wwPDB EM Validation Summary Report (i)

Dec 8, 2025 – 08:43 AM EST

PDB ID	:	9YNU / pdb_00009ynu
EMDB ID	:	EMD-73233
Title	:	Tra1 and core modules including core tip of ctSAGA complex
Authors	:	Mattoo, R.U.H.; Chen, D.H.; Bushnell, D.A.; Tamir, S.; Kornberg, R.D.
Deposited on	:	2025-10-12
Resolution	:	3.20 Å(reported)

This is a wwPDB EM Validation Summary 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.dev129
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)	:	2.47

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 3.20 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		5
Ramachandran outliers		0.0%
Sidechain outliers		0.5%

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.484

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	-
Q-score	-	25397	15020 (2.70 - 3.70)

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.
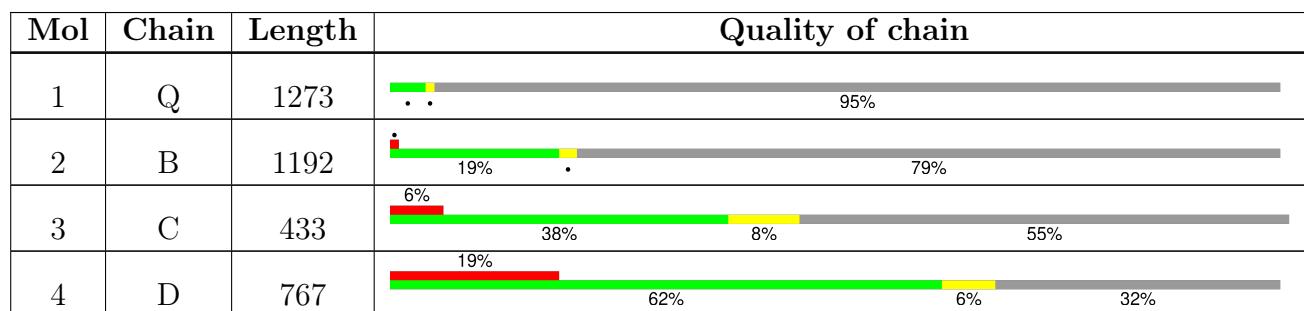
Mol	Chain	Length	Quality of chain
1	Q	1273	95%
2	B	1192	19% · 79%
3	C	433	6% / 38% 8% 55%
4	D	767	19% / 62% 6% 32%

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Mol	Chain	Length	Quality of chain
5	E	480	10% / 80% / 12% / 8%
6	F	277	36% / 7% / 56%
7	G	204	51% / 44%
8	H	485	47% / 5% / 48%
9	I	770	16% / 80%
10	K	1224	10% / 41% / 7% / 52%
11	A	3893	11% / 83% / 10% / 7%
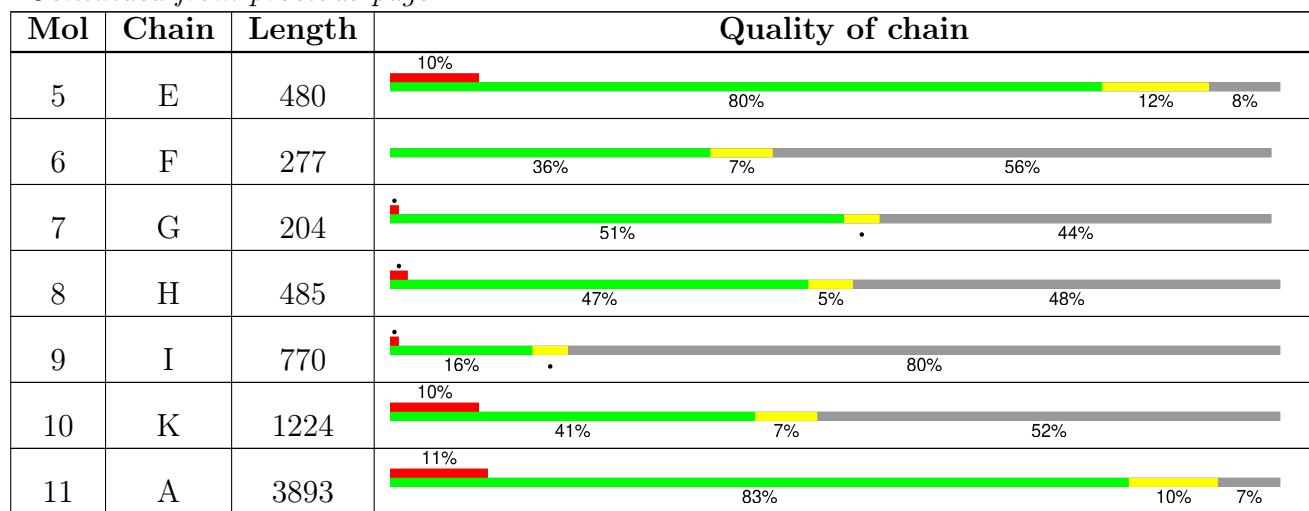
2 Entity composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 100918 atoms, of which 50157 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 SCA7 domain-containing protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	Q	62	950	303	472	86	88	1	0	0

- Molecule 2 is a protein called Spt20-like SEP domain-containing protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	B	245	3987	1319	1952	341	368	7	0	0

- Molecule 3 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	C	197	3225	1022	1607	287	303	6	0	0

- Molecule 4 is a protein called Transcription initiation factor TFIID subunit 5.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
4	D	523	8240	2632	4096	730	762	20	0	0

- Molecule 5 is a protein called Transcription initiation factor TFIID subunit 6.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
5	E	443	6959	2193	3519	598	639	10	0	0

- Molecule 6 is a protein called Putative transcription initiation factor.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
6	F	121	1461	578	546	170	166	1	0	0

- Molecule 7 is a protein called Transcription initiation factor TFIID subunit 10.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
7	G	114	1762	556	879	157	166	4	0	0

- Molecule 8 is a protein called Putative transcriptional coactivator HFI1 protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
8	H	254	3898	1238	1920	346	382	12	0	0

- Molecule 9 is a protein called Transcription initiation factor TFIID subunit 12.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
9	I	154	2269	744	1084	215	220	6	0	0

- Molecule 10 is a protein called SAGA complex subunit Spt7.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
10	K	586	9479	2967	4730	857	907	18	0	0

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	1197	GLY	-	expression tag	UNP G0S267
K	1198	SER	-	expression tag	UNP G0S267
K	1199	ASP	-	expression tag	UNP G0S267
K	1200	TYR	-	expression tag	UNP G0S267
K	1201	LYS	-	expression tag	UNP G0S267
K	1202	ASP	-	expression tag	UNP G0S267
K	1203	HIS	-	expression tag	UNP G0S267
K	1204	ASP	-	expression tag	UNP G0S267
K	1205	GLY	-	expression tag	UNP G0S267
K	1206	ASP	-	expression tag	UNP G0S267
K	1207	TYR	-	expression tag	UNP G0S267
K	1208	LYS	-	expression tag	UNP G0S267
K	1209	ASP	-	expression tag	UNP G0S267
K	1210	ASP	-	expression tag	UNP G0S267
K	1211	ASP	-	expression tag	UNP G0S267
K	1212	ASP	-	expression tag	UNP G0S267
K	1213	LYS	-	expression tag	UNP G0S267

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Chain	Residue	Modelled	Actual	Comment	Reference
K	1214	GLY	-	expression tag	UNP G0S267
K	1215	LEU	-	expression tag	UNP G0S267
K	1216	GLU	-	expression tag	UNP G0S267
K	1217	ALA	-	expression tag	UNP G0S267
K	1218	SER	-	expression tag	UNP G0S267
K	1219	GLU	-	expression tag	UNP G0S267
K	1220	ASN	-	expression tag	UNP G0S267
K	1221	LEU	-	expression tag	UNP G0S267
K	1222	TYR	-	expression tag	UNP G0S267
K	1223	PHE	-	expression tag	UNP G0S267
K	1224	GLN	-	expression tag	UNP G0S267

- Molecule 11 is a protein called Non-specific serine/threonine protein kinase.

Mol	Chain	Residues	Atoms						AltConf	Trace
11	A	3619	Total 58688	C 18811	H 29352	N 5111	O 5270	S 144	0	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: SCA7 domain-containing protein

Chain Q: ▬▬ ··   95%

• Molecule 2: Spt20-like SEP domain-containing protein

Chain B:

19%　　　　　79%

PRO GLN ALA ALA SER PRO MET PRO PRO MET ALA ALA VAL ALA MET GLN HIS SER ASN SER ASN MET GLY GLN ALA GLY SER PRO PRO ARG PRO PRO SER VAL VAL GLN ASN HIS PRO MET GLY VAL PRO MET ALA PRO SER MET SER ALA ARG GLY GLN GLN SER HIS ALA ALA

GLY THR PRO ARG VAL PRO SER ALA THR PRO ASN ILE PRO HIS ALA THR PRO ILE THR ARG PRO GLN VAL VAL PRO PRO ARG MET THR GLN ALA SER PRO PRO ALA GLY VAL MET THR THR PRO GLN GLN MET GLY GLN ALA MET LEU MET ASN ASN GLN GLN ILE ALA GLN MET

PRO ASN VAL ILE ASN LEU ALA ALA ALA GLN MET ALA ALA GLN ALA ARG LEU ILE LEU GLN GLN TYR GLN GLN LEU GLN GLN SER GLY MET VAL PRO GLY ASN VAL GLN ALA ASN MET LEU GLN GLN LEU ALA ALA ARG GLN MET ILE GLN GLN LEU

