WORLDWIDE PDB PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Feb 12, 2026 – 12:29 PM EST

PDB ID	:	9PD3 / pdb_00009pd3
EMDB ID	:	EMD-71524
Title	:	NER dual incision complex - DuIS
Authors	:	Li, C.L.; Kim, J.; Yang, W.
Deposited on	:	2025-06-30
Resolution	:	3.30 Å(reported)
Based on initial models	:	1l1o, 6sxa, 8ebt

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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 3.30 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		7
Ramachandran outliers		0
Sidechain outliers		0.9%

Worse — *Better*

■ Percentile relative to all structures

▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.313

Worse — *Better*

■ Percentile relative to all EM structures

▯ Percentile relative to EM structures of similar resolution
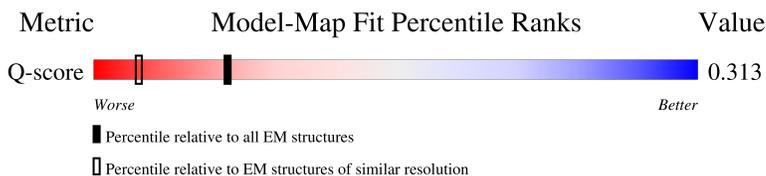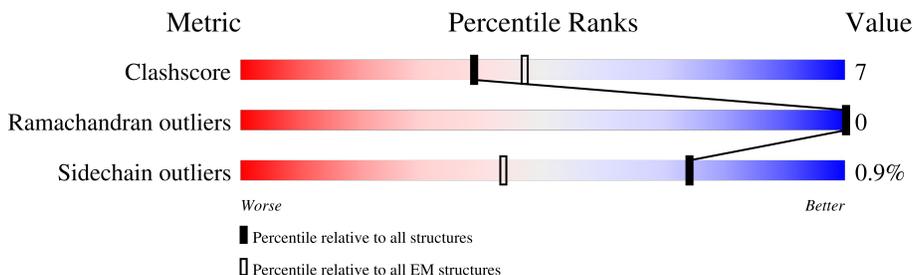
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	15087 (2.80 - 3.80)

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	782	64% 14% 22%
2	B	768	73% 19% 9%
3	C	548	13% 18% 7% 76%
4	D	462	77% 15% 7%

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Mol	Chain	Length	Quality of chain
5	E	395	13% 70% 16% 13%
6	F	308	10% 58% 24% 17%
7	G	71	89% 7%
8	H	940	98%
9	K	273	8% 58% 19% 24%
10	L	51	47% 27% 25%
11	M	53	9% 28% 32% 40%
12	N	616	10% 25% 71%
13	O	270	42% 56% 13% 30%
14	P	121	91% 86% 14%
15	Q	916	8% 67% 11% 22%
16	R	295	16% 58% 8% 34%
17	S	1186	5% 93%

2 Entry composition ⓘ

There are 19 unique types of molecules in this entry. The entry contains 35072 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 TFIIH basal transcription factor complex helicase XPB subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	613	Total	C	N	O	S	0	0
			4947	3159	856	902	30		

- Molecule 2 is a protein called General transcription and DNA repair factor IIH helicase subunit XPD.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	702	Total	C	N	O	S	0	0
			5659	3622	985	1023	29		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	761	ASP	-	expression tag	UNP P18074
B	762	TYR	-	expression tag	UNP P18074
B	763	LYS	-	expression tag	UNP P18074
B	764	ASP	-	expression tag	UNP P18074
B	765	ASP	-	expression tag	UNP P18074
B	766	ASP	-	expression tag	UNP P18074
B	767	ASP	-	expression tag	UNP P18074
B	768	LYS	-	expression tag	UNP P18074

- Molecule 3 is a protein called General transcription factor IIH subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	133	Total	C	N	O	S	0	0
			1076	684	185	200	7		

- Molecule 4 is a protein called General transcription factor IIH subunit 4, p52.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	428	Total	C	N	O	S	0	0
			3441	2218	597	613	13		

- Molecule 5 is a protein called General transcription factor IIH subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	342	Total 2677	C 1694	N 456	O 501	S 26	0	0

- Molecule 6 is a protein called General transcription factor IIH subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	255	Total 2013	C 1289	N 333	O 372	S 19	0	0

- Molecule 7 is a protein called General transcription factor IIH subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	66	Total 522	C 337	N 82	O 100	S 3	0	0

- Molecule 8 is a protein called DNA repair protein complementing XP-C cells.

Mol	Chain	Residues	Atoms				AltConf	Trace
8	H	17	Total 131	C 80	N 27	O 24	0	0

- Molecule 9 is a protein called DNA repair protein complementing XP-A cells.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	K	208	Total 1716	C 1073	N 311	O 316	S 16	0	0

- Molecule 10 is a DNA chain called DNA lesion strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	L	38	Total 770	C 368	N 133	O 231	P 38	0	0

- Molecule 11 is a DNA chain called DNA normal strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	M	32	Total 665	C 315	N 126	O 192	P 32	0	0

- Molecule 12 is a protein called Replication protein A 70 kDa DNA-binding subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	N	177	Total 1459	C 918	N 252	O 278	S 11	0	0

- Molecule 13 is a protein called Replication protein A 32 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	O	189	Total 1485	C 937	N 254	O 286	S 8	0	0

- Molecule 14 is a protein called Replication protein A 14 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	P	121	Total 950	C 610	N 155	O 177	S 8	0	0

- Molecule 15 is a protein called DNA repair endonuclease XPF.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Q	713	Total 5461	C 3501	N 949	O 990	S 21	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	703	ASP	GLY	variant	UNP Q92889

- Molecule 16 is a protein called DNA excision repair protein ERCC-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	R	196	Total 1400	C 901	N 240	O 255	S 4	0	0

- Molecule 17 is a protein called DNA excision repair protein ERCC-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	S	83	Total 685	C 427	N 115	O 140	S 3	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S	812	ASN	ASP	conflict	UNP P28715

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Chain	Residue	Modelled	Actual	Comment	Reference
S	1053	ARG	GLY	variant	UNP P28715
S	1080	ARG	GLY	variant	UNP P28715

- Molecule 18 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).
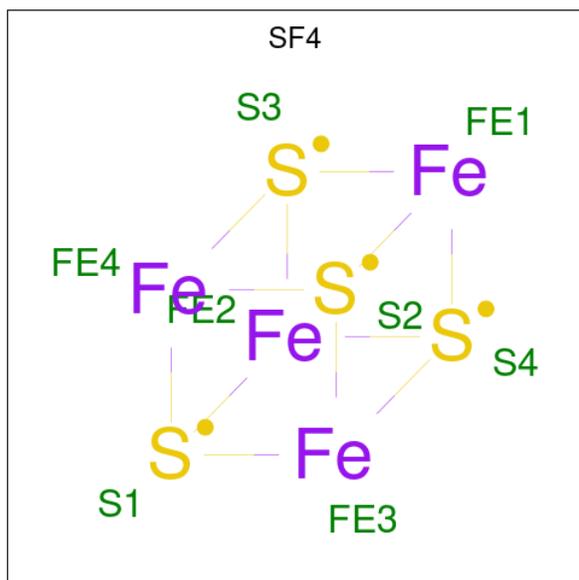
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
18	B	1	8	4	4	0

- Molecule 19 is ZINC ION (CCD ID: ZN) (formula: Zn).

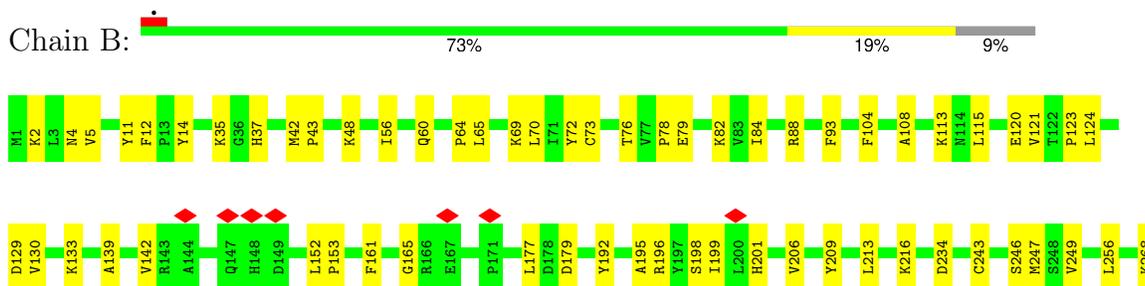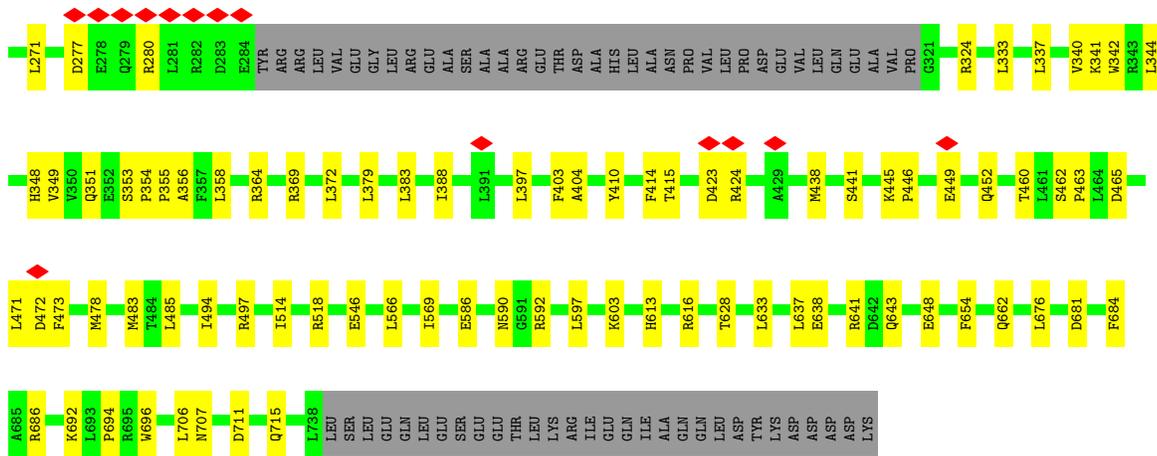| Mol	Chain	Residues	Atoms		AltConf
19	E	3	Total	Zn	0
			3	3	
19	F	2	Total	Zn	0
			2	2	
19	K	1	Total	Zn	0
			1	1	
19	N	1	Total	Zn	0
			1	1	

