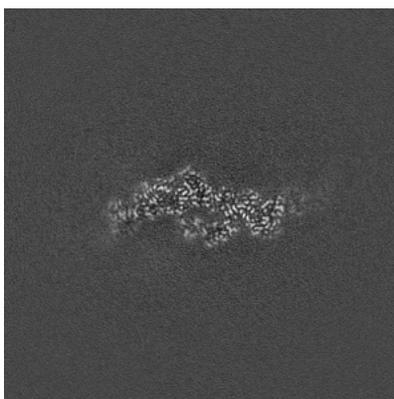
Y Index: 180
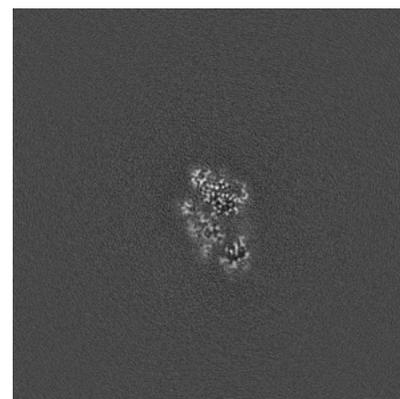
Z Index: 180

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
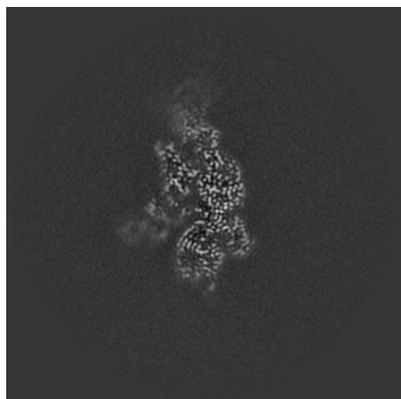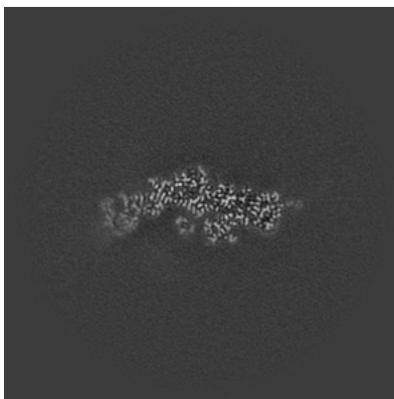
| X Index: 189 | Y Index: 187 | Z Index: 172 |
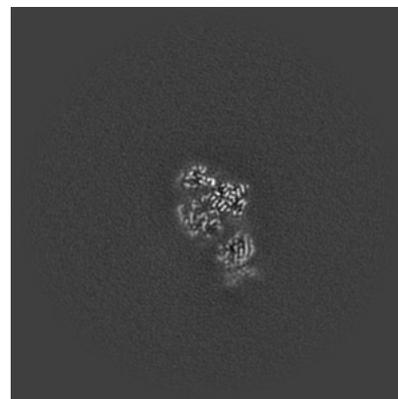
6.3.2 Raw map
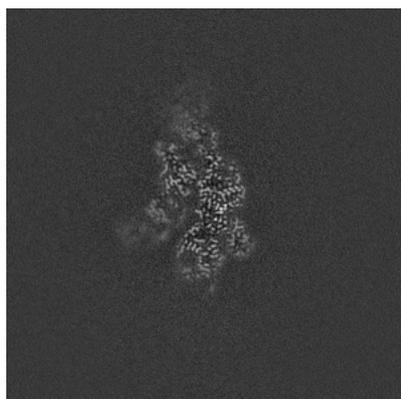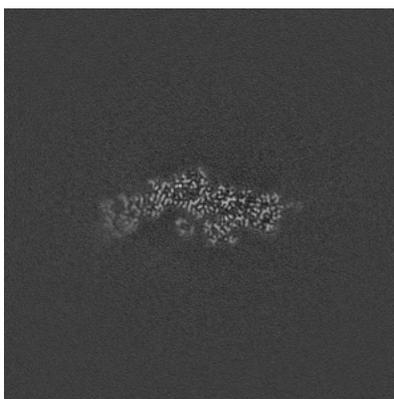
| X Index: 190 | Y Index: 187 | Z Index: 172 |
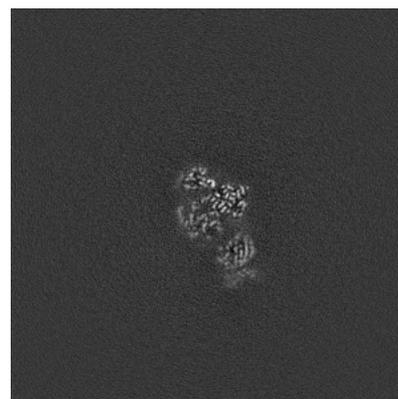
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map