ALA GLN GLN GLN ARG ALA GLY GLN MET MET ASN PRO ASN ILE ALA LEU ALA ALA GLN TYR GLN GLN SER LEU ASN ASN GLN GLN GLN LEU ALA GLN MET ASN MET GLN ALA HIS MET ARG LEU LEU ALA GLN ALA GLN GLN ARG GLN MET MET

MET GLY VAL ASN VAL ASN VAL ASN GLY MET THR PRO GLN GLN LEU ALA VAL MET GLN GLN GLN ILE LEU GLN GLN GLN ALA LEU ILE GLN GLN GLN GLN GLN GLN LEU GLN GLN GLN GLN GLN GLN GLN

GLN GLN GLN GLN GLN ALA GLN GLN PRO GLN PRO GLY MET PRO GLY HIS PRO PRO GLN ALA VAL ALA PRO THR ALA GLN VAL PRO ILE ALA GLN LEU GLN PRO GLN ASN LEU ALA LEU MET ASN PRO ALA VAL GLN ASN GLN ILE ARG ASN HIS

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

PRO PRO GLN VAL ALA GLN ALA VAL GLN ALA MET GLN GLN ALA GLN ALA LEU ALA VAL ALA GLN ALA VAL GLN ALA ALA GLN ALA ALA ALA GLY GLY MET GLY GLN GLY MET

• **Molecule 3: Uncharacterized protein**

Chain C:

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

GLU SER GLN VAL LEU GLN ASN ASP ALA ASP ASP GLU LEU LEU VAL LEU SER ILE LEU ALA GLY LYS VAL PRO LEU SER GLU GLU LEU LEU ALA ASN ASP GLU LEU LEU GLN LEU GLN SER ASP GLY LEU SER SER ALA VAL CYS SER ALA ASP SER GLN GLU GLU ASP ASP LYS ASN ASP ASN ASP ALA

GLY TYR GLY GLU PRO ASP ARG VAL ASP ILE **A133 N134 W135 F136 E137 L138 C139 Q140 M141** VAL **V144** GLU **E147** THR **T156** ILE **I170** ILE ARG HIS ASP ALA PRO LYS VAL SER ARG ARG LEU ARG THR PHE LEU ALA TRP LYS ASP VAL ARG LYS ASN VAL LYS ASP SER ASP LYS GLY

ALA ASP ALA ASP ILE ALA PRO GLY ASP ASP PRO VAL ALA GLY ALA VAL VAL PRO GLY ALA THR VAL ASP ASP THR ALA ARG LYS LYS THR LYS SER ARG VAL **G235** VAL **V246** **E247** **V248** **P249** **E250** **R251** GLU ASP GLU GLU ASP GLU GLU GLU GLU MET ASN TYR ILE THR LEU **Q268** **R269** **L270**

R271 **K272** **A273** **D274** **E275** **R276** **T277** **K278** **A279** **M280** **T281** **K282** **E283** **E284** **Y285** **F296** **G311** **L312** **V313** **T314** **D315** **S316** **K317** **D320** **D321** **L329** **T330** **M333** **V334** **K345** **E346** **Q347** **E348** **E353** **R354** THR GLY GLU ASN GLN SER ASN ALA ASN ASN PRO ASN GLY SER ALA ASN SER SER

LEU SER LYS LYS ARG LYS **L379** **L385** **N390** **E391** **G392** **R393** **T394** **P395** **H400** **L408** **K413** **F433**

• **Molecule 4: Transcription initiation factor TFIID subunit 5**

Chain D:

MET SER ASN ALA PRO ALA GLN ALA ALA GLY GLN GLY ALA ALA GLY THR PRO TYR ASN PRO PRO SER ALA GLY ALA GLY SER GLY SER ALA ALA SER ALA PRO SER THR THR PRO SER ALA GLN **N46** **R62** THR GLU ALA VAL PHE ARG GLN GLU GLY THR ALA HIS LEU

• Molecule 5: Transcription initiation factor TFIID subunit 6

Chain E:

• Molecule 6: Putative transcription initiation factor

Chain F:

THR PRO SER PRO R65 P66 R67 D68 A69 R70 T71 L74 L75 L76 V81 T82 S83 F84 E85 P86 R87 V88 S89 L93 T100 L108 S111 ASP ASP PRO TYR ILE SER HIS ALA GLY ALA ARG PRO SER ALA SER GLY ALA PRO VAL ASN VAL GLY GLU ALA S138

N142 E203 S211 TRP GLY LEU LYS ASP VAL TRP ALA GLY GLU GLU GLY GLU SER GLU GLU GLU SER GLU PRO GLU GLU GLN GLY ASP LYS MET GLU VAL ASP GLU ASN GLY LYS ASN GLY GLU ALA GLU ASP GLY VAL GLU VAL GLY GLY THR MET GLU ASP VAL PHE GLY

ASP GLU GLY LEU GLU ASP GLU GLU MET GLY GLU ALA

• Molecule 7: Transcription initiation factor TFIID subunit 10

Chain G: 51%   •   44%

MET ALA THR ASN GLN SER ILE ASP ASN SER VAL SER GLN PRO ALA ALA PRO THR ALA SER ALA ASN GLY THR SER GLN PRO ALA GLY GLU THR SER MET PHE PRO GLY ILE PRO SER ALA SER VAL PRO GLU GLU PRO LYS LEU PRO THR ARG LYS ASP A54 I69 P87 P88

Q103 S122 ASN THR ASN ALA ASN ASN PRO MET GLY SER LEU GLY ALA ALA ALA GLY PHE PRO ILE PRO GLY GLN GLN PRO SER ASN GLN PRO GLY GLY LYS GLU GLN GLN GLY ARG GLY GLY PRO L160 S175 L181 T182 D185 L186 V190 R204

• Molecule 8: Putative transcriptional coactivator HFI1 protein

Chain H: 47%   5%   48%

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

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

ALA ALA ILE TYR ALA ASN VAL THR ARG GLU MET PRO ASP PRO GLY LEU ALA PRO TRP VAL SER ALA ASN ASP LYS PRO THR THR ALA GLN THR LYS PRO VAL THR GLY ASP ALA ASN E160 R161 R162 L163 V167 L170 D174 R175 L181 D185 F186 D190 A191 L192 A193

N194 H199 A200 ARG ALA LYS PRO PRO LYS ILE ALA GLU PRO PRO ALA SER ALA GLY GLY L217 R228 I246 M250 E256 L259 E276 S298 G299 S300 L305 R333 M336 N389 S408 ARG GLY ASP GLY ASP VAL GLU MET GLY GLY VAL GLY VAL

ASN GLY VAL VAL LYS GLY GLU PRO GLU GLN GLN GLN PRO LEU ALA ASN GLY VAL VAL HIS ASP VAL ASP ALA MET ASP ILE ASP GLY VAL SER VAL GLY GLY ALA ALA ASN GLU ILE TRP W463 E464 G465 A466 E467 P468 E469 T470 S471 A483 VAL ASN

• Molecule 9: Transcription initiation factor TFIID subunit 12

Chain I: 16%   •   80%

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

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

GLN GLN GLN GLN GLN GLN GLN GLN GLN GLN GLN GLN VAL GLN PRO GLN THR PRO GLN PRO GLN GLN GLN LEU GLN ALA VAL GLN GLN GLN VAL GLN GLN GLN GLN GLN ILE PRO GLN GLN GLN

• Molecule 10: SAGA complex subunit Spt7

Chain K:

10%

41% 7% 52%
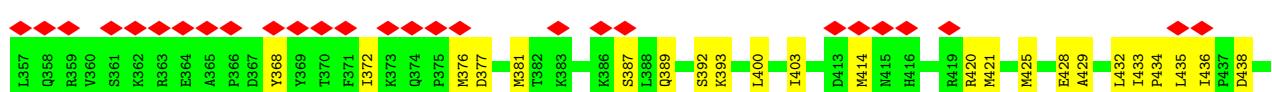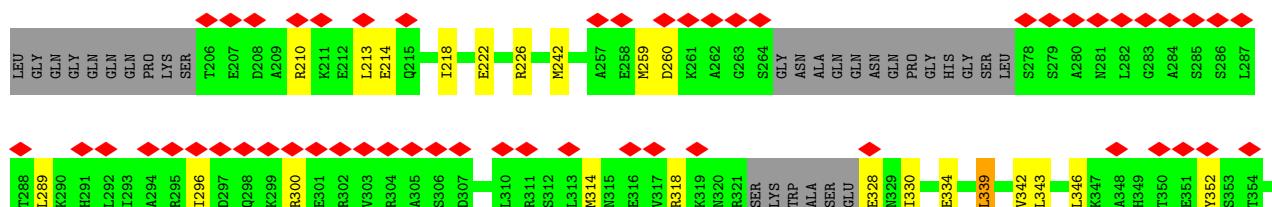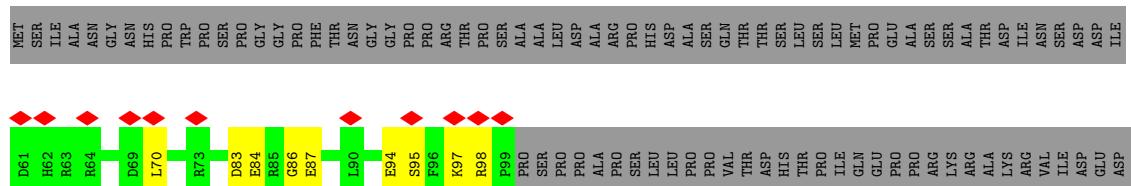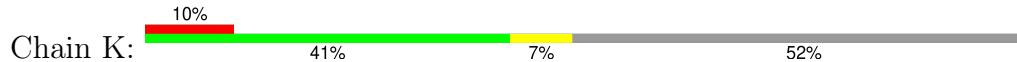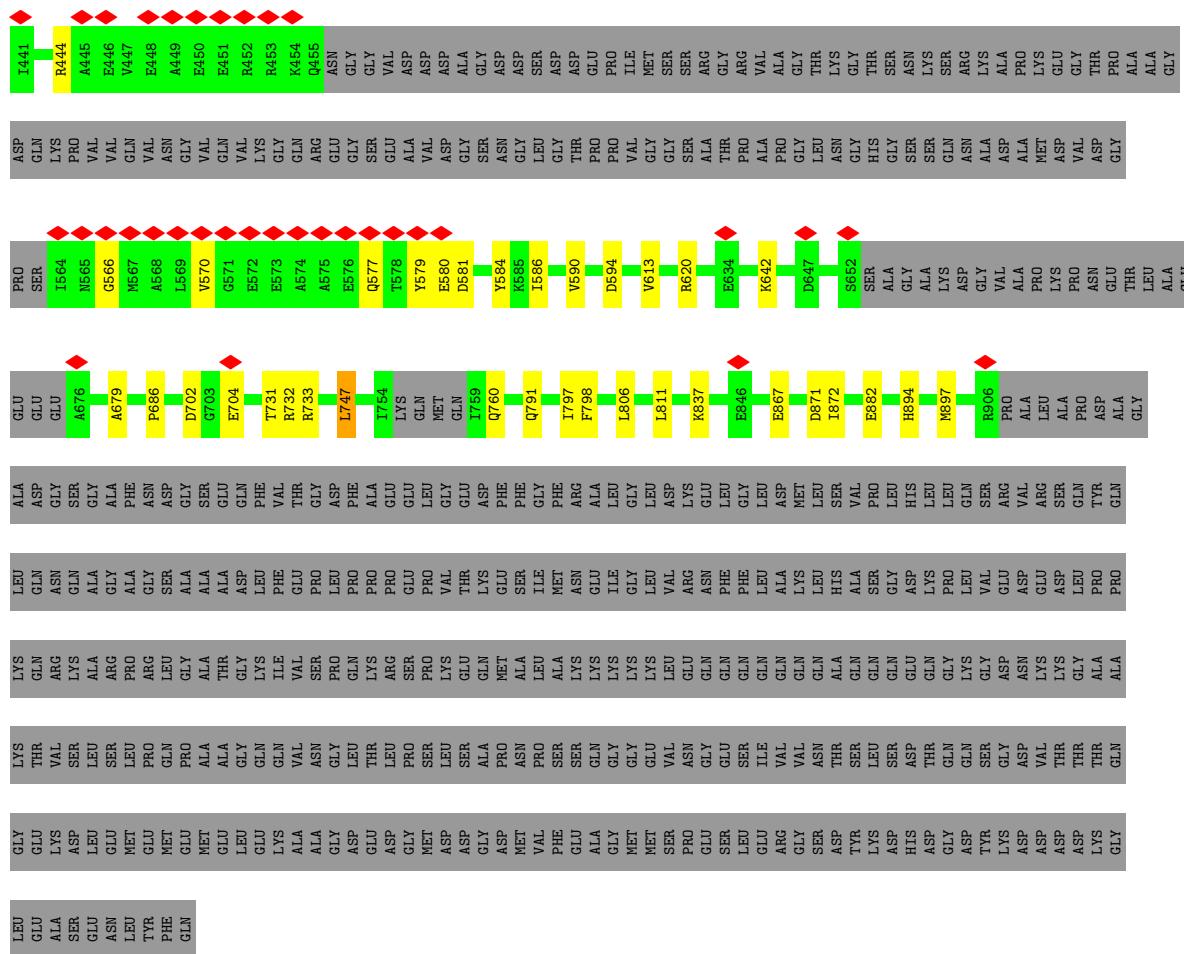
• Molecule 11: Non-specific serine/threonine protein kinase

Chain A:

11%

83%   10%   7%
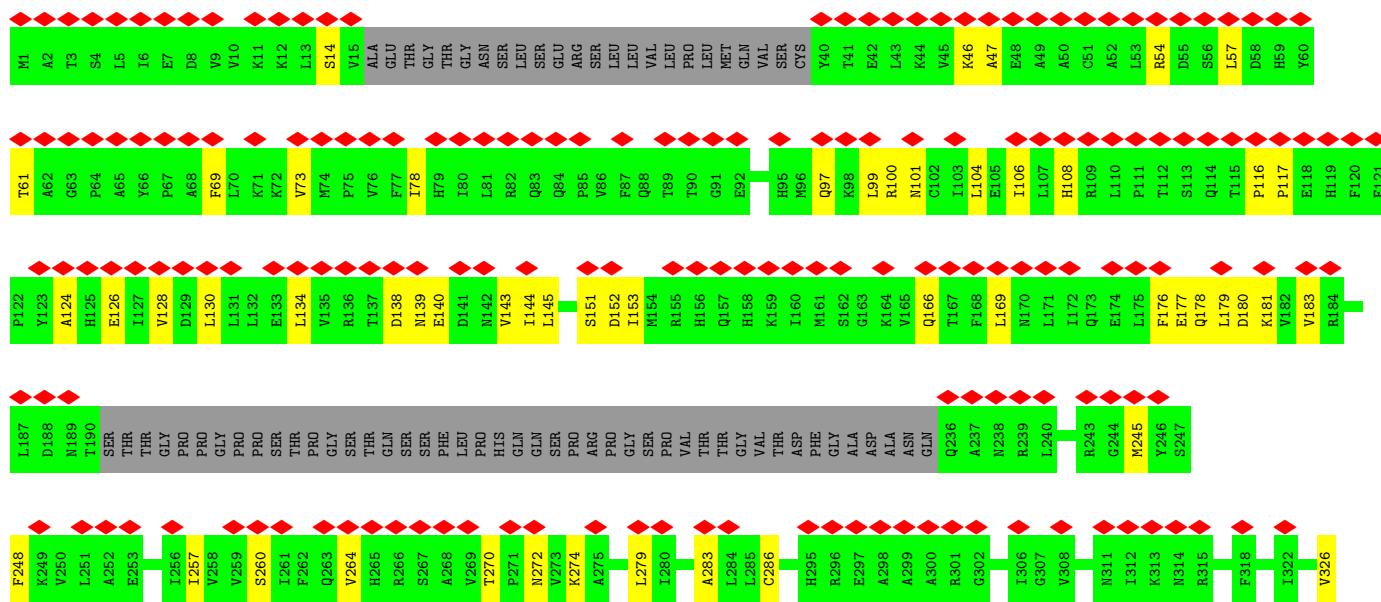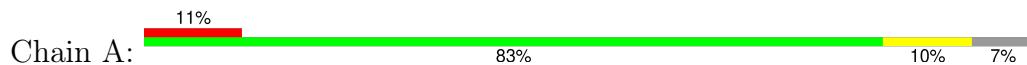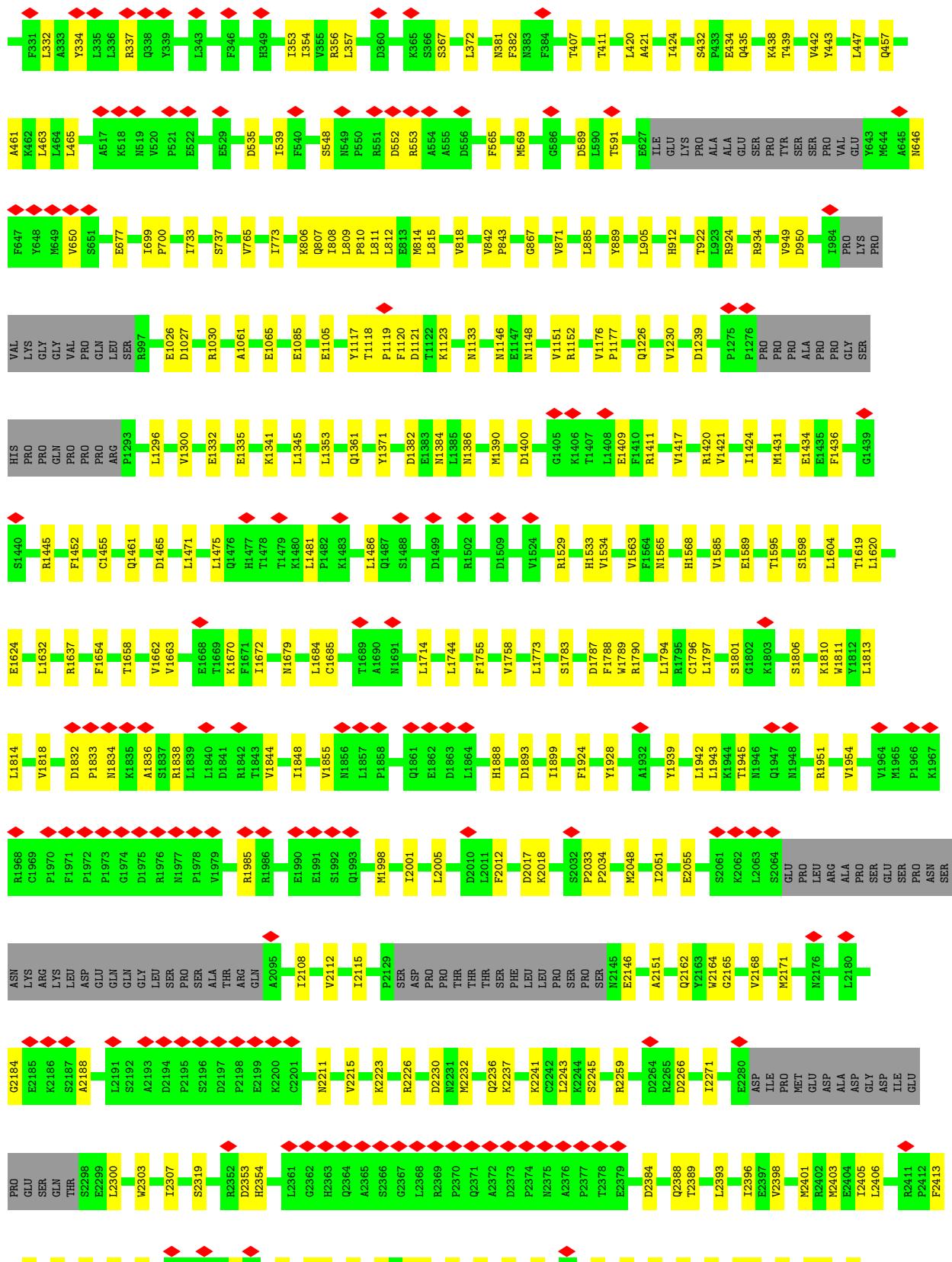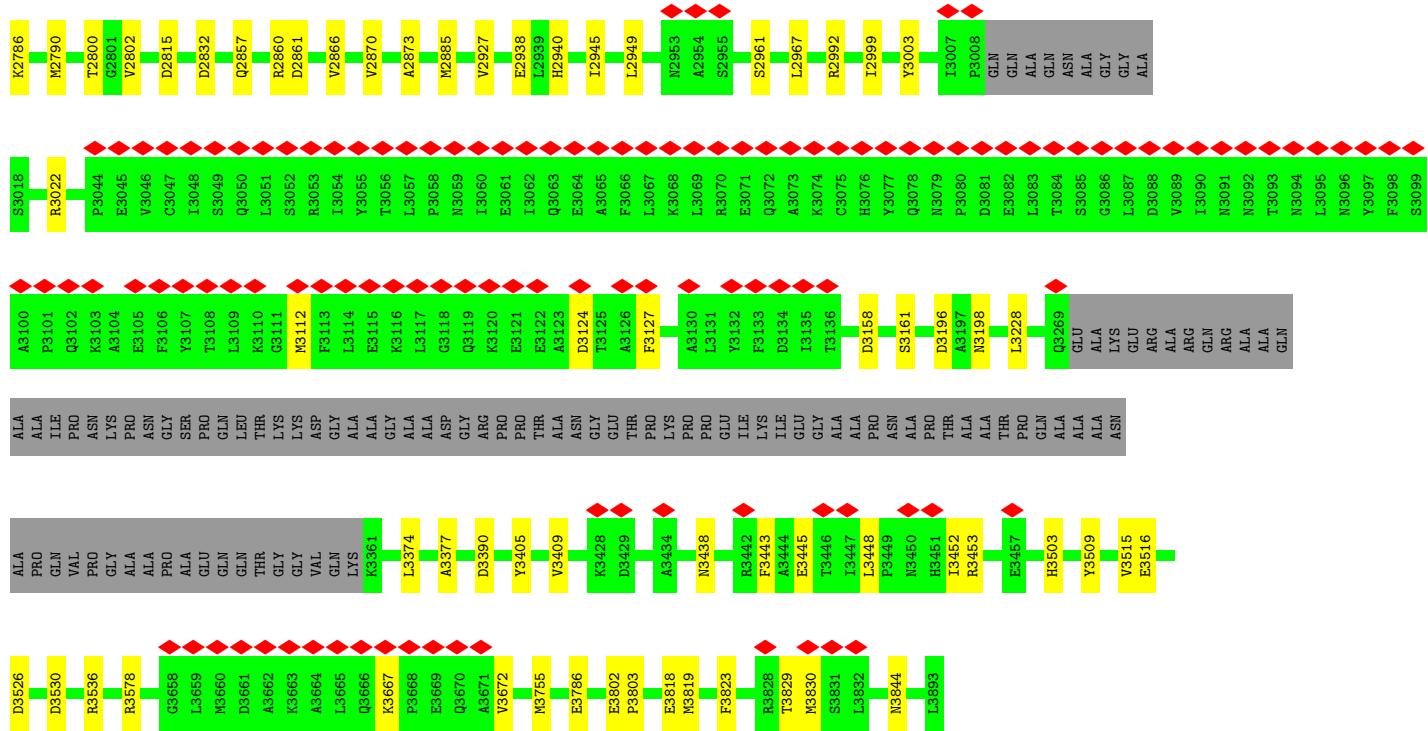
4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	171646	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	68.9	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	4.428	Depositor
Minimum map value	-2.344	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.082	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	499.68, 499.68, 499.68	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.041, 1.041, 1.041	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	Q	0.11	0/489	0.22	0/667
2	B	0.11	0/2094	0.25	0/2842
3	C	0.10	0/1649	0.24	0/2214
4	D	0.10	0/4235	0.23	0/5730
5	E	0.10	0/3505	0.23	0/4767
6	F	0.11	0/932	0.26	0/1259
7	G	0.11	0/899	0.24	0/1213
8	H	0.10	0/2018	0.22	0/2721
9	I	0.10	0/1203	0.26	0/1624
10	K	0.11	0/4824	0.24	0/6484
11	A	0.10	0/30011	0.26	0/40686
All	All	0.10	0/51859	0.25	0/70207

