Full wwPDB EM Validation Report (i)

Mar 10, 2025 – 12:32 PM JST

PDB ID	:	9J0N
EMDB ID	:	EMD-61058
Title	:	Paused elongation complex of mammalian RNA polymerase II with nucleosome (PEC2-nuc)
Authors	:	Naganuma, M.; Kujirai, T.; Ehara, H.; Uejima, T.; Ito, T.; Goto, M.; Aoki, M.; Henmi, M.; Miyamoto-Kohno, S.; Shirouzu, M.; Kurumizaka, H.; Sekine, S.
Deposited on	:	2024-08-02
Resolution	:	3.40 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:

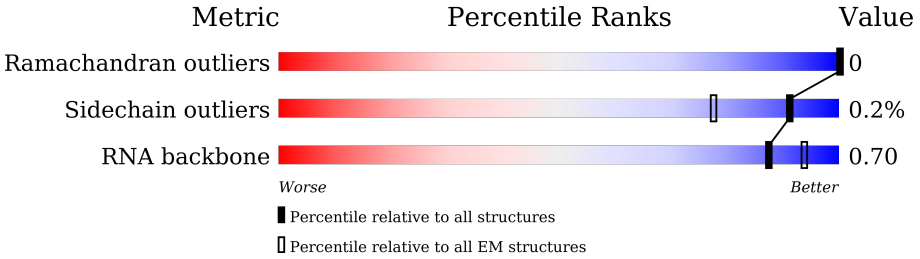
EMDB validation analysis	:	0.0.1.dev117
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



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

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

Mol	Chain	Length	Quality of chain
1	A	1970	71% 29%
2	B	1174	95% 5%
3	C	271	95% 5%
4	E	210	100%
5	F	127	61% 39%
6	G	172	99%
7	H	150	99%
8	I	125	93% 7%

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Mol	Chain	Length	Quality of chain
9	Y	118	53% 98%
10	Z	1107	14% 43% 57%
11	N	198	7% 79% 21%
12	P	42	26% 71%
13	T	198	5% 84% 16%
14	D	142	89% 11%
15	J	67	100%
16	K	117	98%
17	L	58	79% 21%
18	M	301	40% 59%
19	a	136	71% 29%
19	e	136	70% 29%
20	b	103	77% 22%
20	f	103	75% 24%
21	c	130	5% 79% 21%
21	g	130	81% 19%
22	d	126	6% 75% 25%
22	h	126	74% 26%
23	U	528	14% 35% 65%
24	V	580	35% 93% 7%
25	W	611	30% 89% 11%
26	X	404	9% 91%

2 Entry composition (i)

There are 28 unique types of molecules in this entry. The entry contains 59666 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 DNA-directed RNA polymerase subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1394	11042	6947	1981	2046	68	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	1121	8971	5679	1575	1653	64	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	258	2072	1300	356	410	6	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerase II subunit E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	209	1720	1089	300	323	8	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerase II subunit F.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	78	626	401	106	114	5	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	G	171	1351	875	219	249	8	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	H	149	1197	759	195	238	5	0	0

- Molecule 8 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	I	116	942	582	168	181	11	0	0

- Molecule 9 is a protein called Transcription elongation factor SPT4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	Y	116	911	570	159	173	9	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Y	0	SER	-	expression tag	UNP P63272

- Molecule 10 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	Z	480	3837	2439	676	705	17	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Z	1088	LYS	-	expression tag	UNP O00267
Z	1089	GLU	-	expression tag	UNP O00267
Z	1090	THR	-	expression tag	UNP O00267
Z	1091	ALA	-	expression tag	UNP O00267
Z	1092	ALA	-	expression tag	UNP O00267
Z	1093	ALA	-	expression tag	UNP O00267
Z	1094	LYS	-	expression tag	UNP O00267
Z	1095	PHE	-	expression tag	UNP O00267
Z	1096	GLU	-	expression tag	UNP O00267
Z	1097	ARG	-	expression tag	UNP O00267
Z	1098	GLN	-	expression tag	UNP O00267
Z	1099	HIS	-	expression tag	UNP O00267

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Chain	Residue	Modelled	Actual	Comment	Reference
Z	1100	MET	-	expression tag	UNP O00267
Z	1101	ASP	-	expression tag	UNP O00267
Z	1102	SER	-	expression tag	UNP O00267
Z	1103	SER	-	expression tag	UNP O00267
Z	1104	THR	-	expression tag	UNP O00267
Z	1105	SER	-	expression tag	UNP O00267
Z	1106	ALA	-	expression tag	UNP O00267
Z	1107	ALA	-	expression tag	UNP O00267

- Molecule 11 is a DNA chain called Non-template DNA (157-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
11	N	156	3207	1526	559	966	156	0	0

- Molecule 12 is a RNA chain called RNA (5'-R(P*UP*GP*GP*GP*UP*GP*GP*UP*GP*G P*CP*C)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
12	P	12	261	115	47	87	12	0	0

- Molecule 13 is a DNA chain called Template DNA (168-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
13	T	167	3405	1613	658	968	166	0	0