X	Y	Z

6.4.2 Raw map

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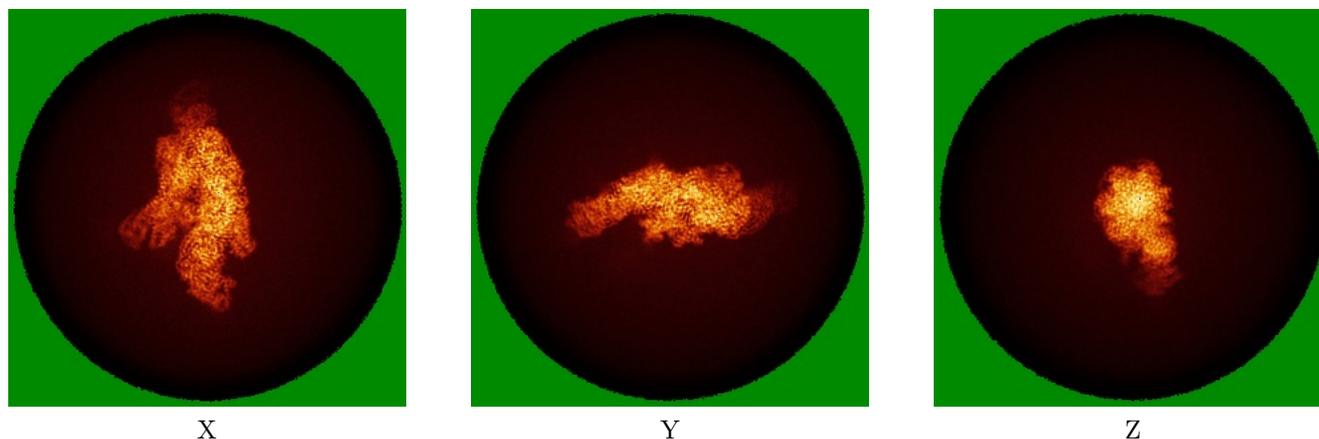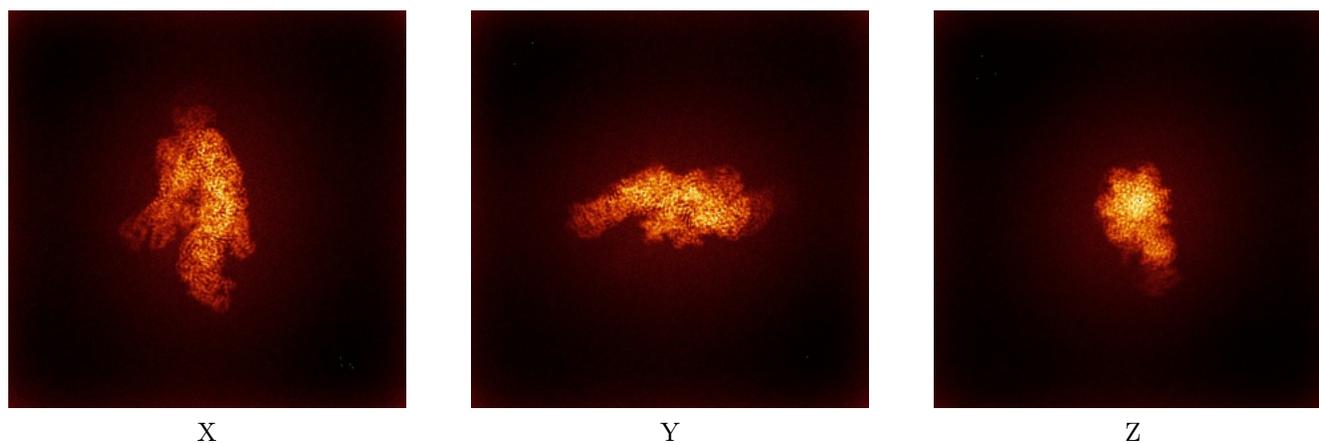
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