There are no bond length outliers.

There are no bond angle outliers.

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	Q	478	472	471	8	0
2	B	2035	1952	2013	17	0
3	C	1618	1607	1602	25	0
4	D	4144	4096	4088	35	0
5	E	3440	3519	3515	48	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	F	915	546	922	25	0
7	G	883	879	877	7	0
8	H	1978	1920	1917	22	0
9	I	1185	1084	1220	32	0
10	K	4749	4730	4729	71	0
11	A	29336	29352	29619	257	0
All	All	50761	50157	50973	491	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 5.

The worst 5 of 491 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)
4:D:472:SER:OG	4:D:474:ASP:OD1	1.93	0.86
9:I:628:TYR:OH	11:A:2756:ASP:OD1	1.93	0.85
11:A:435:GLN:O	11:A:439:THR:HG23	1.79	0.83
2:B:400:ARG:NH2	9:I:684:GLU:OE1	2.14	0.81
2:B:220:ILE:O	11:A:2765:ARG:NH1	2.13	0.81

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	Q	60/1273 (5%)	60 (100%)	0	0	100	100
2	B	233/1192 (20%)	221 (95%)	11 (5%)	1 (0%)	30	64
3	C	189/433 (44%)	184 (97%)	5 (3%)	0	100	100
4	D	509/767 (66%)	488 (96%)	21 (4%)	0	100	100
5	E	435/480 (91%)	428 (98%)	7 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	F	117/277 (42%)	110 (94%)	7 (6%)	0	100	100
7	G	110/204 (54%)	107 (97%)	3 (3%)	0	100	100
8	H	248/485 (51%)	243 (98%)	5 (2%)	0	100	100
9	I	148/770 (19%)	140 (95%)	8 (5%)	0	100	100
10	K	572/1224 (47%)	556 (97%)	16 (3%)	0	100	100
11	A	3597/3893 (92%)	3433 (95%)	164 (5%)	0	100	100
All	All	6218/10998 (56%)	5970 (96%)	247 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	230	SER

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	Q	50/1047 (5%)	50 (100%)	0	100	100
2	B	227/928 (24%)	227 (100%)	0	100	100
3	C	173/377 (46%)	171 (99%)	2 (1%)	67	85
4	D	450/635 (71%)	449 (100%)	1 (0%)	92	97
5	E	375/401 (94%)	371 (99%)	4 (1%)	70	86
6	F	92/212 (43%)	90 (98%)	2 (2%)	47	73
7	G	90/157 (57%)	90 (100%)	0	100	100
8	H	206/387 (53%)	206 (100%)	0	100	100
9	I	129/620 (21%)	128 (99%)	1 (1%)	79	90
10	K	506/1023 (50%)	502 (99%)	4 (1%)	79	90
11	A	3197/3412 (94%)	3184 (100%)	13 (0%)	89	94
All	All	5495/9199 (60%)	5468 (100%)	27 (0%)	85	93

5 of 27 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
11	A	354	ILE
11	A	1117	TYR
11	A	2999	ILE
11	A	808	ILE
11	A	1371	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 45 such sidechains are listed below:

Mol	Chain	Res	Type
11	A	1947	GLN
11	A	2993	GLN
11	A	1977	ASN
11	A	2705	HIS
11	A	3269	GLN

5.3.3　RNA ⓘ

There are no RNA molecules in this entry.

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 ⓘ

There are no ligands in this entry.