- Molecule 14 is a protein called DNA-directed RNA polymerase II subunit RPB4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	D	126	1004	630	170	200	4	0	0

- Molecule 15 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	J	67	533	345	90	92	6	0	0

- Molecule 16 is a protein called DNA-directed RNA polymerase II subunit RPB11-a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	K	115	920	593	152	173	2	0	0

- Molecule 17 is a protein called RPB12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	L	46	388	241	75	66	6	0	0

- Molecule 18 is a protein called Transcription elongation factor A protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	M	122	969	589	181	191	8	0	0

- Molecule 19 is a protein called Histone H3.3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	a	97	797	503	155	137	2	0	0
19	e	97	796	501	155	138	2	0	0

- Molecule 20 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	b	80	638	401	125	111	1	0	0
20	f	78	619	391	120	107	1	0	0

- Molecule 21 is a protein called Histone H2A type 1-B/E.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
21	c	103	796	502	155	139	0	0
21	g	105	810	511	158	141	0	0

- Molecule 22 is a protein called Histone H2B type 1-J.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	d	95	Total 746	C 468	N 136	O 140	S 2	0	0
22	h	93	Total 725	C 456	N 130	O 137	S 2	0	0

- Molecule 23 is a protein called Negative elongation factor A.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	U	187	Total 1439	C 912	N 245	O 273	S 9	0	0

- Molecule 24 is a protein called Negative elongation factor B.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	V	542	Total 4341	C 2785	N 736	O 795	S 25	0	0

- Molecule 25 is a protein called Negative elongation factor C/D.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	W	543	Total 4312	C 2755	N 722	O 811	S 24	0	0

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
W	591	GLY	-	expression tag	UNP Q8IXH7
W	592	SER	-	expression tag	UNP Q8IXH7
W	593	SER	-	expression tag	UNP Q8IXH7
W	594	GLY	-	expression tag	UNP Q8IXH7
W	595	SER	-	expression tag	UNP Q8IXH7
W	596	SER	-	expression tag	UNP Q8IXH7
W	597	GLY	-	expression tag	UNP Q8IXH7
W	598	LEU	-	expression tag	UNP Q8IXH7
W	599	GLU	-	expression tag	UNP Q8IXH7
W	600	VAL	-	expression tag	UNP Q8IXH7
W	601	LEU	-	expression tag	UNP Q8IXH7
W	602	PHE	-	expression tag	UNP Q8IXH7
W	603	GLN	-	expression tag	UNP Q8IXH7
W	604	GLY	-	expression tag	UNP Q8IXH7
W	605	PRO	-	expression tag	UNP Q8IXH7
W	606	HIS	-	expression tag	UNP Q8IXH7
W	607	HIS	-	expression tag	UNP Q8IXH7

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Chain	Residue	Modelled	Actual	Comment	Reference
W	608	HIS	-	expression tag	UNP Q8IXH7
W	609	HIS	-	expression tag	UNP Q8IXH7
W	610	HIS	-	expression tag	UNP Q8IXH7
W	611	HIS	-	expression tag	UNP Q8IXH7

- Molecule 26 is a protein called Negative elongation factor E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	X	35	281	185	48	47	1	0	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
X	-23	MET	-	initiating methionine	UNP P18615
X	-22	ASP	-	expression tag	UNP P18615
X	-21	TYR	-	expression tag	UNP P18615
X	-20	LYS	-	expression tag	UNP P18615
X	-19	ASP	-	expression tag	UNP P18615
X	-18	ASP	-	expression tag	UNP P18615
X	-17	ASP	-	expression tag	UNP P18615
X	-16	ASP	-	expression tag	UNP P18615
X	-15	LYS	-	expression tag	UNP P18615
X	-14	LEU	-	expression tag	UNP P18615
X	-13	GLU	-	expression tag	UNP P18615
X	-12	VAL	-	expression tag	UNP P18615
X	-11	LEU	-	expression tag	UNP P18615
X	-10	PHE	-	expression tag	UNP P18615
X	-9	GLN	-	expression tag	UNP P18615
X	-8	GLY	-	expression tag	UNP P18615
X	-7	PRO	-	expression tag	UNP P18615
X	-6	GLY	-	expression tag	UNP P18615
X	-5	SER	-	expression tag	UNP P18615
X	-4	SER	-	expression tag	UNP P18615
X	-3	GLY	-	expression tag	UNP P18615
X	-2	SER	-	expression tag	UNP P18615
X	-1	SER	-	expression tag	UNP P18615
X	0	GLY	-	expression tag	UNP P18615

- Molecule 27 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
27	A	2	2	2	0
27	B	1	1	1	0
27	C	1	1	1	0
27	I	2	2	2	0
27	Y	1	1	1	0
27	J	1	1	1	0
27	L	1	1	1	0