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: TFIIH basal transcription factor complex helicase XPB subunit

Chain A:

64%   14%   22%

• Molecule 2: General transcription and DNA repair factor IIH helicase subunit XPD

Chain B:

73%   19%   9%

• Molecule 3: General transcription factor IIH subunit 1

Chain C:

• Molecule 4: General transcription factor IIH subunit 4, p52

Chain D:

• Molecule 5: General transcription factor IIH subunit 2

Chain E:

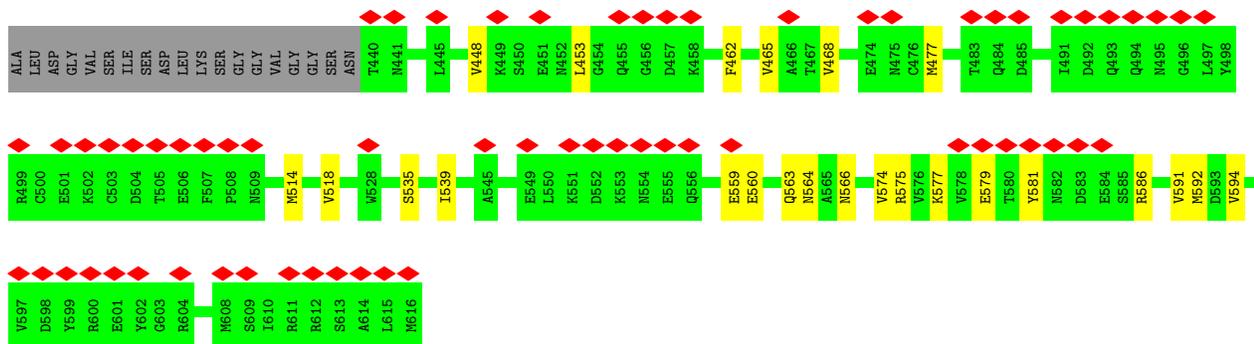
• Molecule 6: General transcription factor IIH subunit 3

Chain F:

• Molecule 7: General transcription factor IIH subunit 5

Chain G:

89%   •   7%

MET VAL ASN V4 F19 I38 F44 T69 GLN LYS

• Molecule 8: DNA repair protein complementing XP-C cells

Chain H: •

98%

MET ALA ARG LYS ARG ALA ALA GLY GLY GLU GLU PRO ARG ARG GLU GLY SER SER ALA LYS SER ALA LYS SER ALA ARG ARG GLU GLU GLU GLU GLU ASP ALA PHE GLU ASP LYS PRO PRO LYS LYS SER LEU LEU SER LYS VAL SER GLN GLY LYS ARG LYS ARG GLY CYS

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

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

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

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

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

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

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

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

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

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

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

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

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

GLU LYS ARG ALA LEU GLY ASN TRP LYS LEU LEU ALA LYS GLY LEU LEU ILE ARG GLU ARG LEU LYS ARG TYR GLY PRO LYS SER SER GLU ALA ALA ALA SER HIS LEU PHE PRO PHE GLU GLN LEU S892 E895 R898 A901 A902 S903

W904 P905 Q906 N907 R908 GLU ASP GLU GLU LYS LYS GLN LYS LEU LEU GLY GLY LEU LEU ILE ARG GLU ARG LEU LYS ARG GLU GLU LYS LYS ALA ALA ALA SER HIS LEU GLU PHE PRO PHE GLU GLN GLU LEU

• Molecule 9: DNA repair protein complementing XP-A cells

Chain K:

• Molecule 10: DNA lesion strand

Chain L:

• Molecule 11: DNA normal strand

Chain M:

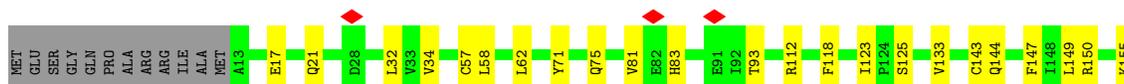• Molecule 12: Replication protein A 70 kDa DNA-binding subunit

Chain N:

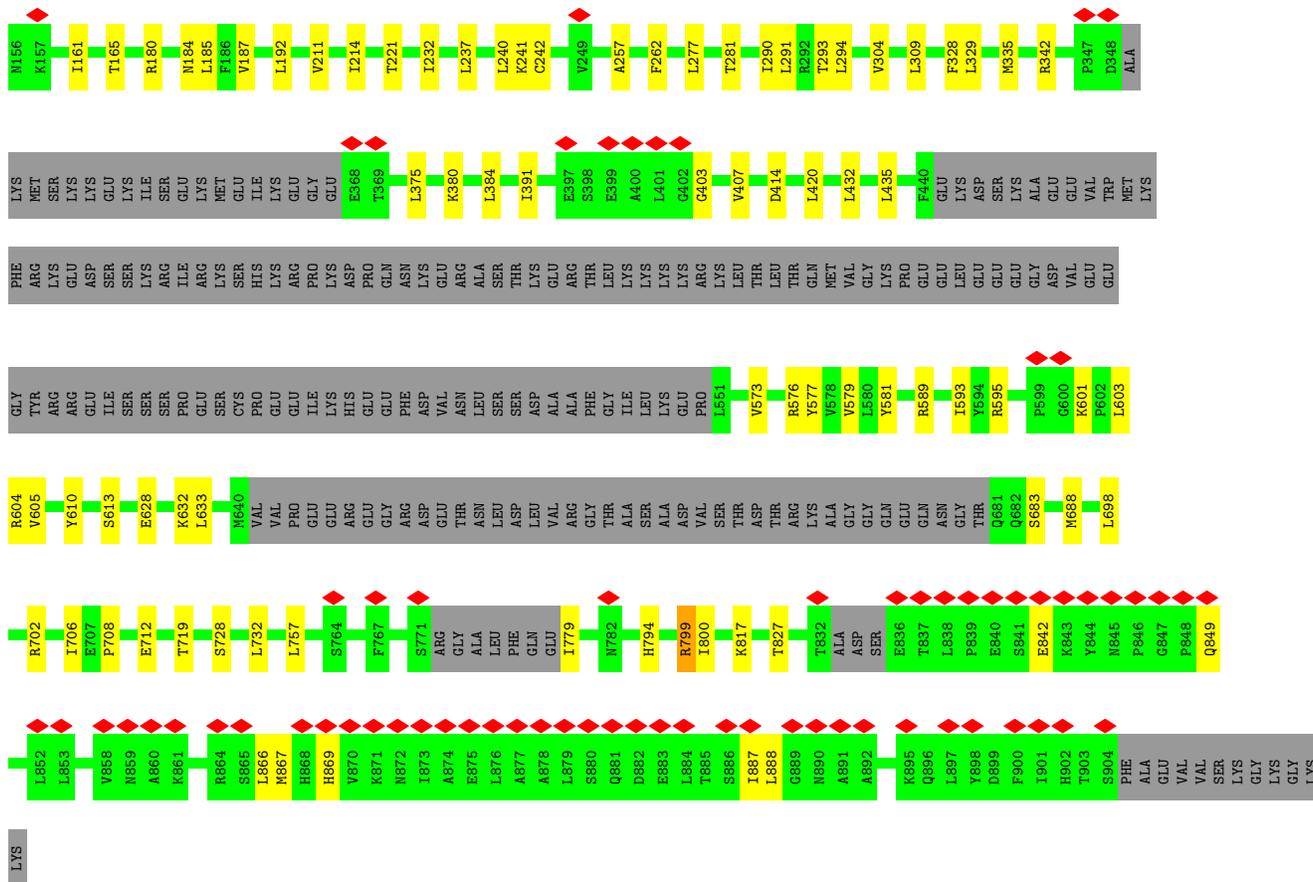• Molecule 13: Replication protein A 32 kDa subunit

Chain O:

• Molecule 14: Replication protein A 14 kDa subunit

Chain P:

• Molecule 15: DNA repair endonuclease XPF

Chain Q:

• Molecule 16: DNA excision repair protein ERCC-1

• Molecule 17: DNA excision repair protein ERCC-5

Row 1: ARG LEU CYS LYS LEU LEU PHE PHE ARG ILE ARG PRO ILE PHE VAL PHE ASP GLY ASP ALA PRO LEU LEU LYS LYS GLN THR LEU VAL LYS ARG ARG GLN ARG GLN ARG LYS ASP LEU ALA SER SER ASP SER ARG ALA LYS THR THR GLU LYS LEU LEU LYS LYS THR PHE LEU LEU LYS ILE ARG ALA ILE LYS