5.7　Other polymers ⓘ

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-73233. 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
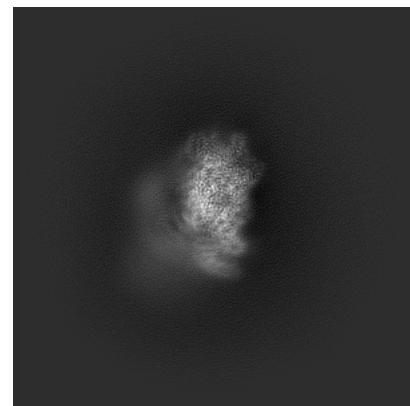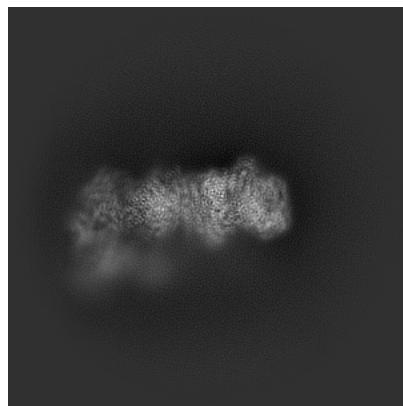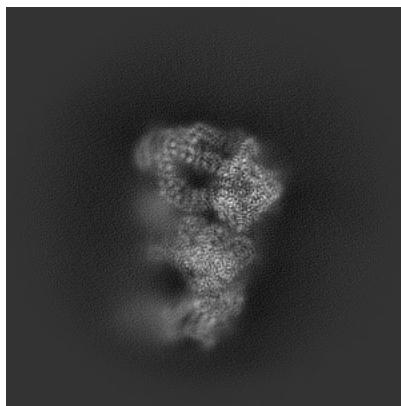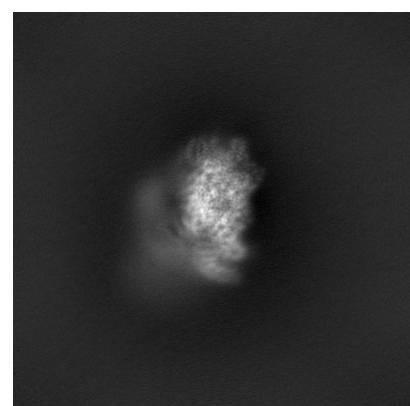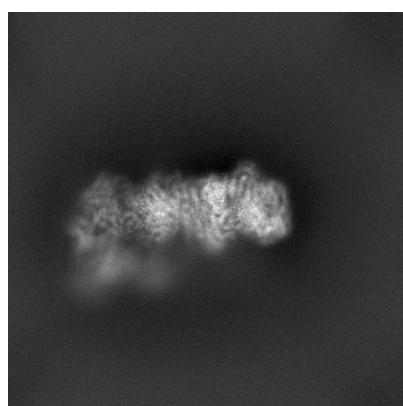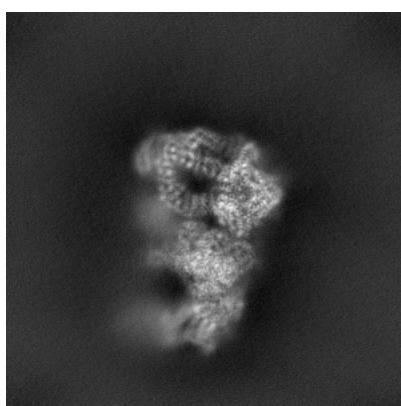
The images above show the map projected in three orthogonal directions.

6.2   Central slices   ⓘ
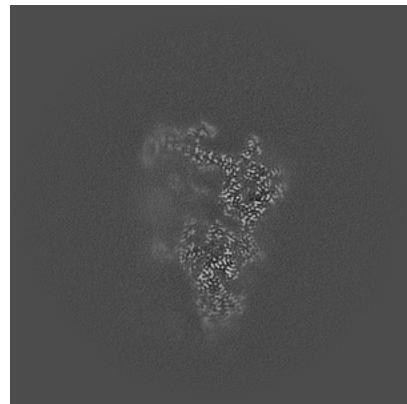
6.2.1   Primary map
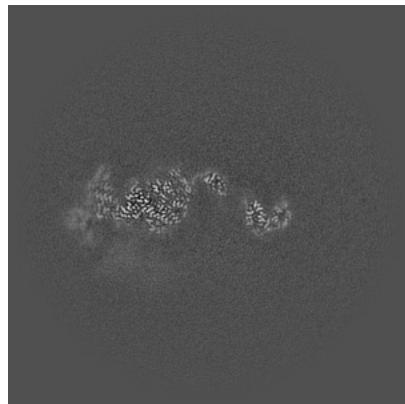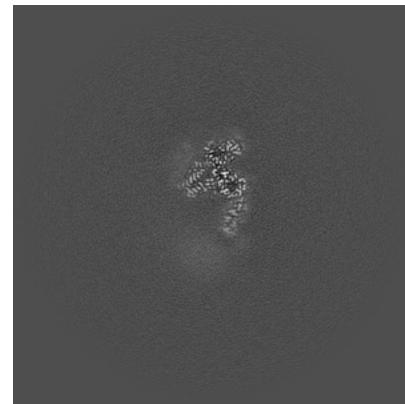
X Index: 240   Y Index: 240   Z Index: 240

6.2.2   Raw map
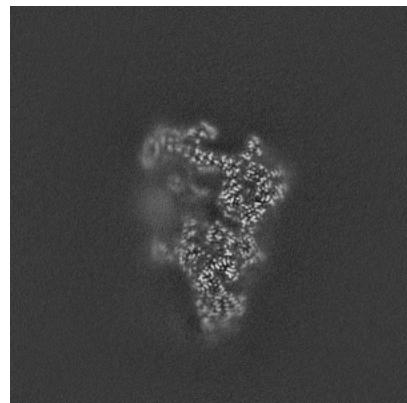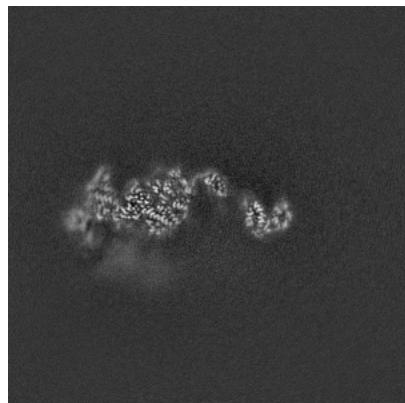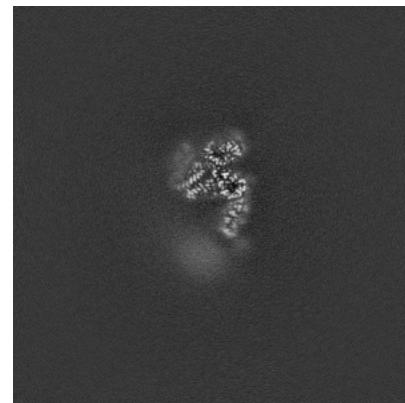
X Index: 240   Y Index: 240   Z Index: 240

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
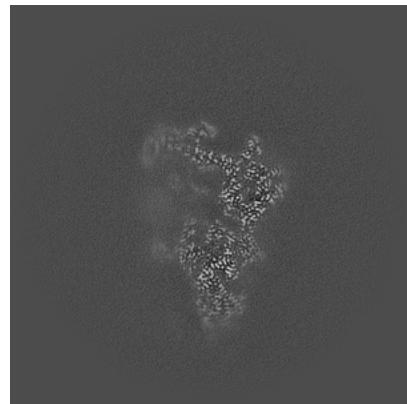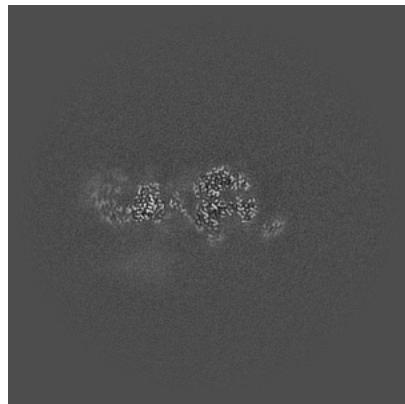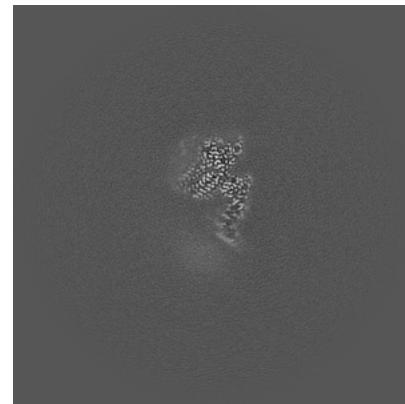
X Index: 240	Y Index: 262	Z Index: 246

6.3.2 Raw map
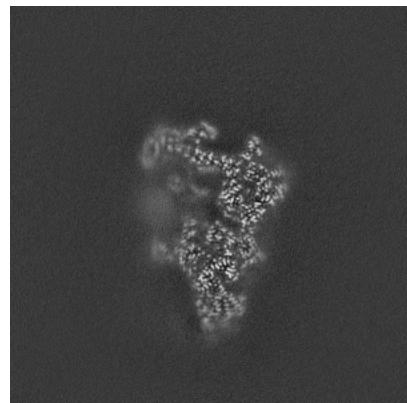
X Index: 240	Y Index: 262	Z Index: 249

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
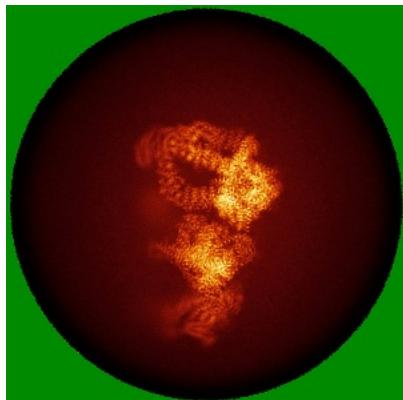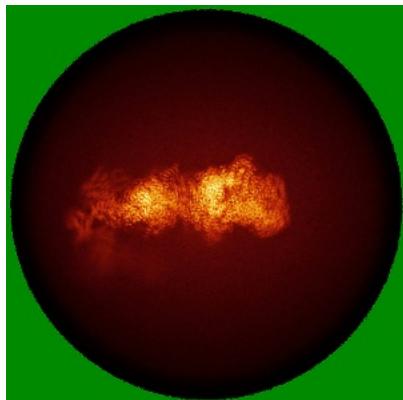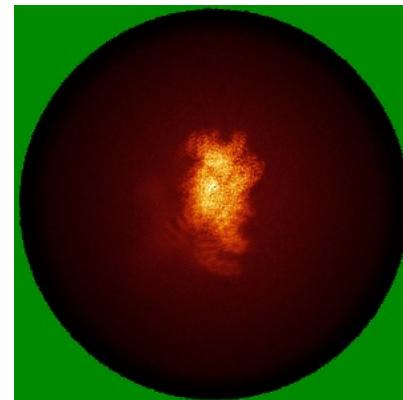
X   Y   Z