X	Y	Z
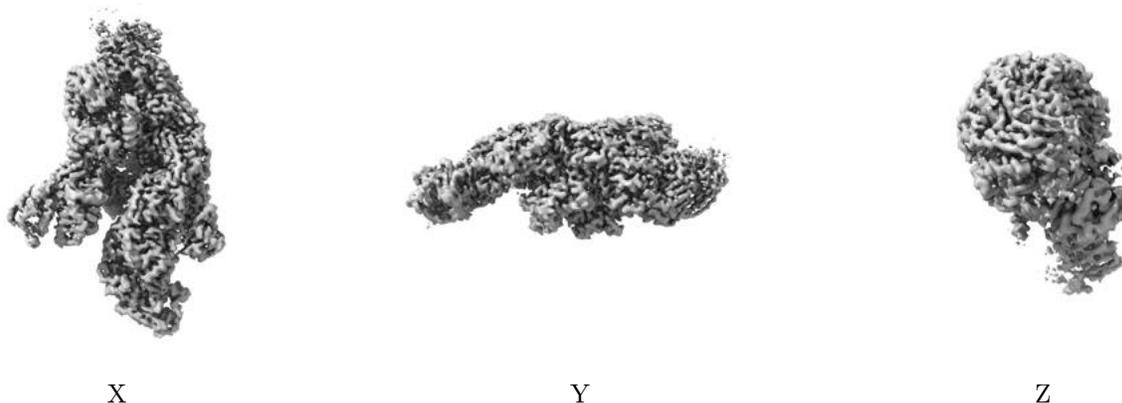
The images above show the 3D surface view of the map at the recommended contour level 0.05. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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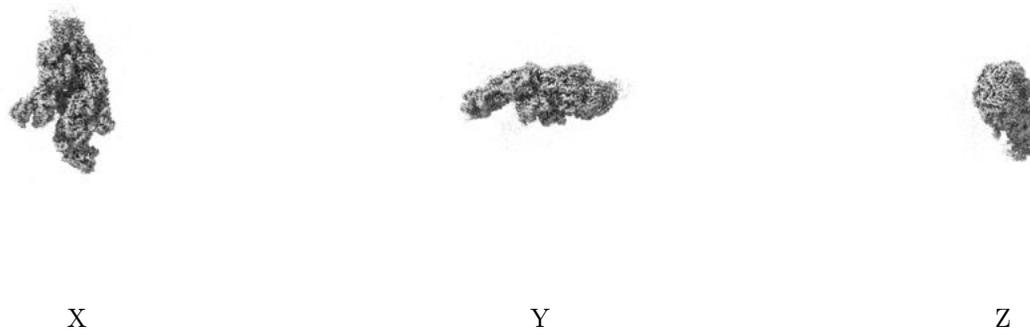
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation (i)

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

A mask typically either:

- Encompasses the whole structure

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

6.6.1 emd_61266_msk_1.map (i)

X   Y   Z
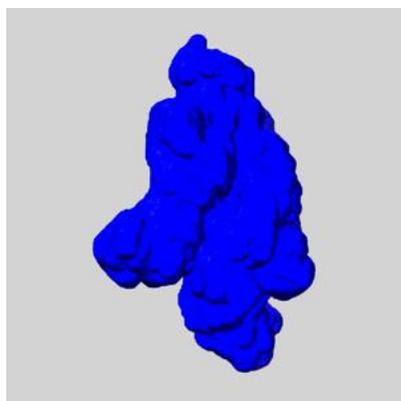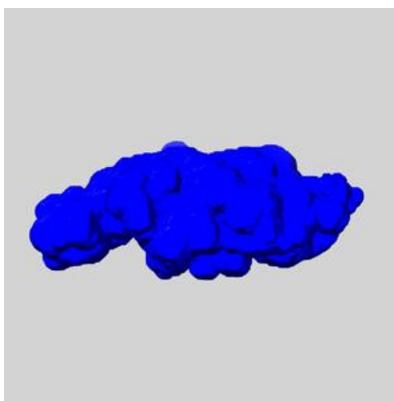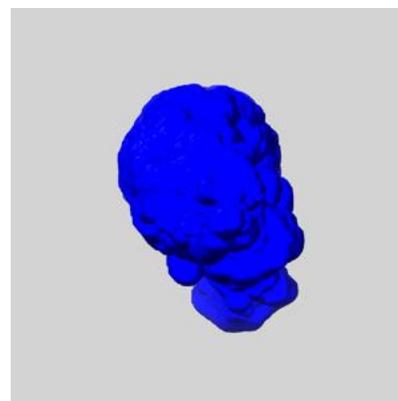
7 Map analysis ⓘ