Row 2: THR ALA PHE SER LYS ARG ASP GLU GLU ALA LEU LEU PRO SER LEU THR GLN LEU VAL ARG ARG GLU ASN ASP ASP LEU TYR VAL LEU PRO LEU GLN GLU GLU GLU LYS HIS SER GLU GLU ASP LYS GLU TRP GLN GLU ARG MET ASN GLN LYS GLN ALA LEU GLN GLU GLU PHE PHE

Row 3: HIS ASN PRO GLN ALA ILE ASP **I188** **D192** **F193** **S194** **S195** **E199** **V200** **K201** **H202** **E203** **I204** **L205** **T206** **D207** **M208** **K209** **K213** **E225** **S226** **D227** **L237** **K240** **L243** **I247** **V250** **Q251** **M254** **Q257** HIS SER GLY HIS ILE ARG ARG GLN TYR GLU ASP GLY GLY

Row 4: PHE LEU LYS LYS GLU VAL GLU GLU SER ARG ARG VAL VAL SER GLU ASP THR SER HIS TYR ILE LEU ILE LYS GLY ILE GLN ALA LYS THR ALA GLU ASP SER GLU SER LEU PRO SER SER LYS MET HIS GLY MET SER PHE ASP VAL LYS SER SER PRO CYS GLU LYS LEU LYS THR

Row 5: GLU LYS GLU PRO ASP ALA THR PRO PRO SER PRO ARG THR LEU LEU ALA MET **Q349** **L353** **E360** **L361** GLU SER GLU ASN ARG ARG GLN ALA ARG GLY ARG ASN ALA PRO ALA VAL ASP GLY SER ILE SER PRO ARG THR LEU SER ALA ILE LYS ARG ALA LEU ASP ASP

Row 6: GLU ASP VAL LYS VAL CYS ALA GLY ASP ASP VAL GLN THR GLY GLY PRO GLY ALA GLU GLU MET SER LEU VAL HIS VAL GLY THR GLU ASN SER ASP GLY LEU VAL ARG ASP GLY LYS GLY ILE PRO PHE THR ALA THR GLU ALA SER SER VAL ASN SER ALA GLU HIS VAL

Row 7: ALA SER THR ASN GLU GLY ARG GLU PRO THR ASP SER VAL PRO LYS GLU GLN MET SER LEU VAL HIS VAL GLY THR GLU ALA PHE ILE SER ASP GLU SER MET ILE LYS ASP ARG LYS GLY ARG ASP LEU PRO LEU GLU SER ALA VAL VAL ARG HIS SER ASP ALA PRO GLY LEU PRO ASN

Row 8: GLY ARG GLU LEU THR PRO ALA SER PRO THR CYS THR ASN SER VAL SER LYS ASN GLU THR HIS ALA GLU VAL LEU GLU GLN GLN ASN LEU CYS TYR GLU SER LYS PHE ASP SER GLU LEU LEU SER ASP ASP GLU GLY THR LYS CYS PRO ASN SER ALA SER GLU VAL ILE

Row 9: GLY PRO VAL LEU GLN THR SER SER ILE VAL SER VAL PRO SER GLU ALA VAL ASP ASN VAL GLU ASN VAL VAL SER PHE ASN ALA LYS GLU HIS GLU ASN PHE GLU LEU GLN GLU THR ILE GLN GLU GLN THR THR GLU ALA GLY GLN ASP LEU ILE SER ILE SER PRO LYS ALA VAL

Row 10: GLU PRO MET ILE ASP GLU GLU GLU SER GLY SER PHE ILE GLU GLU VAL GLN THR SER VAL ILE SER ASP GLU GLU LEU GLN ALA GLU PRO THR LYS PRO SER GLU GLN GLY GLU GLU LEU VAL GLY THR ARG GLU GLY GLU ALA PRO ALA GLU SER GLU

Row 11: SER LEU LEU ASP ASN GLU ARG ASP ASP VAL ASP GLY GLU GLN GLU ALA GLU LEU ARG LEU LEU PHE VAL PRO ILE TYR ILE GLN ALA MET GLU ALA GLU GLN ALA ILE LEU GLU GLU LEU THR LEU SER ASN LEU ALA GLN GLN ASN SER LYS ASP SER LYS GLY SER ARG ASP ILE VAL ALA ASP ASN ILE LYS ASN GLN LYS GLN GLN GLU

Row 12: ARG ILE ALA THR VAL GLY GLN MET PHE LEU SER GLN LEU LEU ARG LEU PHE VAL PRO ILE TYR ILE GLN ALA MET GLU ALA GLU GLN ALA ILE LEU ASP LEU GLU LEU THR ASP ASP GLN SER THR GLY ILE THR ASP ASP SER ILE TRP PHE GLY ALA

Row 13: ARG HIS VAL TYR ARG ASN PHE ASN LYS ASN LYS PHE VAL GLU TYR TYR GLN ILE TYR VAL ASP PHE HIS ASN GLN LEU GLY LEU ASP ARG ASN LYS ILE ASN ALA TYR LEU GLY ASP TYR THR GLU ILE PRO THR VAL GLY CYS VAL THR ALA MET GLU ILE LEU

Row 14: ASN GLU PHE PRO GLY HIS GLY LEU GLU PRO LEU LEU LYS PHE SER GLU TRP HIS GLU ALA GLN LEU ASN PRO LYS ILE ARG ASN PRO ASN HIS ASP THR LYS VAL LYS LYS LEU LEU ARG THR LEU GLN LEU ASP THR PRO GLY PHE PRO ASN PRO ALA VAL ALA GLU ALA TYR LEU LYS

Row 15: PRO VAL VAL ASP SER GLY LYS GLY SER PHE LEU TRP LYS PRO ASP LEU ASP LYS ILE ARG PHE CYS GLN ARG TYR PHE GLY TRP ASN ARG THR LYS THR ASP GLU SER LEU PHE GLN LEU LYS ASP LEU LYS GLY GLN ALA GLN ILE GLN GLN ASP ALA GLN GLN THR GLN LEU ARG ILE ASP SER PHE PHE ARG

Row 16: LEU ALA GLN GLU LYS GLU ASP ALA LYS ARG ILE LYS SER GLN ARG ASN ARG ALA VAL THR MET LEU ARG GLY ILE ASP SER ASN LYS GLY GLY GLU SER SER ASP GLY SER PHE PRO ASN ASN PRO ALA VAL ALA GLU ALA VAL ALA ALA GLU MET GLU LEU GLY ASP GLU GLN LEU LEU ASP GLN ALA SER ALA ARG LYS LYS ARG

Row 17: GLY ILE THR ASN THR LEU GLU GLU SER SER SER LEU ARG LYS SER ASP VAL SER ARG LYS ASN THR CYS GLY PHE GLY LEU GLY GLU LEU THR CYS LEU SER SER GLU SER SER ASP GLY SER GLU ASP ALA GLU GLU SER SER LEU MET ASN VAL GLN ARG ARG THR ALA

Row 18: ALA LYS GLU PRO LYS THR SER ALA SER ASP GLN SER GLU VAL LYS GLU ALA PRO VAL LYS ASN GLY ALA THR THR SER SER ASP ASP ASP GLY GLY LYS GLU MET VAL LEU VAL THR ALA ARG SER VAL PHE GLY LYS LYS ARG ARG LYS LEU ARG ARG

Row 19: ALA ARG GLY ARG LYS ARG LYS THR

4   Experimental information   ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	161019	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 $(e^-/\text{Å}^2)$	52.5	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.052	Depositor
Minimum map value	-0.012	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.008	Depositor
Map size (Å)	266.56, 266.56, 266.56	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.833, 0.833, 0.833	Depositor

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SF4, 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	0.08	0/5051	0.23	0/6822
2	B	0.09	0/5780	0.24	0/7821
3	C	0.11	0/1097	0.26	0/1480
4	D	0.08	0/3519	0.20	0/4765
5	E	0.09	0/2736	0.25	0/3706
6	F	0.11	0/2049	0.28	0/2776
7	G	0.07	0/528	0.19	0/713
8	H	0.16	0/133	0.31	0/180
9	K	0.09	0/1743	0.22	0/2322
10	L	0.16	0/860	0.35	0/1323
11	M	0.16	0/747	0.33	0/1153
12	N	0.07	0/1486	0.21	0/2001
13	O	0.10	0/1511	0.24	0/2051
14	P	0.06	0/970	0.18	0/1310
15	Q	0.09	0/5570	0.23	0/7583
16	R	0.09	0/1431	0.26	0/1968
17	S	0.09	0/695	0.24	0/929
All	All	0.09	0/35906	0.24	0/48903

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	A	4947	0	4993	68	0
2	B	5659	0	5699	93	0
3	C	1076	0	1078	27	0
4	D	3441	0	3486	43	0
5	E	2677	0	2645	49	0
6	F	2013	0	2030	52	0
7	G	522	0	531	3	0
8	H	131	0	127	4	0
9	K	1716	0	1723	35	0
10	L	770	0	430	9	0
11	M	665	0	361	11	0
12	N	1459	0	1416	12	0
13	O	1485	0	1488	26	0
14	P	950	0	952	11	0
15	Q	5461	0	5326	61	0
16	R	1400	0	1292	20	0
17	S	685	0	662	20	0
18	B	8	0	0	0	0
19	E	3	0	0	0	0
19	F	2	0	0	0	0
19	K	1	0	0	0	0
19	N	1	0	0	0	0
All	All	35072	0	34239	490	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 7.