6.4.2   Raw map

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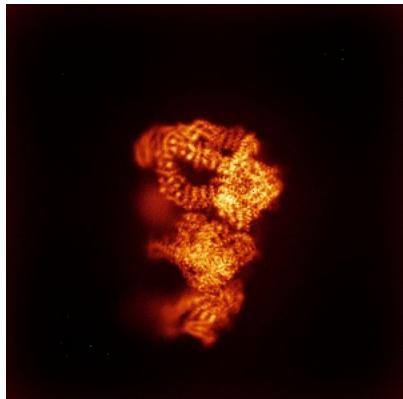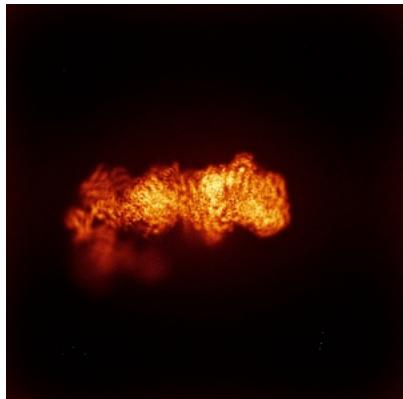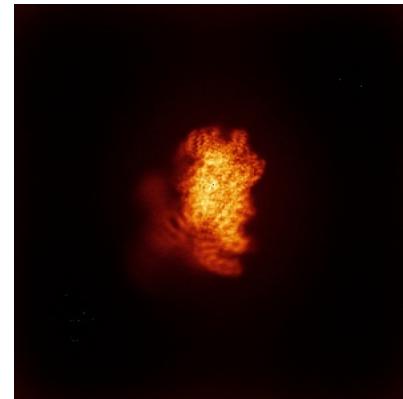
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X   Y   Z
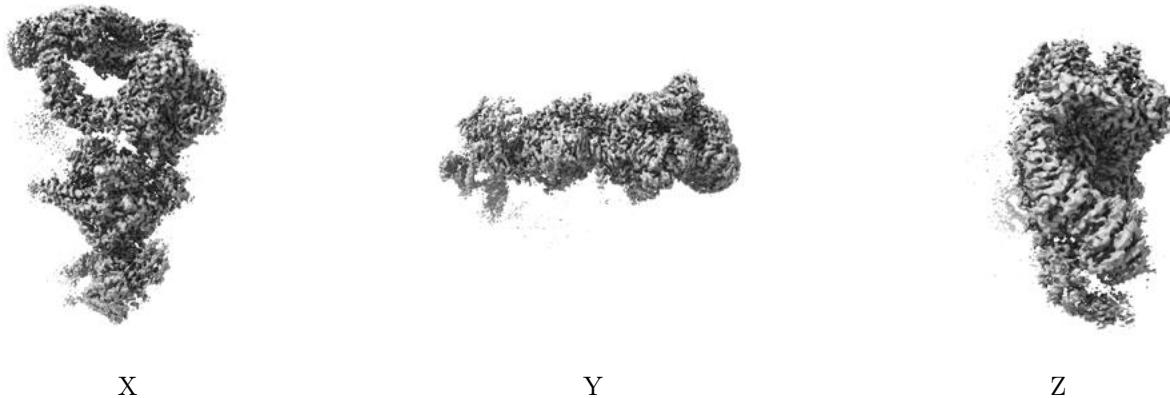
The images above show the 3D surface view of the map at the recommended contour level 0.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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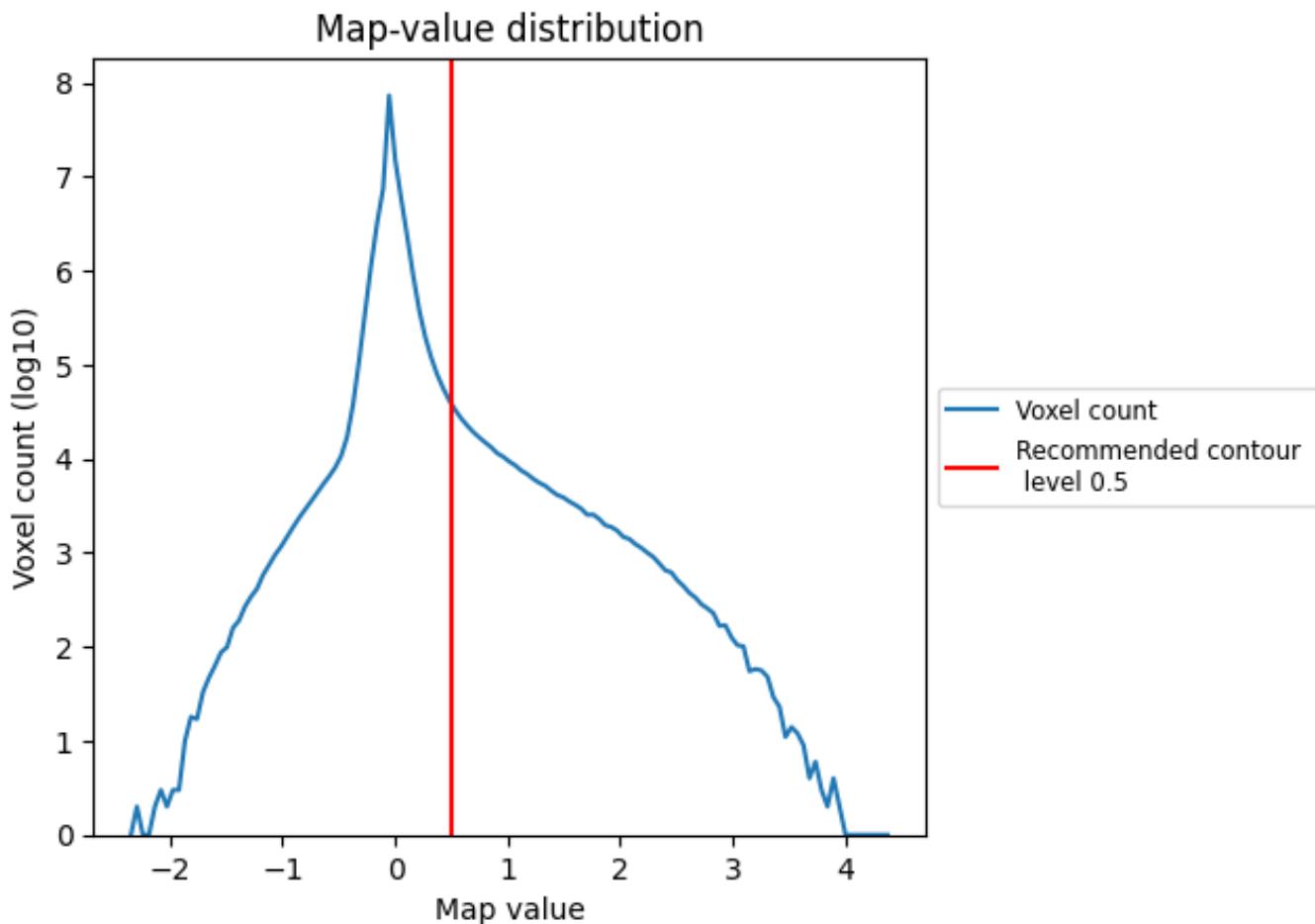
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
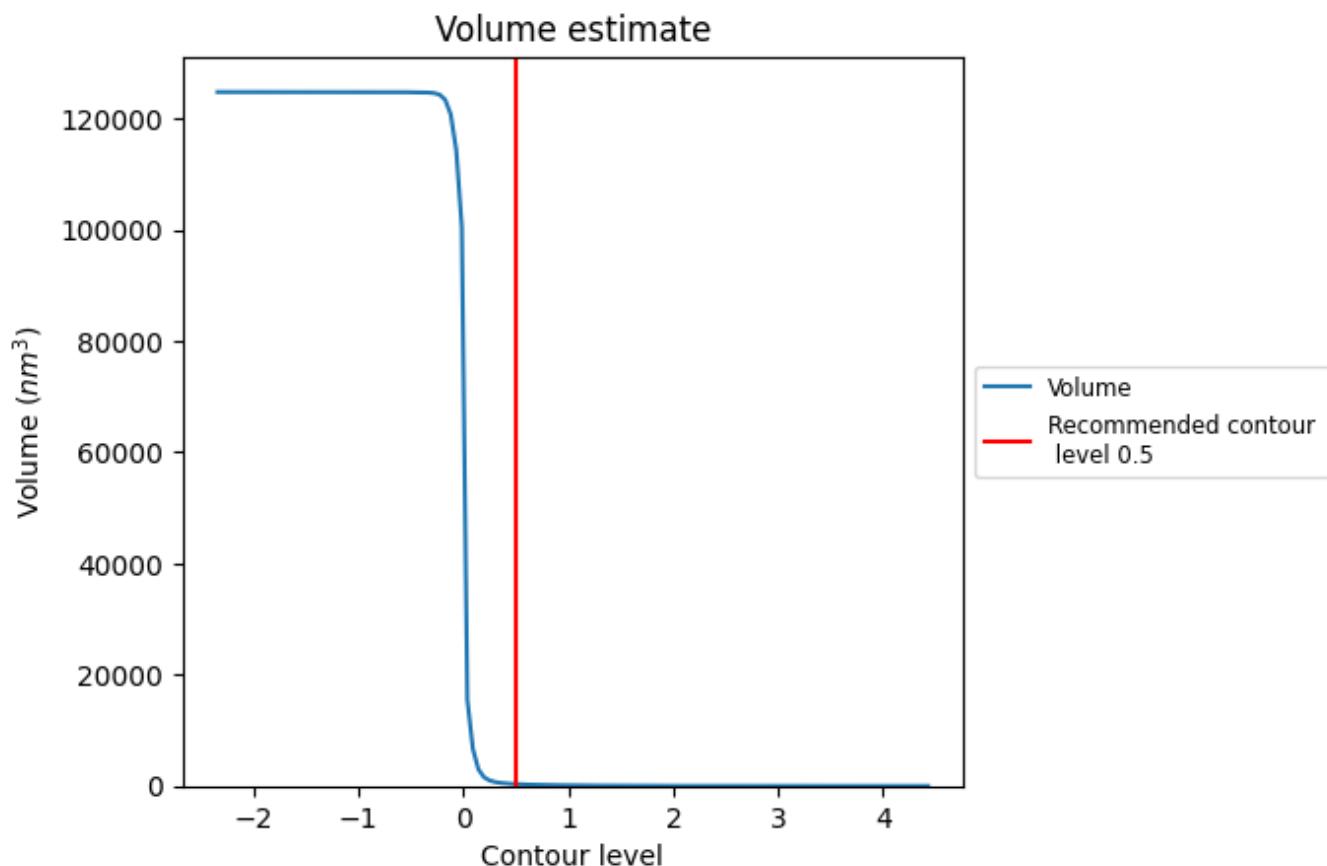
The volume at the recommended contour level is 331 nm^3; this corresponds to an approximate mass of 299 kDa.