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

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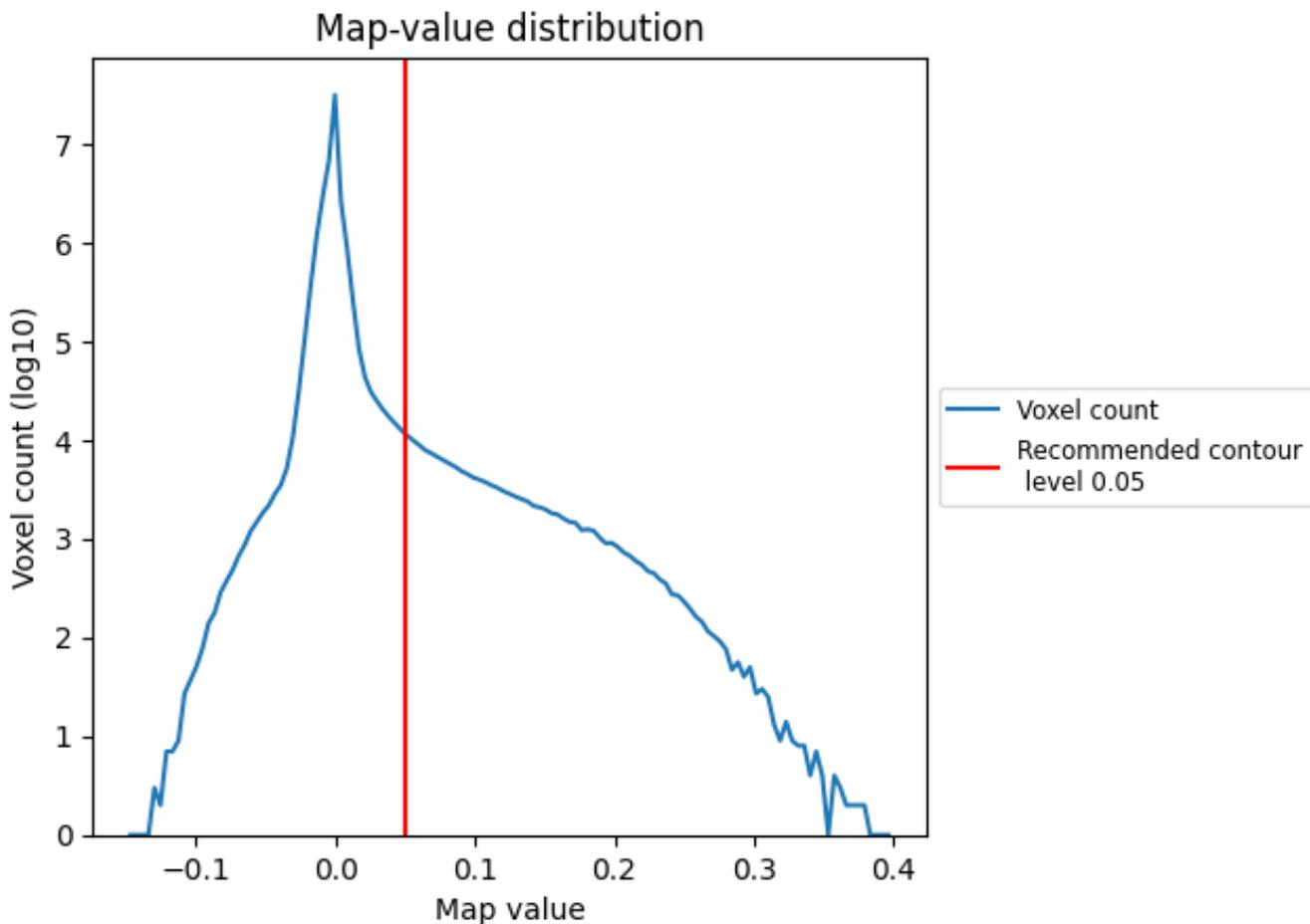
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
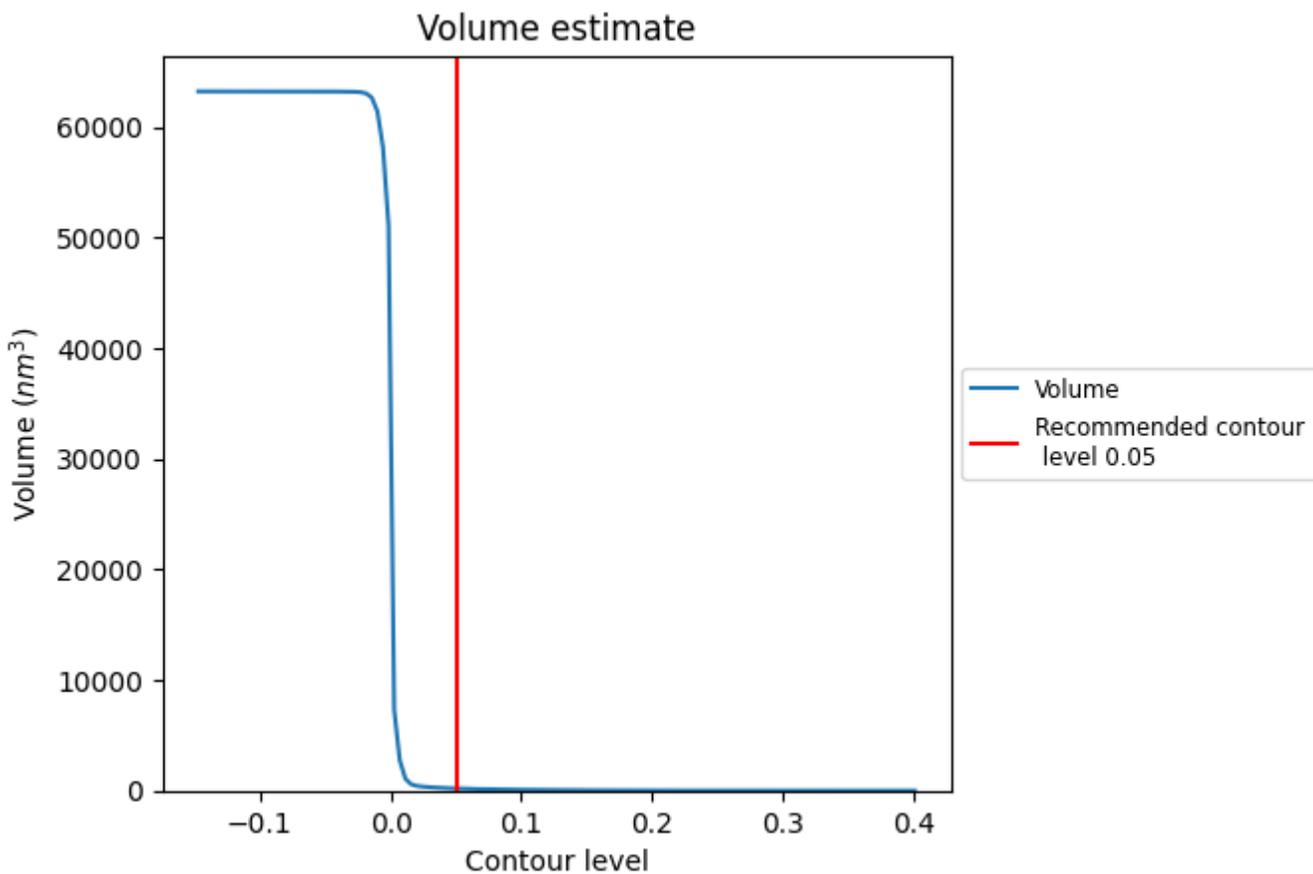
The volume at the recommended contour level is 193 nm^3; this corresponds to an approximate mass of 174 kDa.