The worst 5 of 490 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)
17:S:202:HIS:HE1	17:S:254:MET:HG3	1.08	1.17
17:S:202:HIS:CE1	17:S:254:MET:HG3	1.85	1.11
5:E:272:SER:HB3	5:E:275:HIS:HD2	1.18	1.08
5:E:272:SER:HB3	5:E:275:HIS:CD2	1.95	1.00
2:B:35:LYS:HD2	2:B:452:GLN:HE21	1.42	0.82

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	609/782 (78%)	581 (95%)	28 (5%)	0	100	100
2	B	698/768 (91%)	676 (97%)	22 (3%)	0	100	100
3	C	127/548 (23%)	124 (98%)	3 (2%)	0	100	100
4	D	422/462 (91%)	413 (98%)	9 (2%)	0	100	100
5	E	336/395 (85%)	321 (96%)	15 (4%)	0	100	100
6	F	251/308 (82%)	243 (97%)	8 (3%)	0	100	100
7	G	64/71 (90%)	64 (100%)	0	0	100	100
8	H	15/940 (2%)	15 (100%)	0	0	100	100
9	K	200/273 (73%)	191 (96%)	9 (4%)	0	100	100
12	N	175/616 (28%)	171 (98%)	4 (2%)	0	100	100
13	O	185/270 (68%)	179 (97%)	6 (3%)	0	100	100
14	P	119/121 (98%)	117 (98%)	2 (2%)	0	100	100
15	Q	701/916 (76%)	678 (97%)	23 (3%)	0	100	100
16	R	194/295 (66%)	179 (92%)	15 (8%)	0	100	100
17	S	79/1186 (7%)	76 (96%)	3 (4%)	0	100	100
All	All	4175/7951 (52%)	4028 (96%)	147 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2   Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	542/688 (79%)	538 (99%)	4 (1%)	81	88
2	B	614/672 (91%)	611 (100%)	3 (0%)	86	91
3	C	123/484 (25%)	122 (99%)	1 (1%)	79	87
4	D	374/399 (94%)	372 (100%)	2 (0%)	86	91
5	E	306/352 (87%)	301 (98%)	5 (2%)	58	76
6	F	228/272 (84%)	223 (98%)	5 (2%)	47	69
7	G	59/64 (92%)	59 (100%)	0	100	100
8	H	12/804 (2%)	11 (92%)	1 (8%)	9	31
9	K	187/233 (80%)	186 (100%)	1 (0%)	86	91
12	N	160/530 (30%)	158 (99%)	2 (1%)	65	79
13	O	172/228 (75%)	171 (99%)	1 (1%)	84	90
14	P	106/106 (100%)	106 (100%)	0	100	100
15	Q	564/816 (69%)	557 (99%)	7 (1%)	67	80
16	R	132/252 (52%)	131 (99%)	1 (1%)	79	87
17	S	78/1050 (7%)	78 (100%)	0	100	100
All	All	3657/6950 (53%)	3624 (99%)	33 (1%)	74	85

5 of 33 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
15	Q	579	VAL
15	Q	719	THR
16	R	129	ASP
5	E	254	PHE
5	E	155	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

Mol	Chain	Res	Type
4	D	366	HIS
16	R	118	ASN
5	E	220	HIS
17	S	202	HIS
15	Q	52	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 7 are monoatomic - leaving 1 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	$\#|Z| > 2$
18	SF4	B	1000	2	0,12,12	-	-	-		

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
18	SF4	B	1000	2	-	-	0/6/5/5

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 ⓘ

This section contains visualisations of the EMDB entry EMD-71524. 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 ⓘ
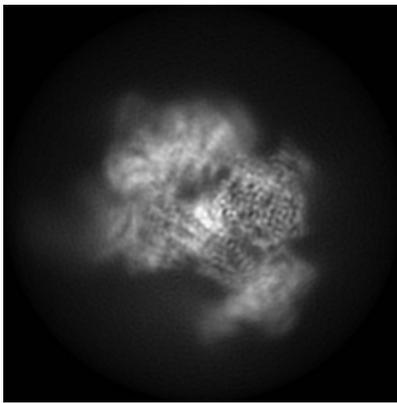
6.1.1 Primary map

X
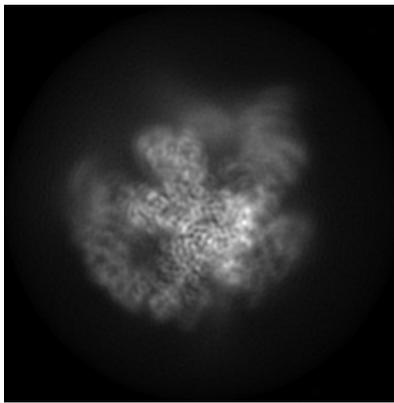
Y
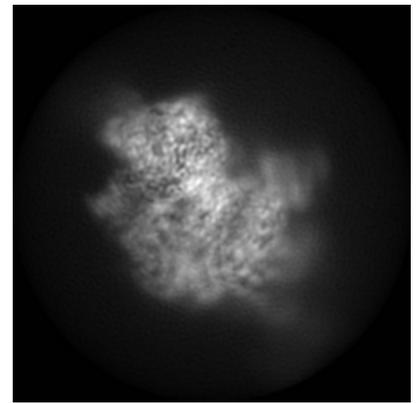
Z

6.1.2 Raw map

X

Y

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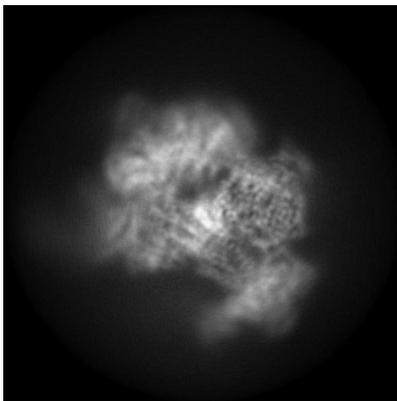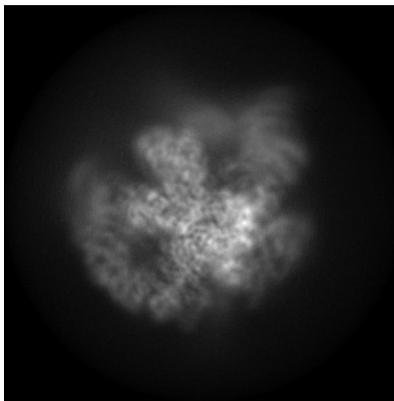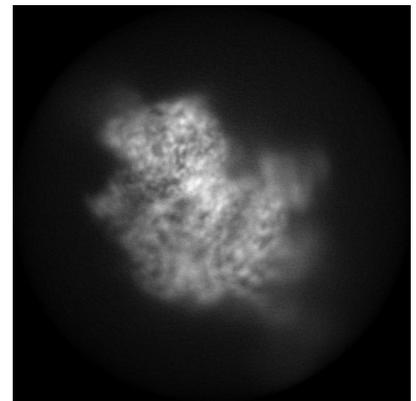
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
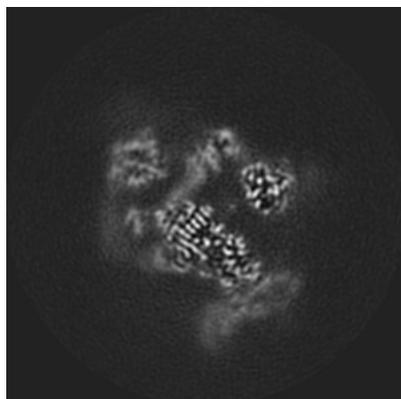
6.2.1 Primary map
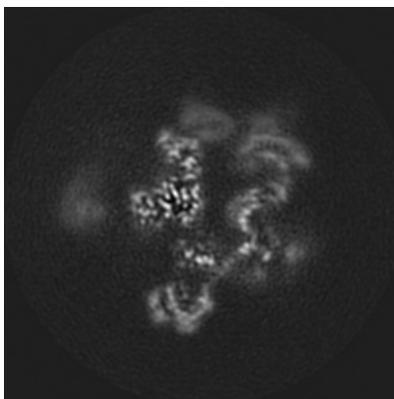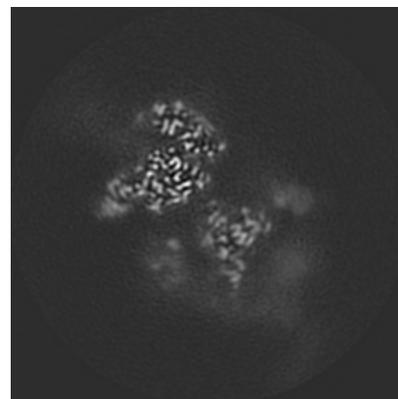
X Index: 160   Y Index: 160   Z Index: 160