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 ⓘ
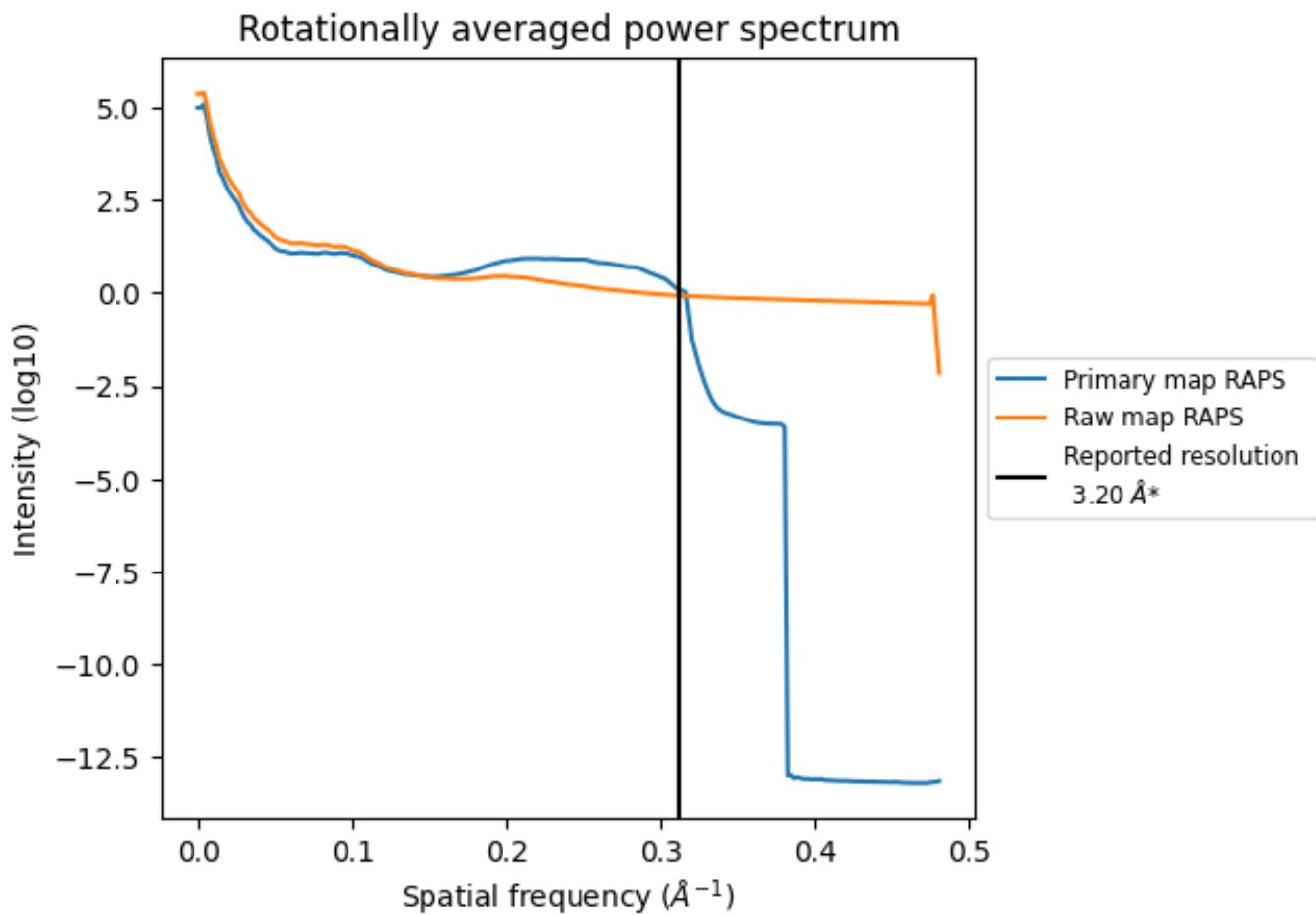
*Reported resolution corresponds to spatial frequency of 0.312 Å^{-1}

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 ⓘ
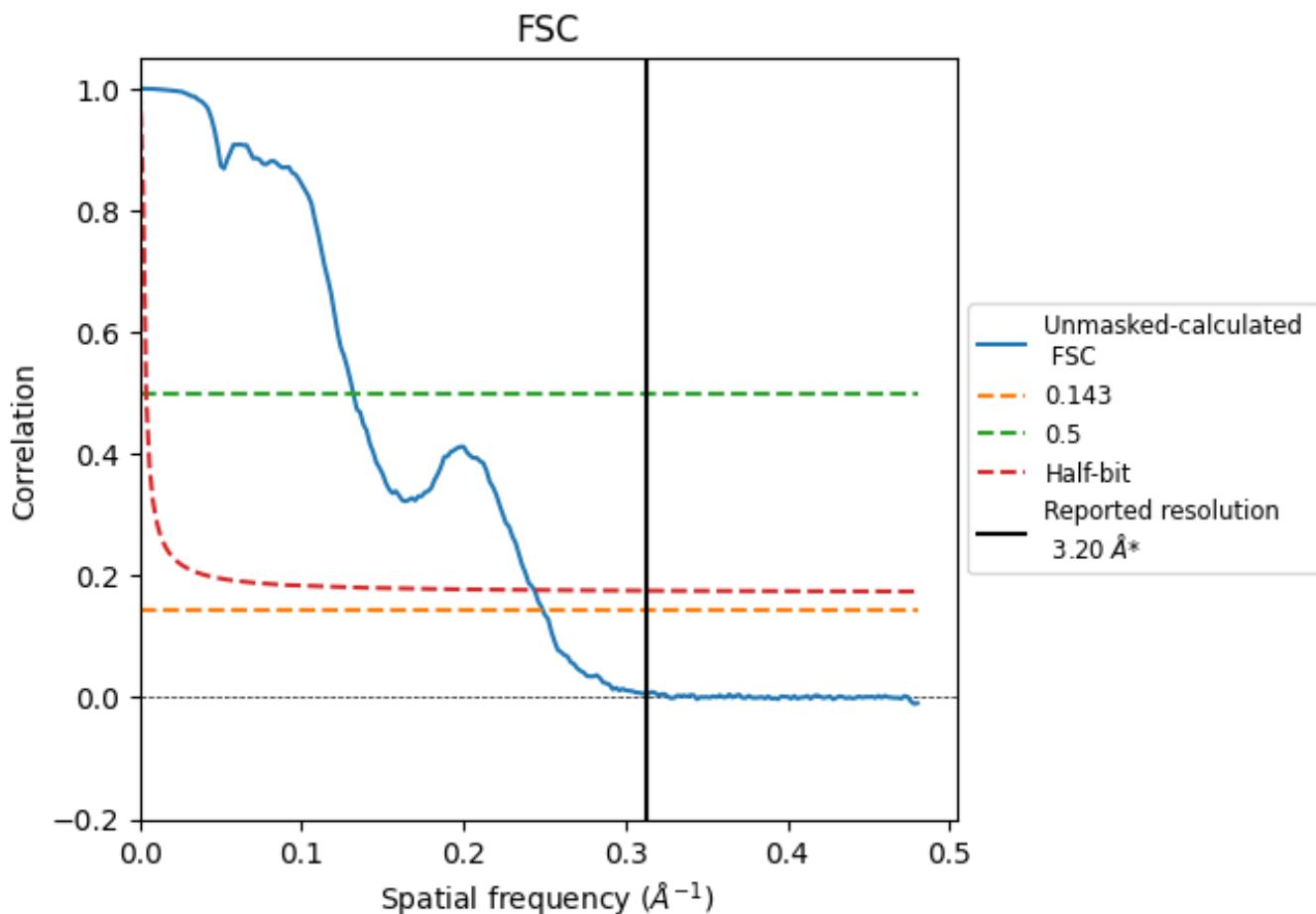
*Reported resolution corresponds to spatial frequency of 0.312 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.20	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.02	7.59	4.11

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.02 differs from the reported value 3.2 by more than 10 %

9   Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-73233 and PDB model 9YNU. Per-residue inclusion information can be found in section 3 on page 7.