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 ⓘ
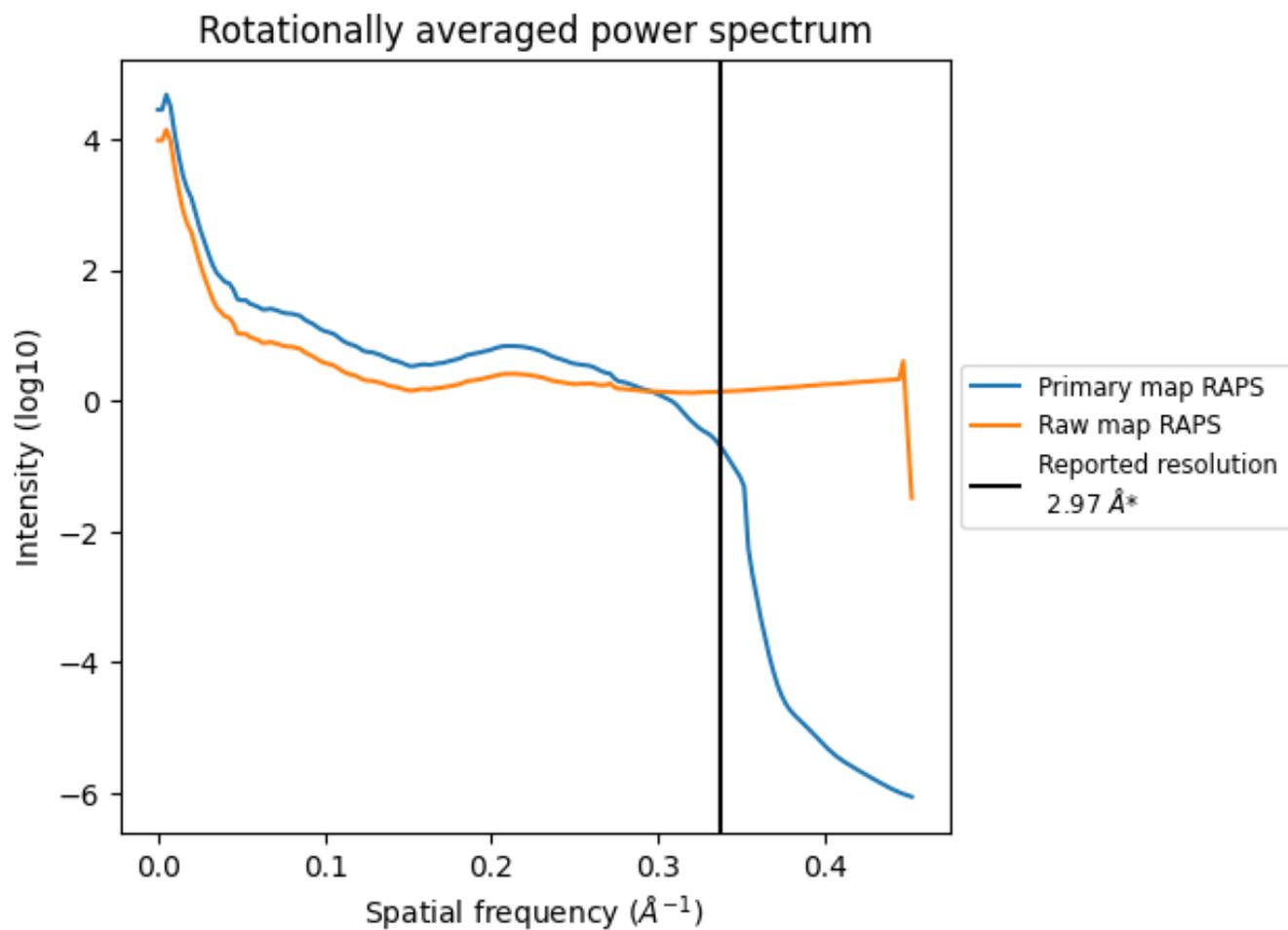
*Reported resolution corresponds to spatial frequency of 0.337 Å^{-1}