6.2.2 Raw map
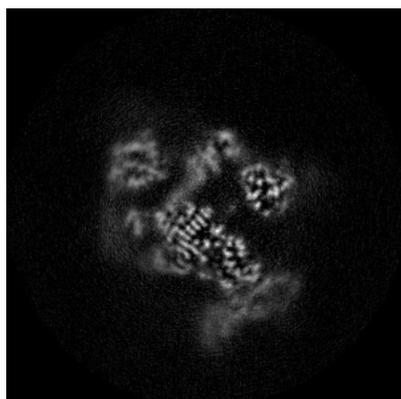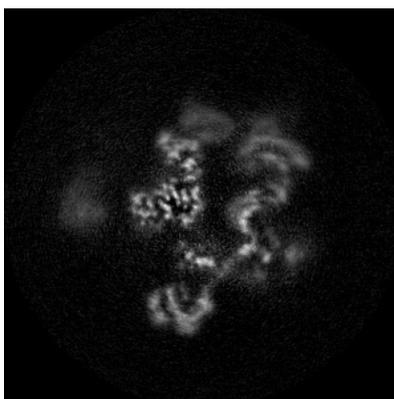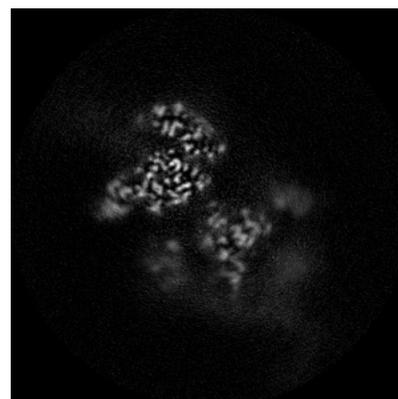
X Index: 160   Y Index: 160   Z Index: 160

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

6.3 Largest variance slices (i)

6.3.1 Primary map
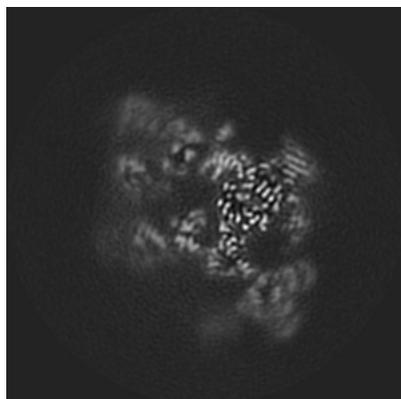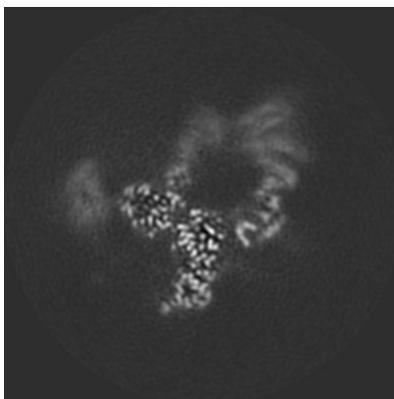
| X Index: 143 | Y Index: 173 | Z Index: 153 |
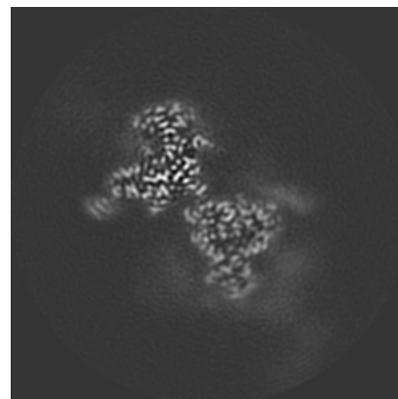
6.3.2 Raw map
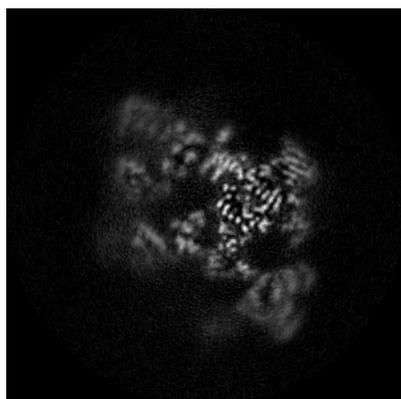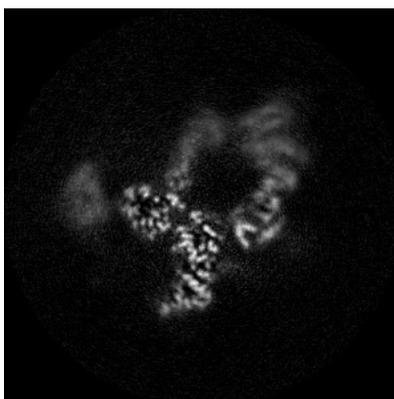
| X Index: 142 | Y Index: 172 | Z Index: 146 |
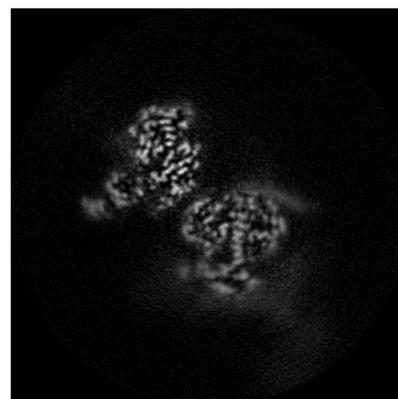
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map
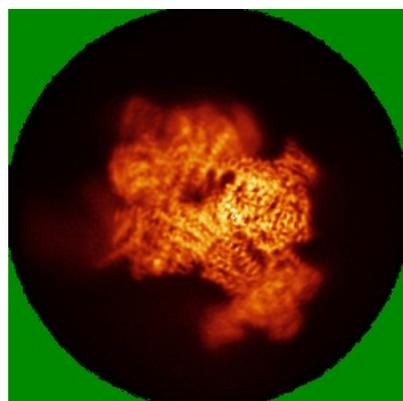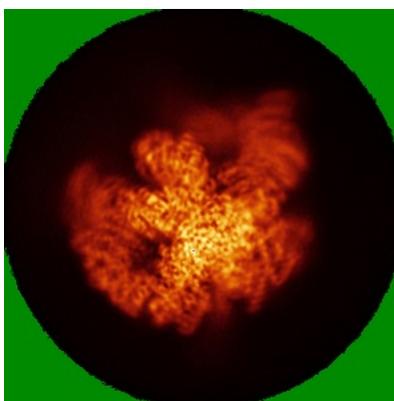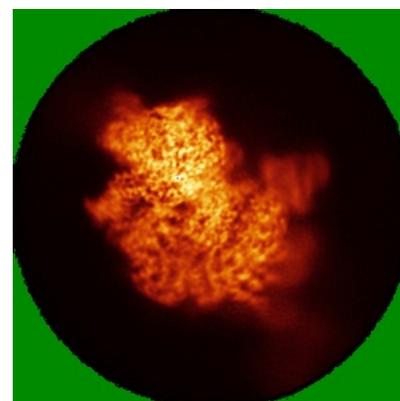
X   Y   Z

6.4.2 Raw map

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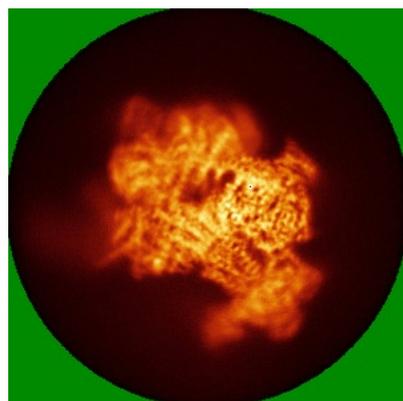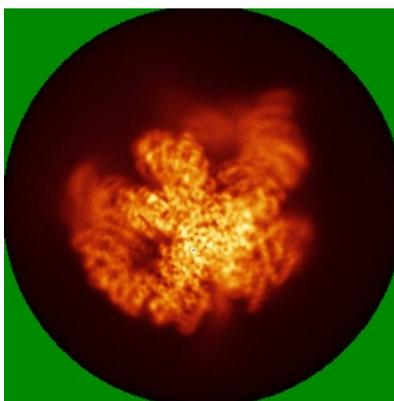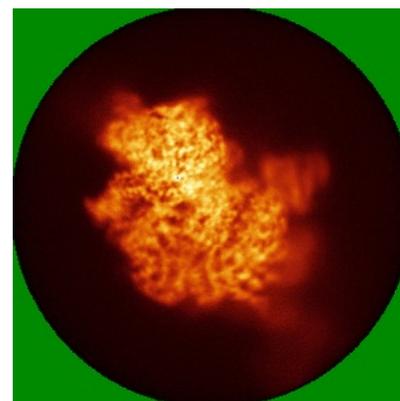
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5   Orthogonal surface views (i)