- Molecule 28 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

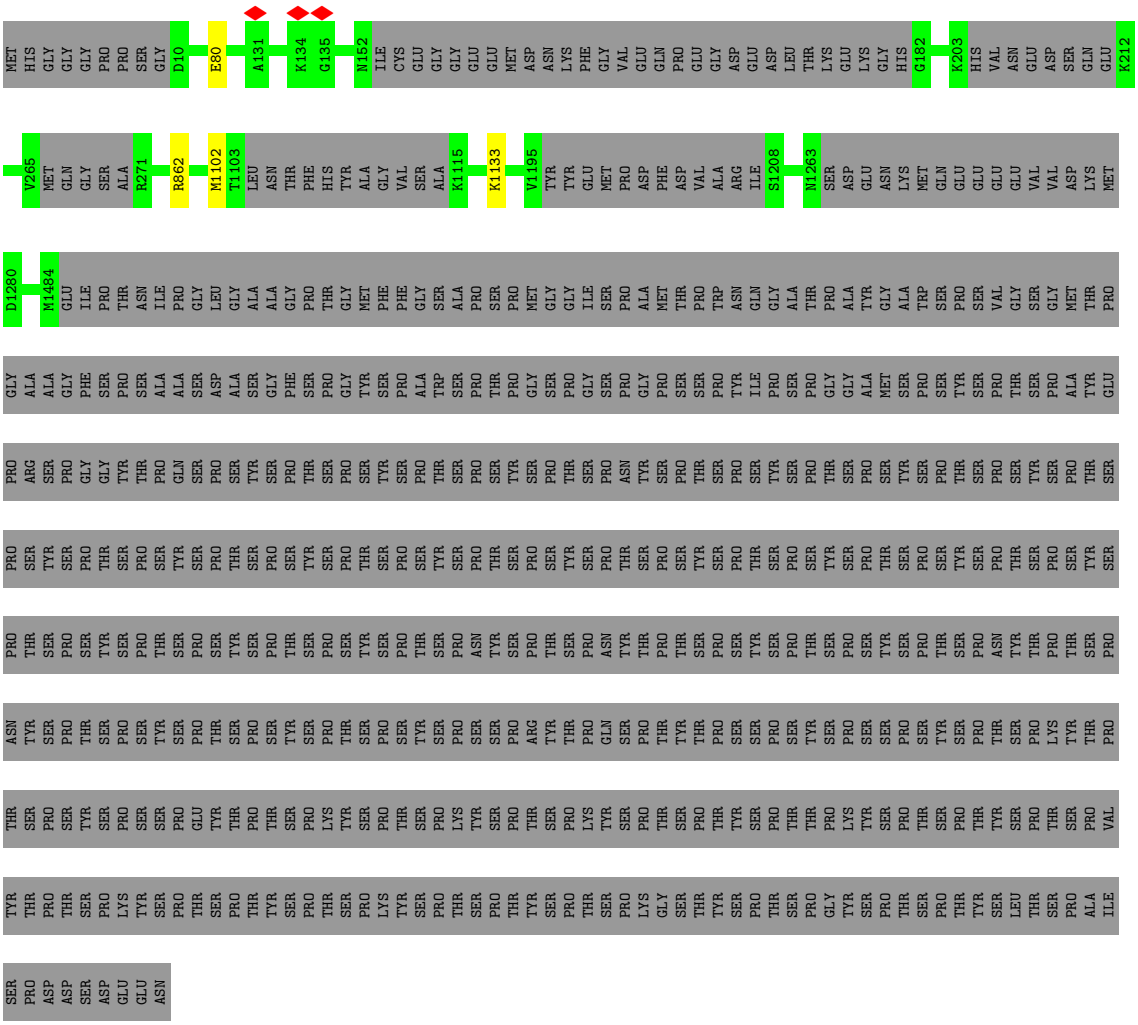
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
28	A	1	1	1	0

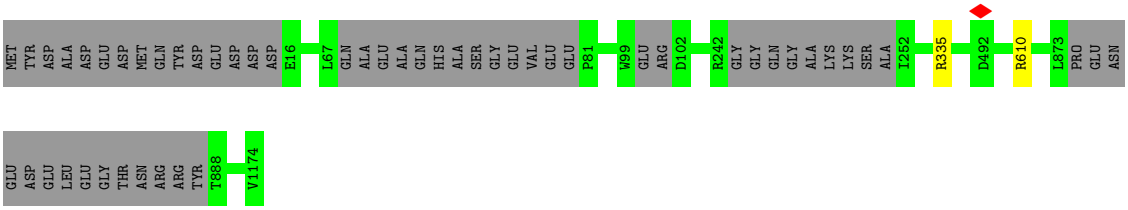
3 Residue-property plots (i)

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: DNA-directed RNA polymerase subunit