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 ⓘ
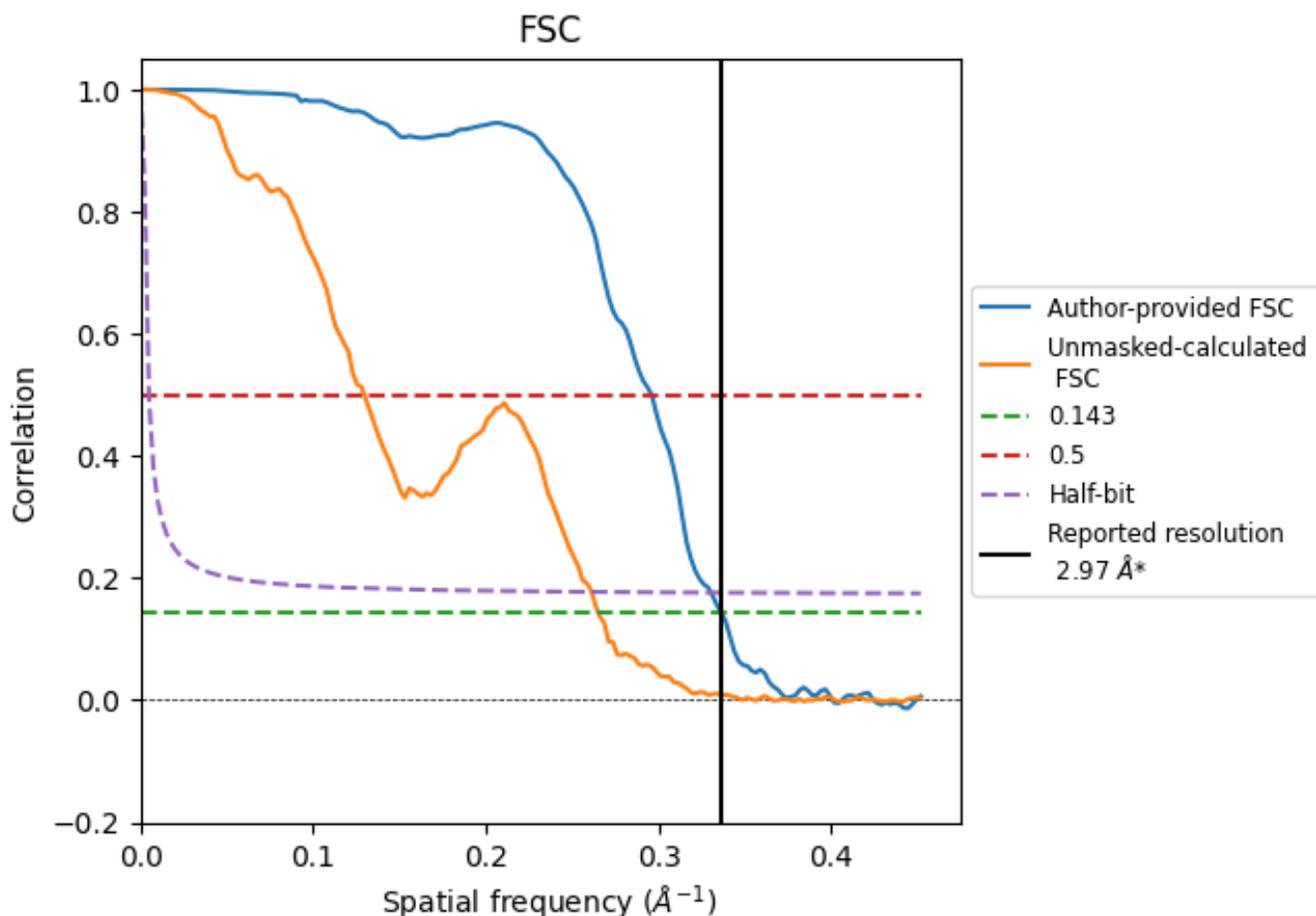
*Reported resolution corresponds to spatial frequency of 0.337 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.97	-	-
Author-provided FSC curve	2.97	3.38	3.03
Unmasked-calculated*	3.77	7.72	3.83

*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 3.77 differs from the reported value 2.97 by more than 10 %

9　Map-model fit　ⓘ

This section contains information regarding the fit between EMDB map EMD-61266 and PDB model 9J9E. Per-residue inclusion information can be found in section 3 on page 6.