## 9.1   Map-model overlay ⓘ

X   Y   Z
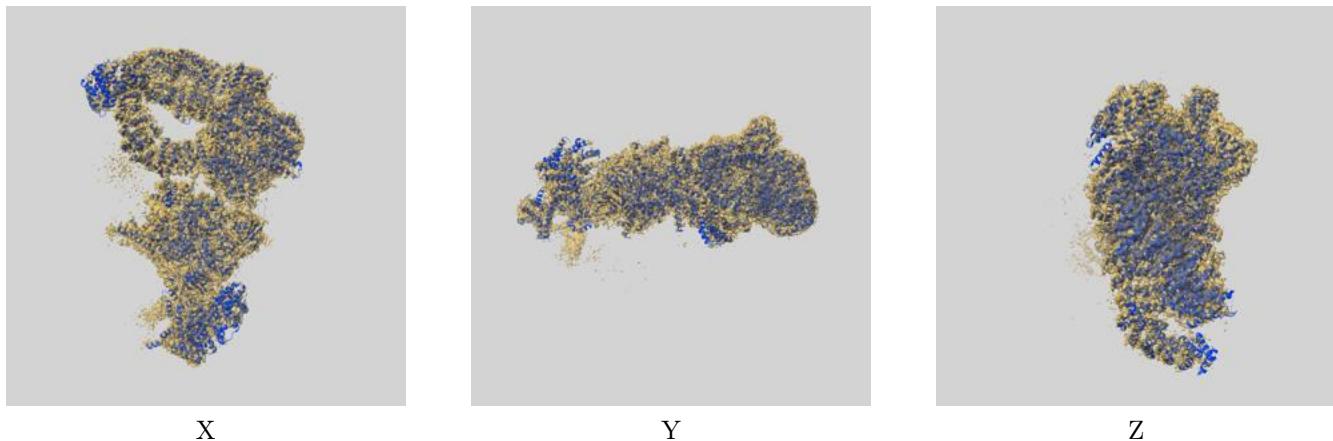
The images above show the 3D surface view of the map at the recommended contour level 0.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model   ⓘ

X   Y   Z
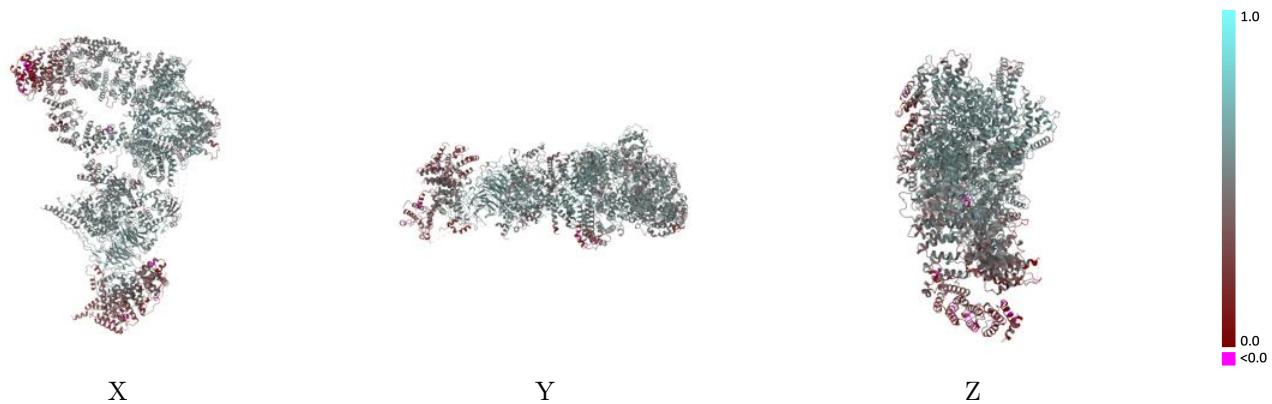
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
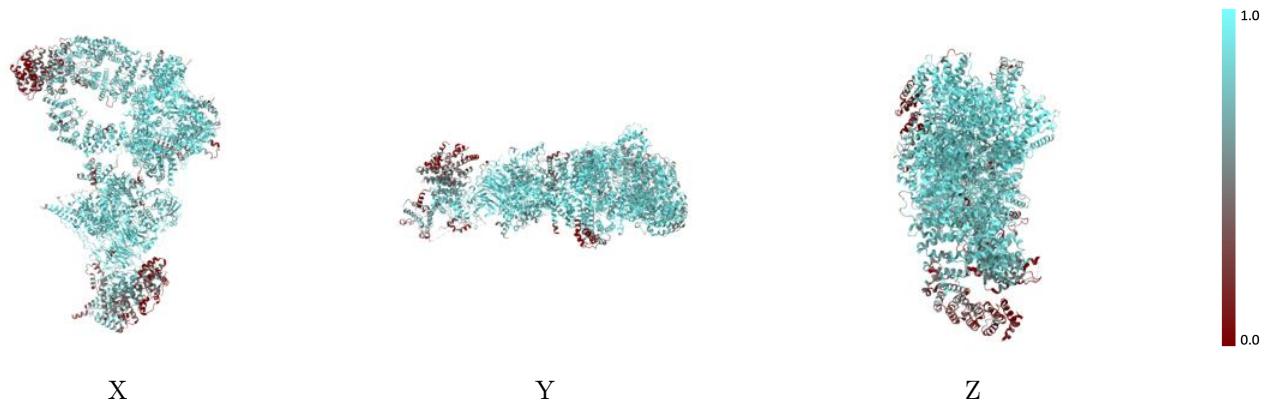
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.5).

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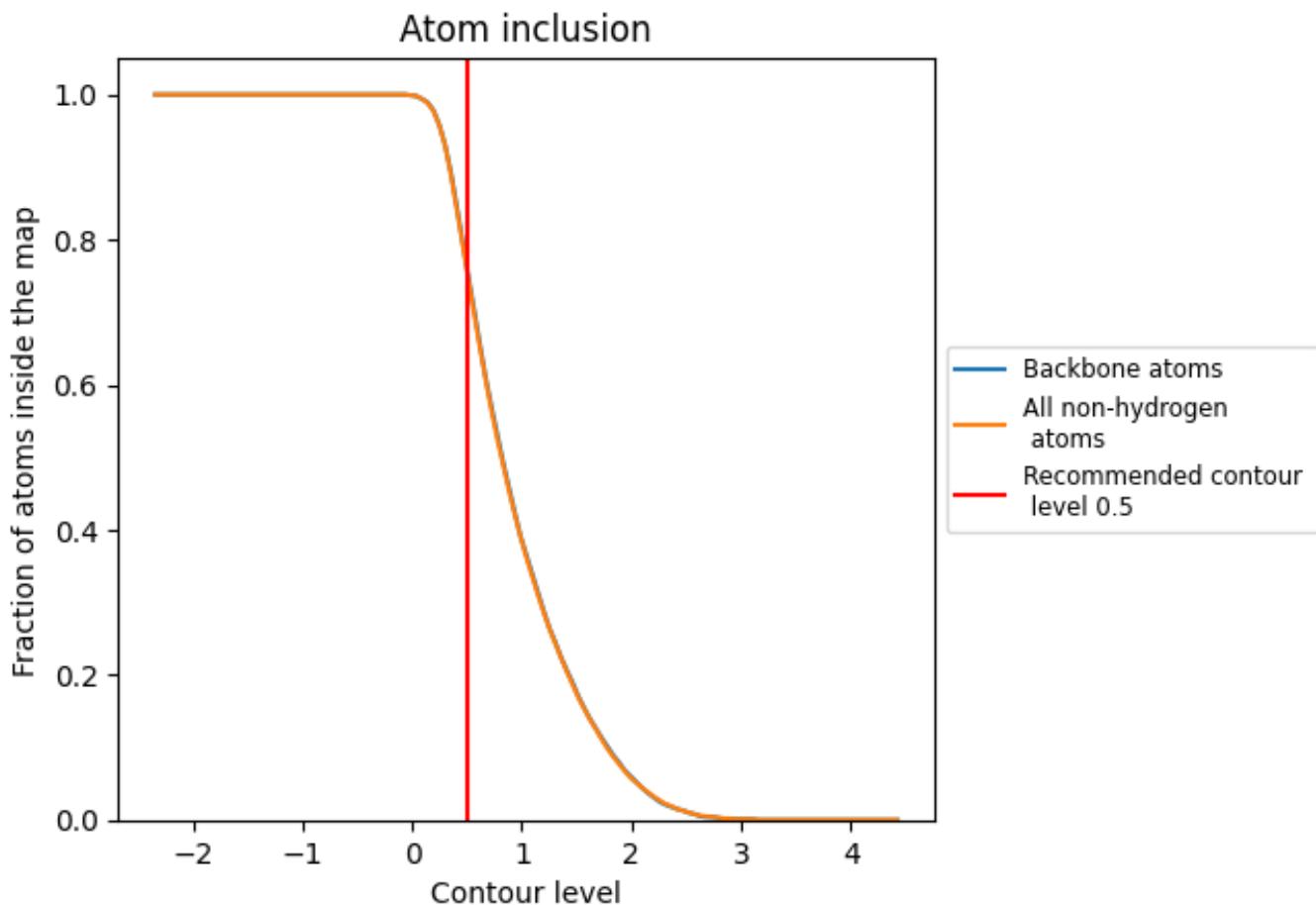
At the recommended contour level, 76% of all backbone atoms, 76% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7570	0.4840
A	0.7740	0.4860
B	0.8340	0.5280
C	0.7500	0.4880
D	0.6890	0.4890
E	0.7400	0.4760
F	0.9100	0.5550
G	0.8800	0.5450
H	0.8240	0.5260
I	0.7930	0.5280
K	0.6520	0.3990
Q	0.8570	0.5220

1.0

0.0
<0.0