Chain A: 71% 29%


MET HIS GLY GLY GLY PRO PRO SER GLY D10 E80 A131 K134 G135 N152 ILE CYS GLU GLY GLY GLU GLU MET ASP ASN LYS PHE GLY VAL GLU GLN PRO GLU GLY ASP GLU ASP LEU THR LYS GLU LYS GLY HIS G182 K203 HIS VAL ASN GLU ASP SER GLN GLU K212
V265 MET GLN GLY SER ALA R271 R862 M1102 T1103 LEU ASN THR PHE HIS TYR ALA GLY VAL SER ALA K1115 K1133 V1195 TYR TYR GLU MET PRO ASP PHE ASP VAL ALA ARG ILE S1208 N1263 SER ASP GLU ASN LYS MET GLN GLU GLU GLU GLU VAL VAL ASP LYS MET
D1280 M1484 GLU ILE PRO THR ASN ILE PRO GLY LEU GLY ALA ALA GLY PRO THR GLY MET PHE PHE GLY SER ALA ALA PRO SER PRO MET GLY GLY ILE SER PRO ALA MET THR PRO TRP ASN GLN GLY ALA THR PRO ALA ALA TYR GLY ALA TRP SER PRO GLY SER PRO GLY ILE SER PRO ALA GLY PRO SER SER PRO TYR ILE PRO SER PRO GLY GLY ALA MET SER PRO SER TYR SER PRO THR SER PRO SER TYR SER PRO THR SER PRO SER PRO SER PRO THR SER PRO SER PRO SER PRO



• Molecule 3: DNA-directed RNA polymerase II subunit RPB3

Chain C: 95% 5%

• Molecule 4: DNA-directed RNA polymerase II subunit E

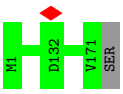
Chain E: 100%

• Molecule 5: DNA-directed RNA polymerase II subunit F

Chain F: 61% 39%

• Molecule 6: DNA-directed RNA polymerase II subunit RPB7

Chain G: 99%

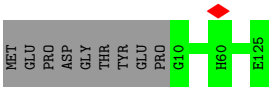


• Molecule 7: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain H: 99%

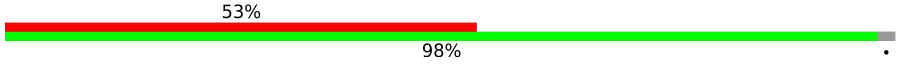
• Molecule 8: DNA-directed RNA polymerase II subunit RPB9

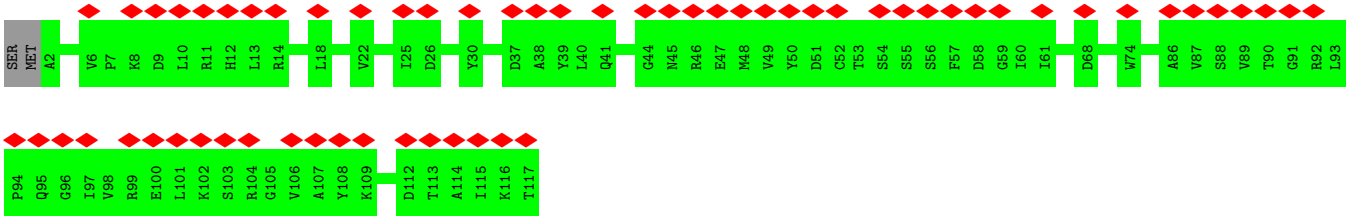
Chain I: 93% 7%



- Molecule 9: Transcription elongation factor SPT4

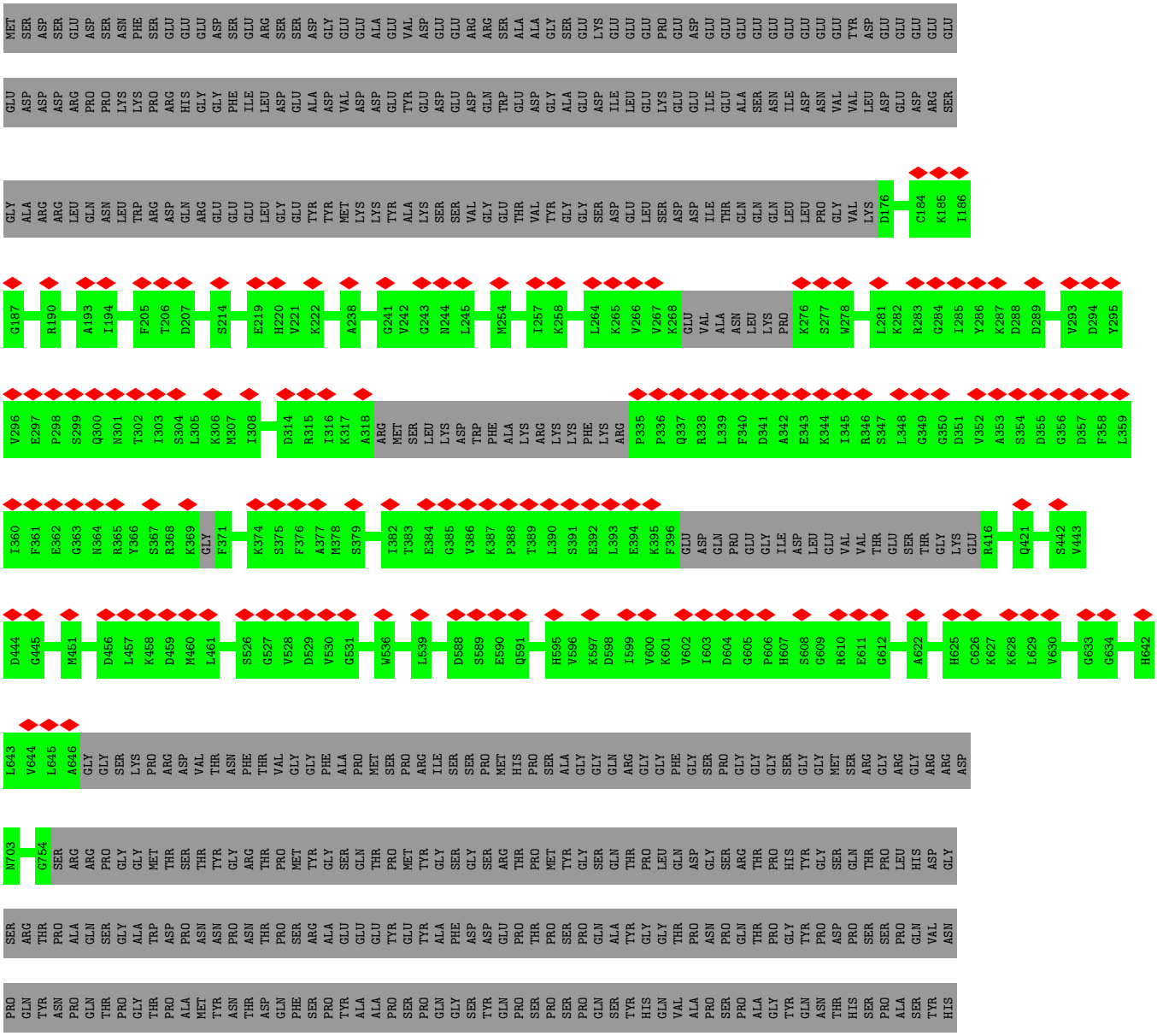
Chain Y:

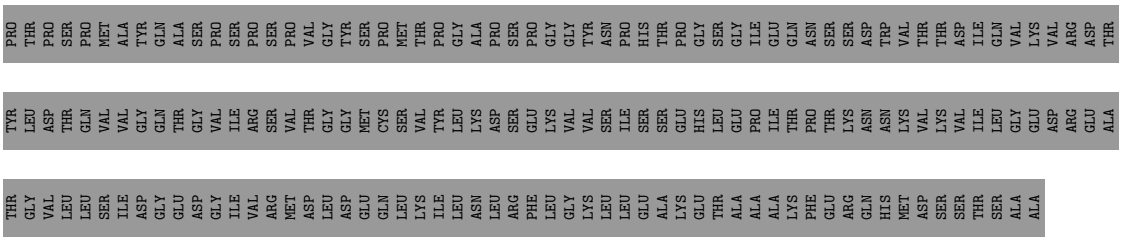




- Molecule 10: Transcription elongation factor SPT5

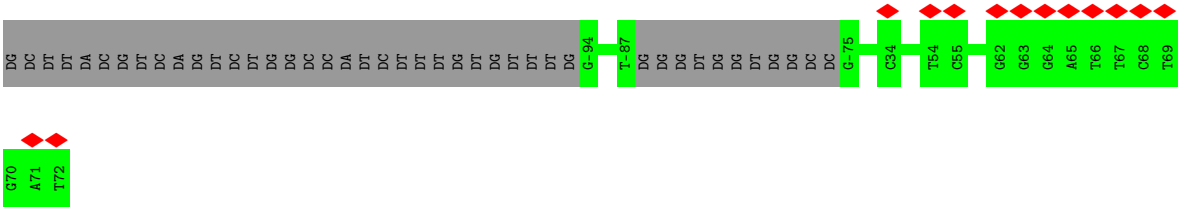
Chain Z:





• Molecule 11: Non-template DNA (157-MER)

Chain N:

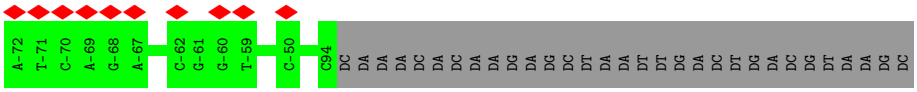


• Molecule 12: RNA (5'-R(P*UP*GP*GP*GP*UP*GP*GP*UP*GP*GP*CP*C)-3')

Chain P:

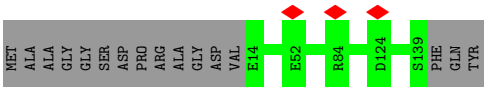
• Molecule 13: Template DNA (168-MER)

Chain T:



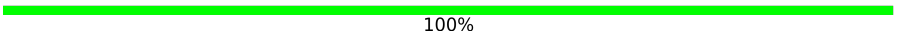
• Molecule 14: DNA-directed RNA polymerase II subunit RPB4

Chain D:



• Molecule 15: DNA-directed RNA polymerases I, II, and III subunit RPABC5

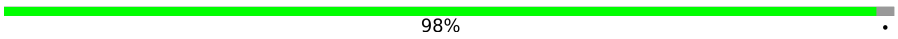
Chain J:



There are no outlier residues recorded for this chain.