9.1　Map-model overlay　ⓘ


X	Y	Z
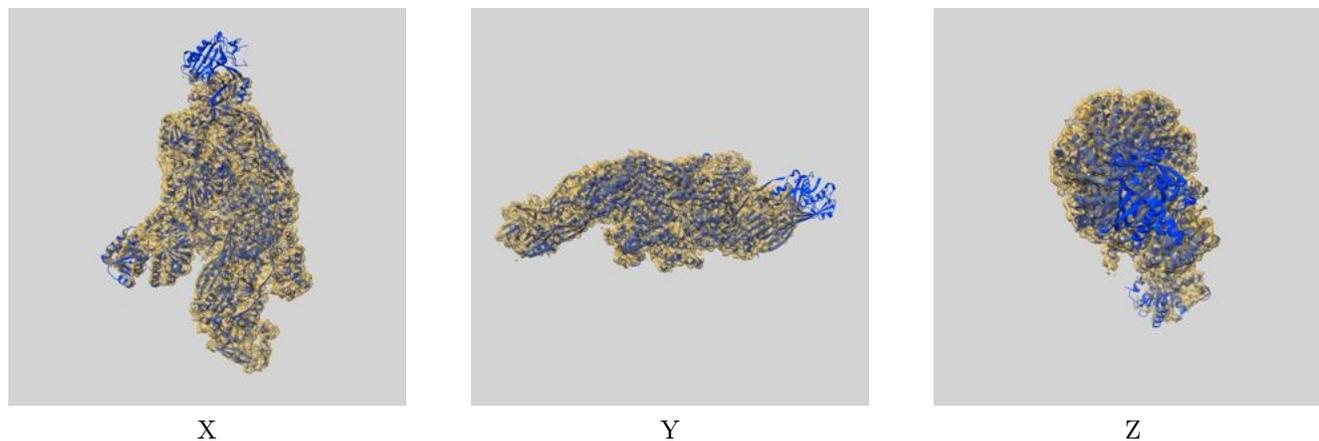
The images above show the 3D surface view of the map at the recommended contour level 0.05 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2　Q-score mapped to coordinate model ⓘ


X　　　　　　　　　Y　　　　　　　　　Z
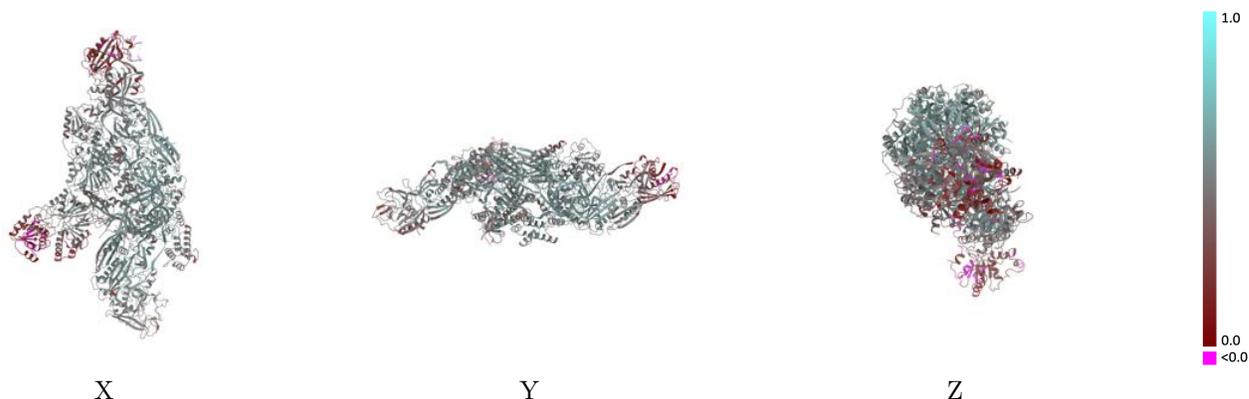
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
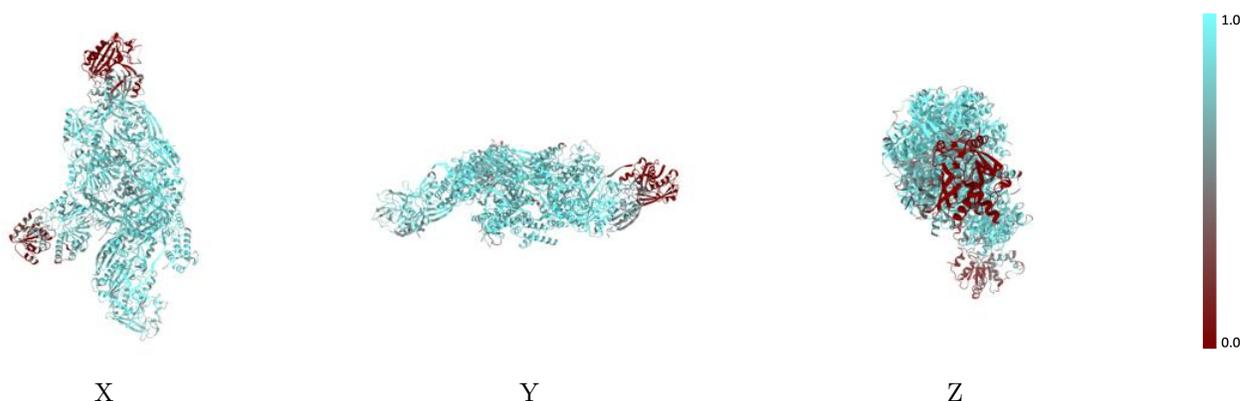
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.05).