6.5.1   Primary map
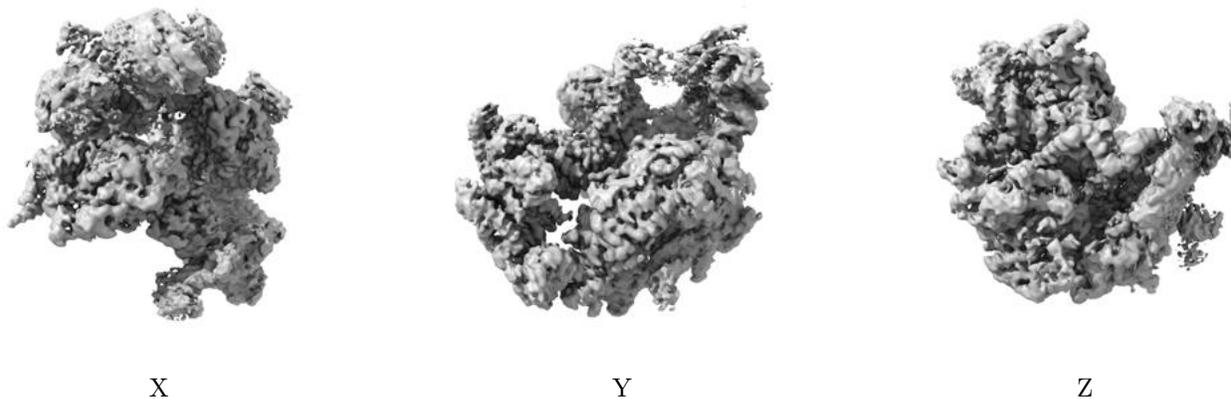
The images above show the 3D surface view of the map at the recommended contour level 0.008. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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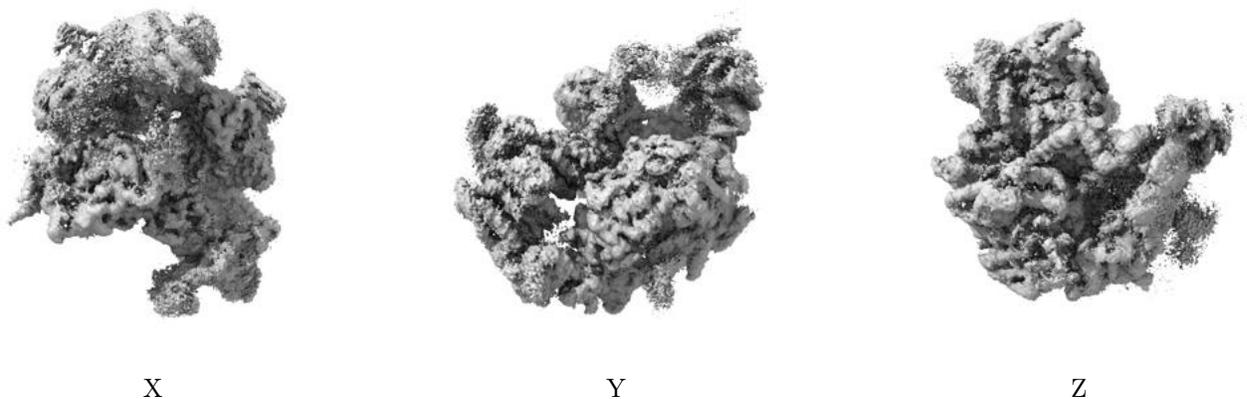
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6   Mask visualisation (i)

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

7 Map analysis (i)

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

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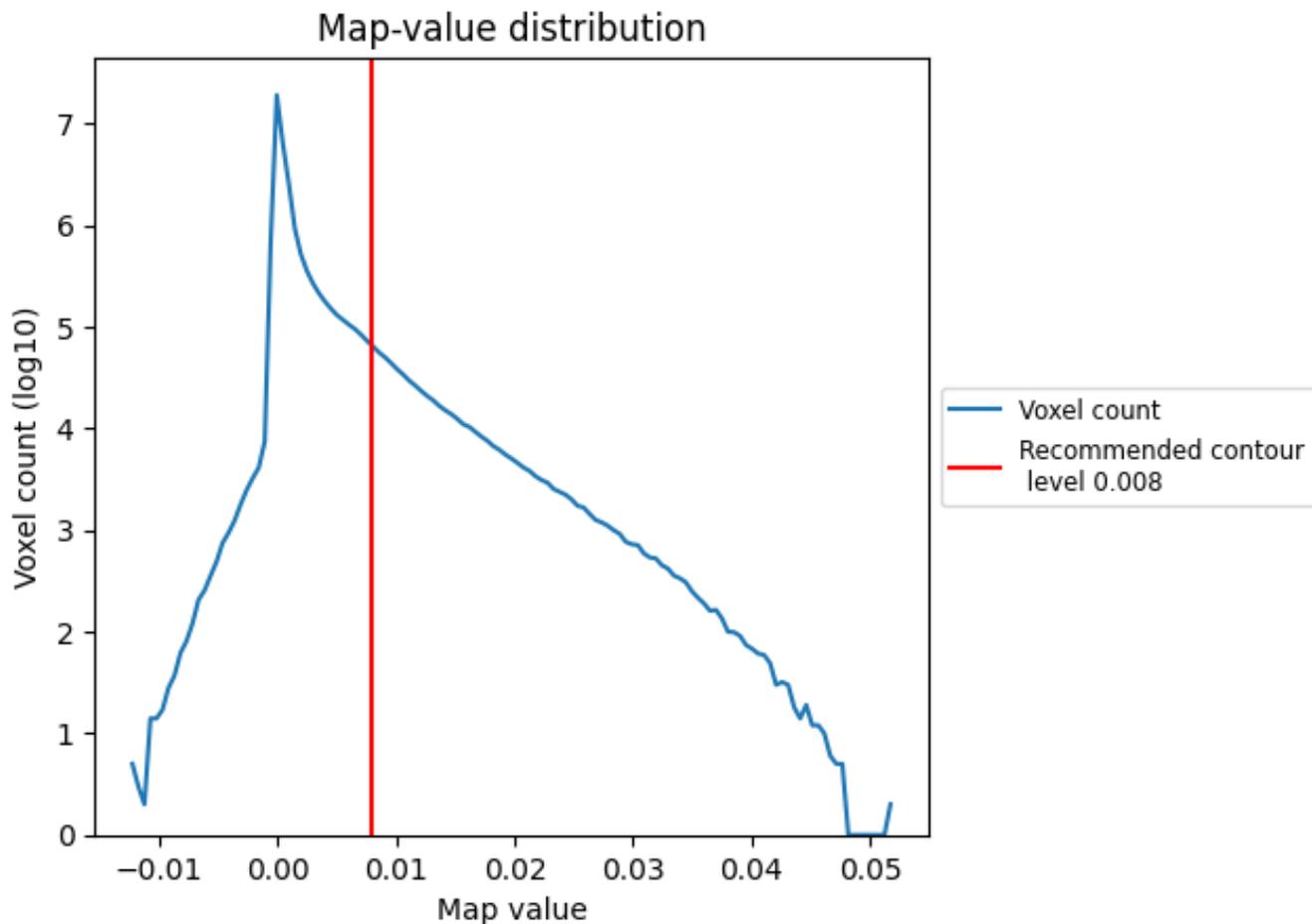
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
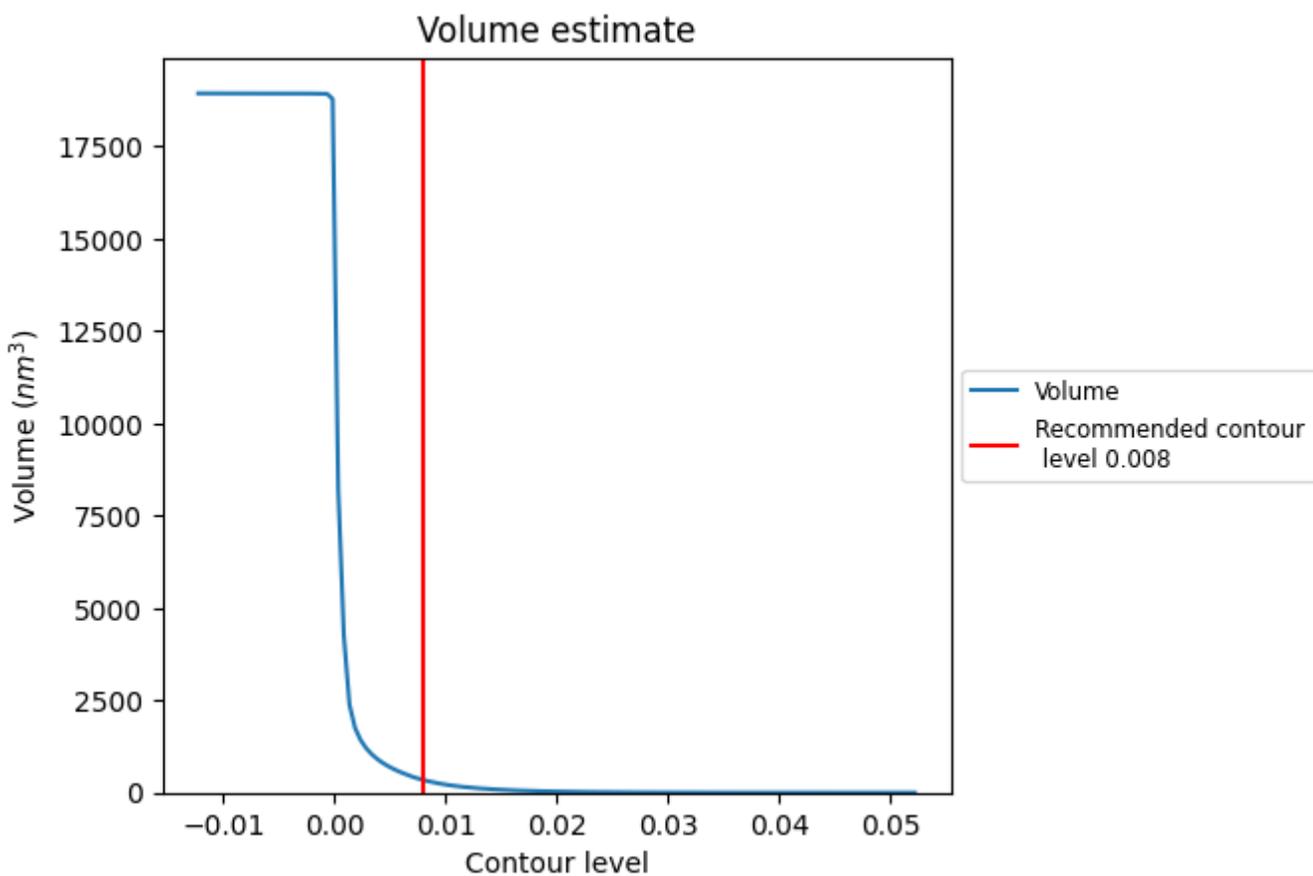
The volume at the recommended contour level is 343 nm^3; this corresponds to an approximate mass of 310 kDa.