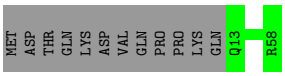
• Molecule 16: DNA-directed RNA polymerase II subunit RPB11-a

Chain K:



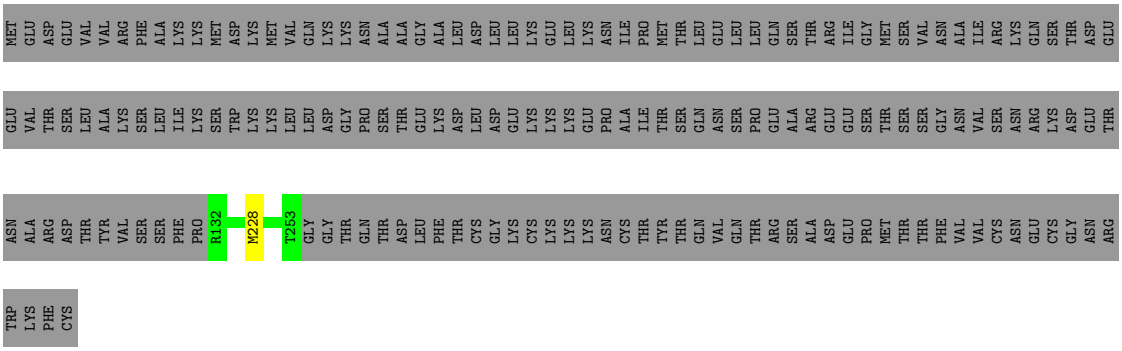
• Molecule 17: RPB12

Chain L:



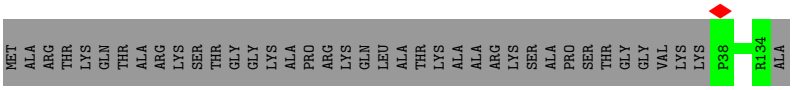
• Molecule 18: Transcription elongation factor A protein 1

Chain M:



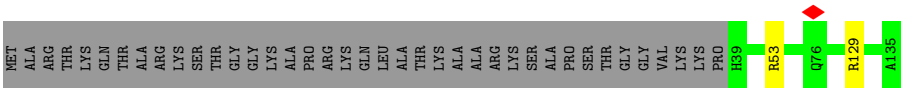
• Molecule 19: Histone H3.3

Chain a:



• Molecule 19: Histone H3.3

Chain e:



• Molecule 20: Histone H4

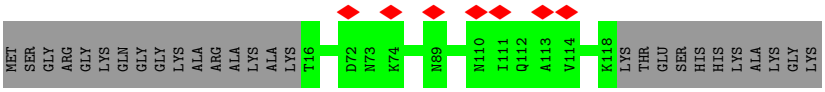
Chain b:

• Molecule 20: Histone H4

Chain f:

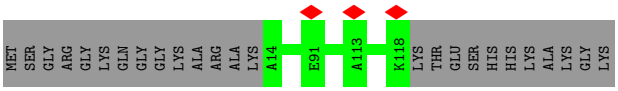
• Molecule 21: Histone H2A type 1-B/E

Chain c:



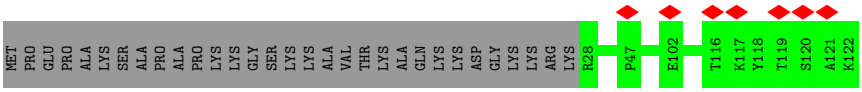
• Molecule 21: Histone H2A type 1-B/E

Chain g:



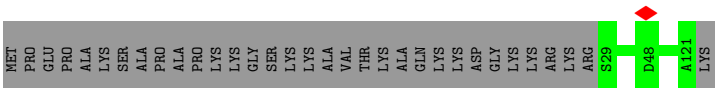
• Molecule 22: Histone H2B type 1-J

Chain d:



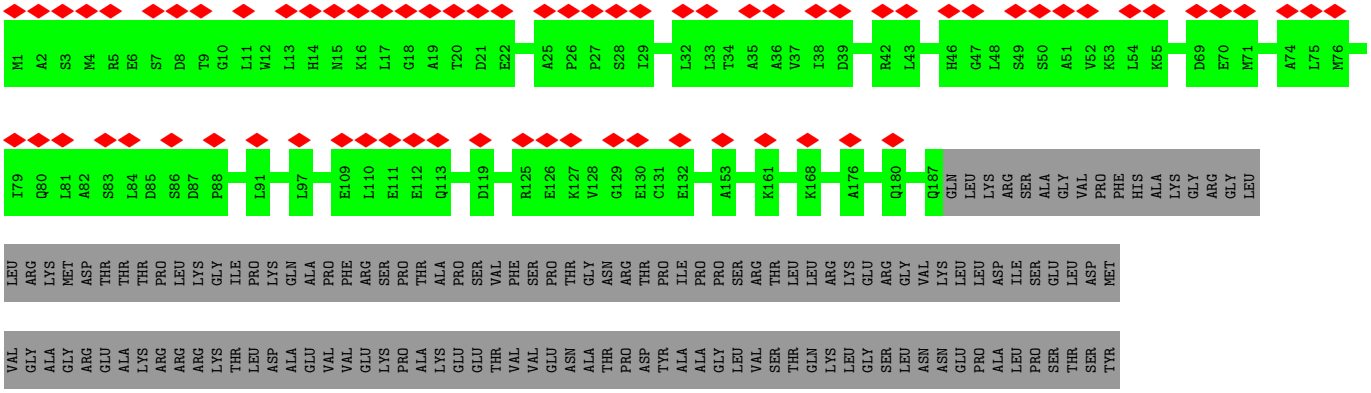
• Molecule 22: Histone H2B type 1-J

Chain h:



• Molecule 23: Negative elongation factor A

Chain U:



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

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

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

VAL PHE GLU MET ASN TYR ALA THR GLY GLN TRP THR ARG PHE LYS LYS TYR LYS PRO MET THR ASN VAL SER

- Molecule 24: Negative elongation factor B

Chain V: 35% 93% 7%

M1 F2 A3 G4 L5 Q6 D7 L8 G9 V10 A11 N12 G13 E14 D15 L16 K17 E18 T19 L20 T21 N22 C23 T24 E25 P26 L27 K28 A29 I30 E31 Q32 F33 Q34 T35 E36 N37 G38 V39 L40 L41 P42 S43 L44 Q45 S46 A47 L48 L51 D52 L53 H54 G55 T56 P57 R58 L59 E60 F61

H62 Q63 S64 V65 F66 D67 E68 L69 R70 D71 K72 L73 L74 E75 S78 A79 I80 A81 S82 E83 G84 K85 A86 E87 E88 R89 Y90 K91 K92 L93 E94 D95 L96 L97 E98 K99 S102 L103 V104 K105 M106 P107 S108 L109 Q110 P111 V112 V113 M114 C115 V116 M117 K118 H119 L120 V123 P124

E125 K126 K127 L128 K129 L130 V131 M132 A133 D134 K135 E136 L137 Y138 R139 A140 C141 A142 Y143 Q151 D152 N153 Q154 A155 L156 D159 P163 Q167 L170 A175 E180 L181 S182 V183 L184 H185 Q197 G198 Q202 R203 L204 T205 R206 M207 V208 G209 L248 D288

G293 Q294 P394 ALA GLU GLU LYS ALA PRO VAL S402 L448 L471 L472 A473 D474 E475 F476 A477 L478 S484 E498 L508 I509 H510 L511 H512 P513 R514 V515 A516 P517 S518 K519 L520 E521 A522 L523 Q524 K525 A526 L527 E528 P529 T530 G531 Q532 S533 G534 E535 A536 V537 K538 E539

L540 Y541 S542 Q543 L544 G545 E546 K547 L548 E549 GLN LEU ASP HIS ARG LYS PRO SER PRO ALA GLN ALA ALA GLU THR PRO ALA LEU GLU LEU PRO LEU PRO SER VAL PRO ALA PRO ALA PRO LEU

- Molecule 25: Negative elongation factor C/D

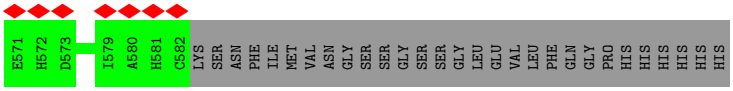
Chain W: 30% 89% 11%

MET ALA GLY ALA VAL PRO GLY ALA ILE MET ASP GLU ASP TYR TYR GLY SER ALA ALA GLU TRP GLY ASP GLU ALA ASP GLY GLY GLN GLN GLU ASP ASP SER GLY GLU GLY GLU ASP D40 A41 E42 V43 Q44 Q45 E46 C47 L48 H49 K50 F51 S52 T53 R54 D55 Y56 I57 M58 E59 P60

S61 I62 F63 N64 T65 L66 K67 R68 Y69 F70 Q71 A72 G73 G74 S75 P76 E77 N78 V79 I80 Q81 L82 L83 S84 E85 N86 Y87 T88 A89 V90 A91 Q92 T93 V94 N95 L96 L97 A98 E99 W100 L101 I102 Q103 T104 G105 V106 E107 P108 V109 Q110 V111 Q112 E113 T114 V115 E116 N117 H118 L119 K120

S121 L122 L123 I124 K125 H126 F127 D128 P129 R130 K131 A132 D133 S134 I135 F136 T137 E138 E139 G140 E141 T142 P143 A144 W145 L146 E147 Q148 M149 I150 A151 H152 T153 T154 W155 R156 D157 L158 F159 Y160 K161 L162 A163 E164 A165 H166 P167 D168 C169 L170 M171 L172 N173 F174 T175 V176 K177 H178 I179 S180

D181 A182 G183 Y184 Q185 G186 E187 I188 T189 S190 V200 R203 D214 G215 N219 Q253 E271 K272 G345 K371 L443 Q444 T445 S482 Q483 L484 D485 V486 M487 L490 D524 P543 D548 L554 S561 I562 A563 G564 T565 I566 K567 T568 E569 G570