9.4   Atom inclusion ⓘ
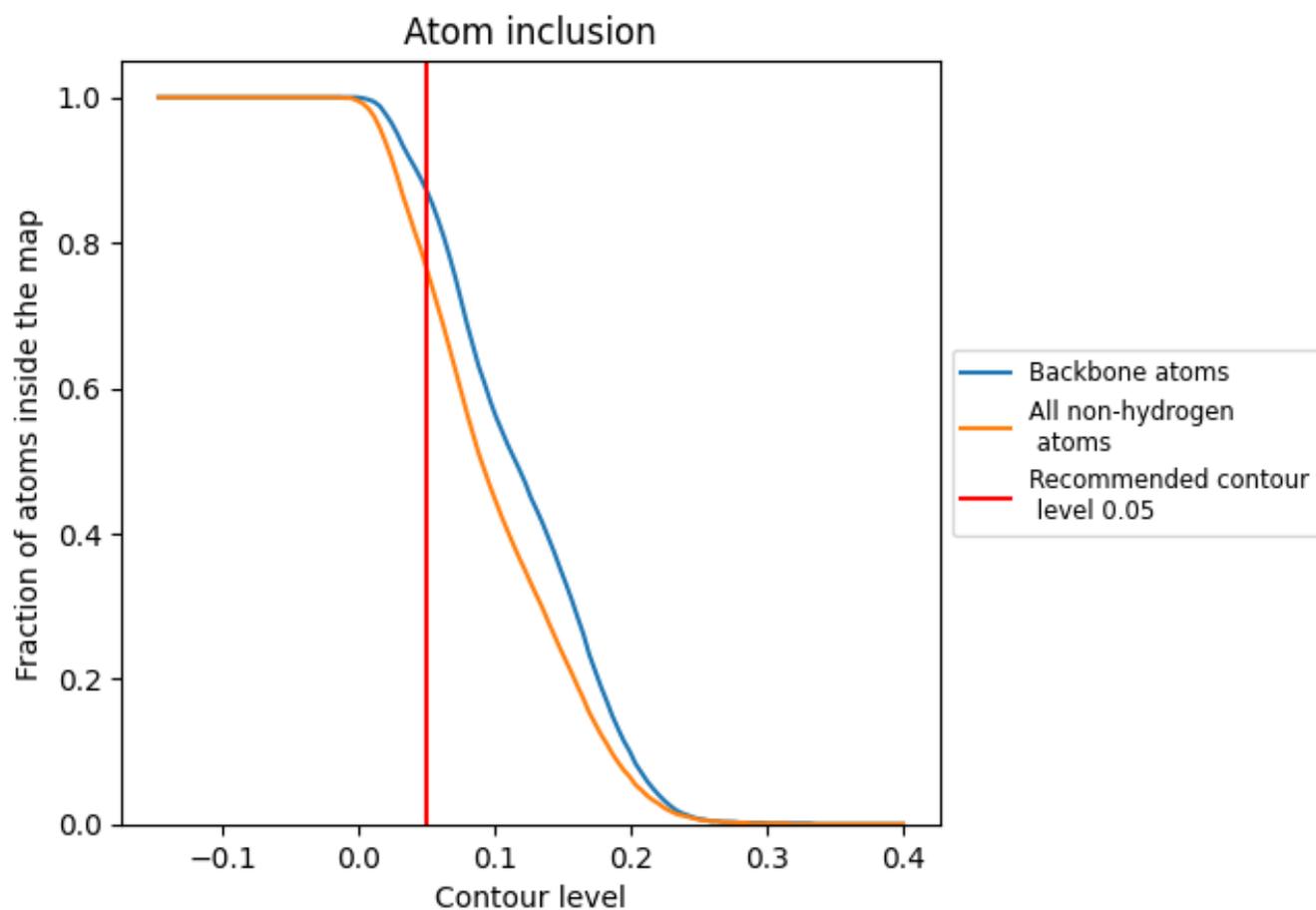
At the recommended contour level, 87% of all backbone atoms, 76% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.05) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7650	0.4740
A	0.8730	0.5390
B	0.9160	0.5570
C	0.7640	0.4460
D1	0.8470	0.5200
D2	0.8830	0.5470
D3	0.9100	0.5600
D4	0.9030	0.5540
D5	0.9230	0.5650
D6	0.9000	0.5420
D7	0.4930	0.4320
D8	0.0240	0.2170
E1	0.8240	0.4640
E2	0.6300	0.3700
E3	0.8410	0.4880
E4	0.8550	0.5010

1.0

0.0
<0.0