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

7.3   Rotationally averaged power spectrum (i)
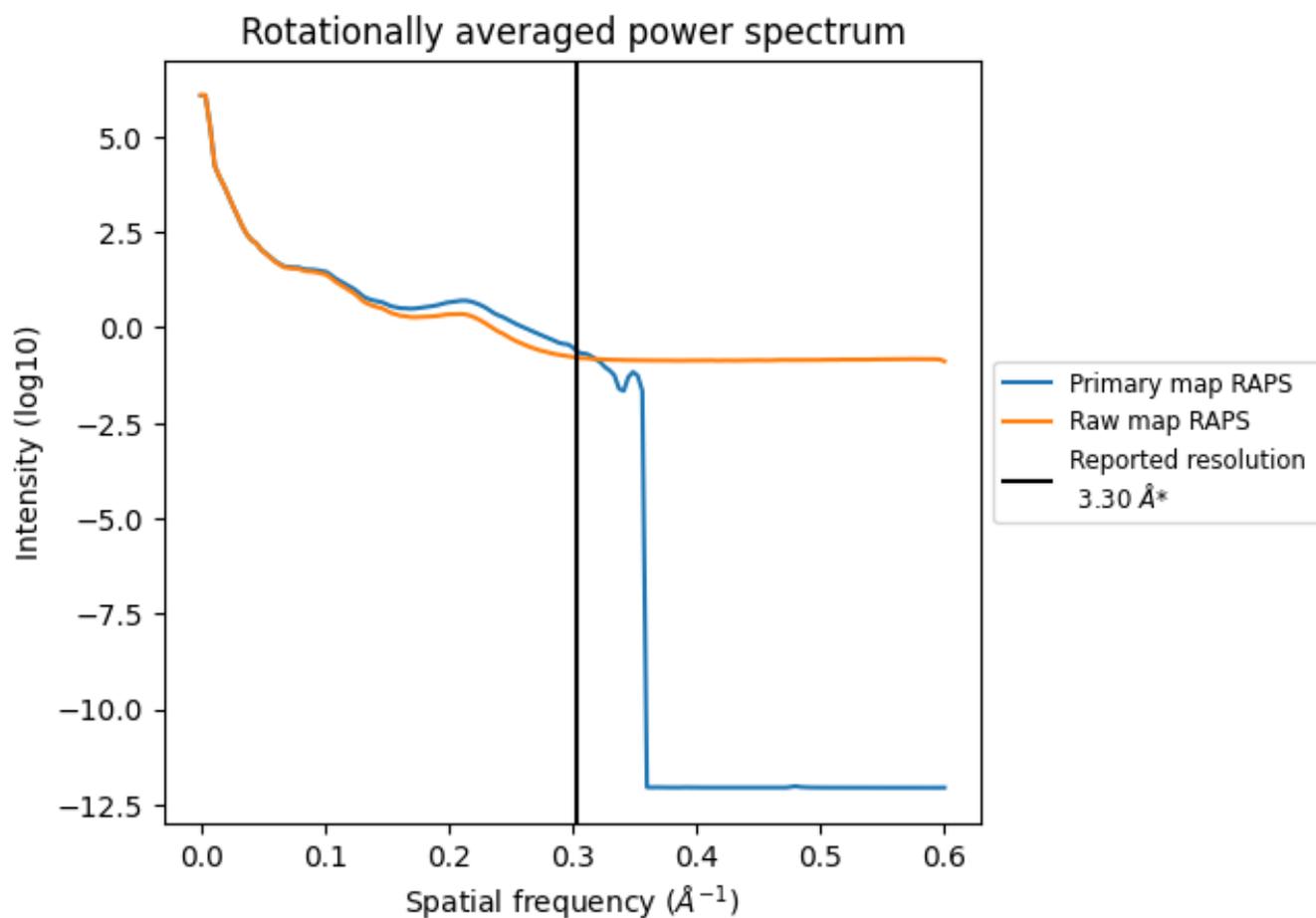
*Reported resolution corresponds to spatial frequency of 0.303 $Å^{-1}$

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 ⓘ
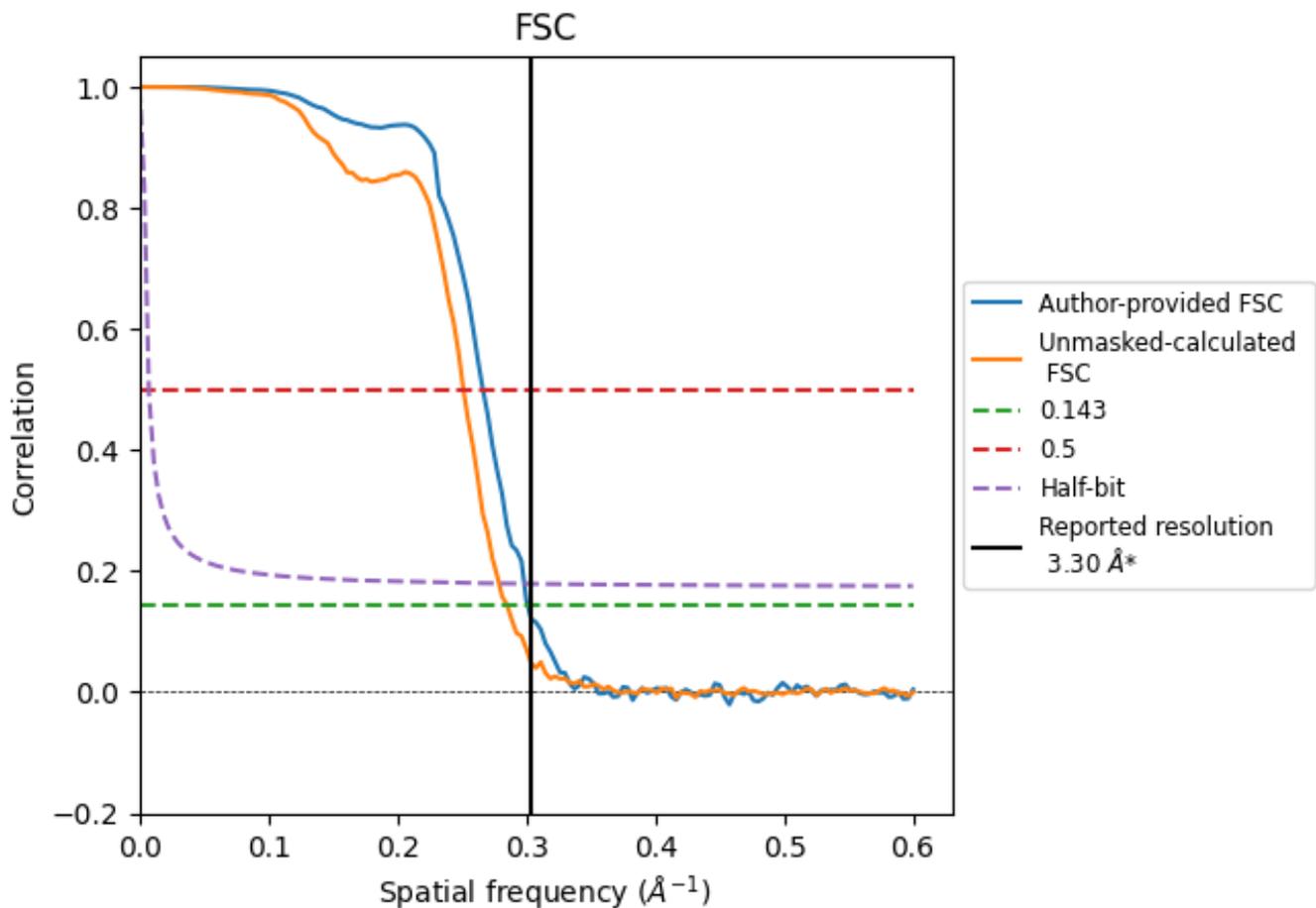
*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.32	3.75	3.35
Unmasked-calculated*	3.51	3.98	3.58

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-71524 and PDB model 9PD3. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay ⓘ


X	Y	Z
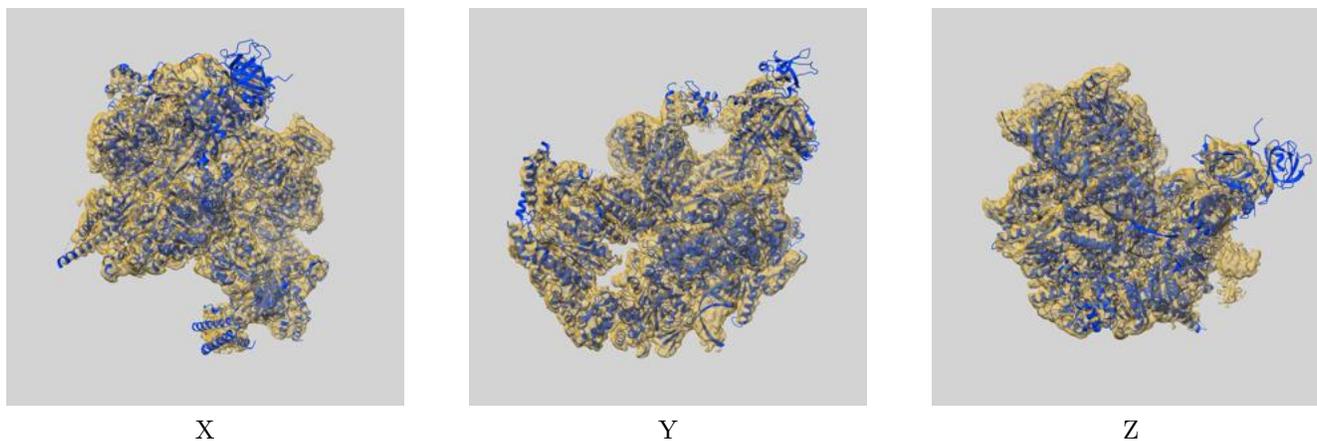
The images above show the 3D surface view of the map at the recommended contour level 0.008 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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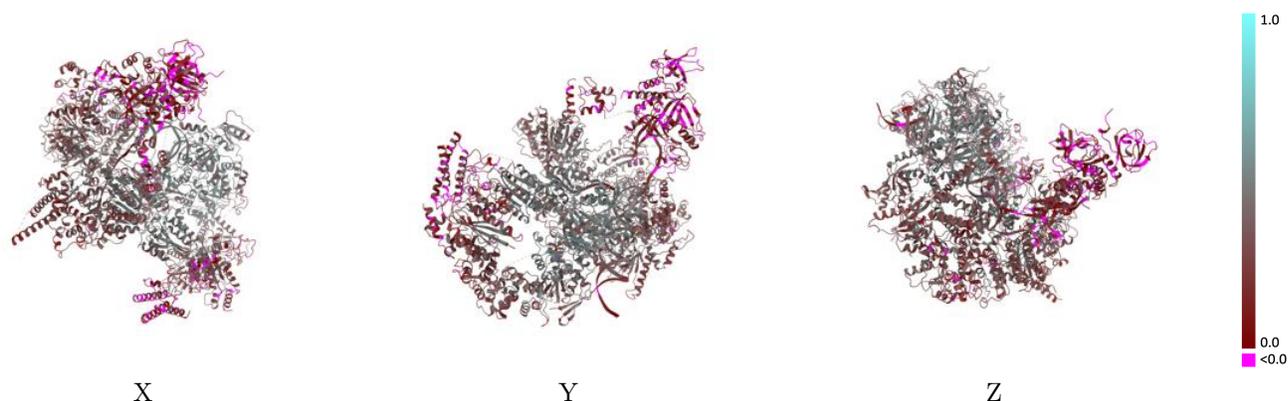
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3   Atom inclusion mapped to coordinate model (i)
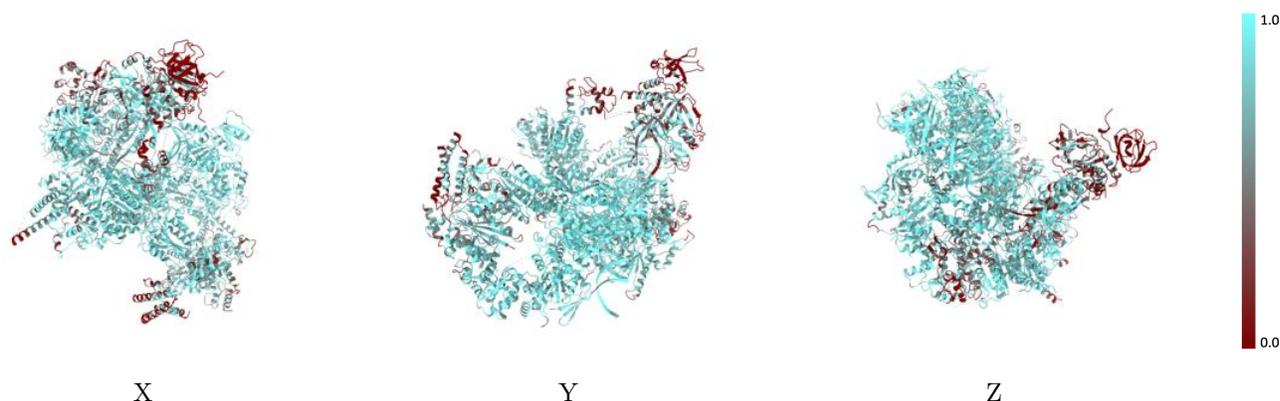
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.008).

9.4   Atom inclusion ⓘ
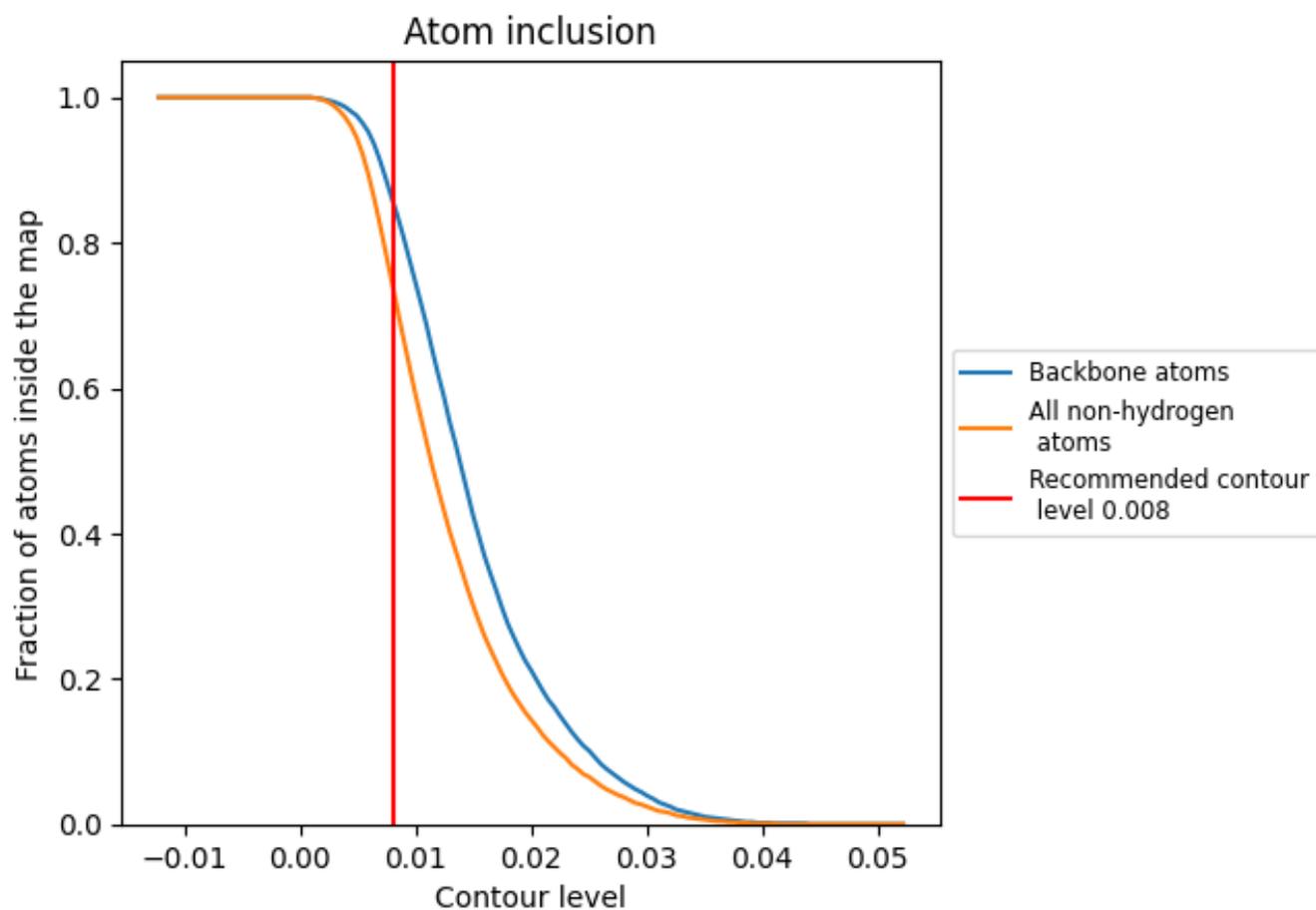
At the recommended contour level, 86% of all backbone atoms, 74% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.008) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7400	0.3130
A	0.9080	0.4680
B	0.8390	0.3650
C	0.3960	0.1320
D	0.8150	0.3490
E	0.7580	0.3290
F	0.7070	0.2630
G	0.8610	0.4080
H	0.5870	0.4140
K	0.7630	0.2740
L	0.9320	0.3400
M	0.7970	0.3090
N	0.5580	0.1230
O	0.3250	0.0890
P	0.0920	0.0380
Q	0.7640	0.3080
R	0.6720	0.3030
S	0.6840	0.2820

1.0

0.0
<0.0