• Molecule 26: Negative elongation factor E

Chain X: 9% 91%

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	47563	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 ($e^-/Å^2$)	57	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.149	Depositor
Minimum map value	-0.056	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.013	Depositor
Map size (Å)	356.16, 356.16, 356.16	wwPDB
Map dimensions	240, 240, 240	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.484, 1.484, 1.484	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, 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	0.27	0/11240	0.50	1/15169 (0.0%)
2	B	0.28	0/9149	0.50	0/12348
3	C	0.30	0/2115	0.50	0/2873
4	E	0.28	0/1751	0.51	0/2366
5	F	0.29	0/636	0.51	0/859
6	G	0.27	0/1382	0.51	0/1874
7	H	0.30	0/1219	0.50	0/1644
8	I	0.25	0/964	0.49	0/1305
9	Y	0.23	0/927	0.48	0/1250
10	Z	0.24	0/3903	0.48	0/5254
11	N	0.48	0/3588	0.95	0/5541
12	P	0.32	0/291	0.81	0/453
13	T	0.52	0/3827	0.85	0/5895
14	D	0.25	0/1017	0.49	0/1368
15	J	0.30	0/542	0.47	0/730
16	K	0.29	0/939	0.45	0/1271
17	L	0.26	0/394	0.59	0/524
18	M	0.24	0/977	0.55	0/1307
19	a	0.26	0/809	0.56	0/1085
19	e	0.24	0/807	0.52	0/1081
20	b	0.24	0/645	0.56	0/862
20	f	0.24	0/626	0.54	0/837
21	c	0.23	0/806	0.51	0/1089
21	g	0.24	0/820	0.51	0/1107
22	d	0.23	0/757	0.47	0/1015
22	h	0.23	0/736	0.44	0/990
23	U	0.24	0/1463	0.45	0/1985
24	V	0.24	0/4424	0.46	0/5975
25	W	0.24	0/4404	0.44	0/5982
26	X	0.25	0/283	0.34	0/372
All	All	0.30	0/61441	0.57	1/84411 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	80	GLU	C-N-CA	-5.12	108.91	121.70

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1380/1970 (70%)	1314 (95%)	66 (5%)	0	100	100
2	B	1111/1174 (95%)	1044 (94%)	67 (6%)	0	100	100
3	C	254/271 (94%)	239 (94%)	15 (6%)	0	100	100
4	E	207/210 (99%)	202 (98%)	5 (2%)	0	100	100
5	F	76/127 (60%)	74 (97%)	2 (3%)	0	100	100
6	G	169/172 (98%)	160 (95%)	9 (5%)	0	100	100
7	H	147/150 (98%)	140 (95%)	7 (5%)	0	100	100
8	I	114/125 (91%)	107 (94%)	7 (6%)	0	100	100
9	Y	114/118 (97%)	112 (98%)	2 (2%)	0	100	100
10	Z	468/1107 (42%)	448 (96%)	20 (4%)	0	100	100
14	D	124/142 (87%)	120 (97%)	4 (3%)	0	100	100
15	J	65/67 (97%)	62 (95%)	3 (5%)	0	100	100
16	K	113/117 (97%)	113 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
17	L	44/58 (76%)	41 (93%)	3 (7%)	0	100	100
18	M	120/301 (40%)	115 (96%)	5 (4%)	0	100	100
19	a	95/136 (70%)	95 (100%)	0	0	100	100
19	e	95/136 (70%)	93 (98%)	2 (2%)	0	100	100
20	b	78/103 (76%)	74 (95%)	4 (5%)	0	100	100
20	f	76/103 (74%)	75 (99%)	1 (1%)	0	100	100
21	c	101/130 (78%)	101 (100%)	0	0	100	100
21	g	103/130 (79%)	100 (97%)	3 (3%)	0	100	100
22	d	93/126 (74%)	91 (98%)	2 (2%)	0	100	100
22	h	91/126 (72%)	89 (98%)	2 (2%)	0	100	100
23	U	185/528 (35%)	182 (98%)	3 (2%)	0	100	100
24	V	538/580 (93%)	525 (98%)	13 (2%)	0	100	100
25	W	541/611 (88%)	525 (97%)	16 (3%)	0	100	100
26	X	33/404 (8%)	33 (100%)	0	0	100	100
All	All	6535/9222 (71%)	6274 (96%)	261 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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	1228/1749 (70%)	1225 (100%)	3 (0%)	92	96
2	B	985/1027 (96%)	983 (100%)	2 (0%)	92	96
3	C	235/248 (95%)	235 (100%)	0	100	100
4	E	191/192 (100%)	191 (100%)	0	100	100
5	F	68/111 (61%)	68 (100%)	0	100	100
6	G	152/153 (99%)	152 (100%)	0	100	100
7	H	130/131 (99%)	130 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
8	I	104/112 (93%)	104 (100%)	0	100	100
9	Y	102/104 (98%)	102 (100%)	0	100	100
10	Z	423/955 (44%)	423 (100%)	0	100	100
14	D	109/126 (86%)	109 (100%)	0	100	100
15	J	56/56 (100%)	56 (100%)	0	100	100
16	K	104/106 (98%)	104 (100%)	0	100	100
17	L	43/55 (78%)	43 (100%)	0	100	100
18	M	105/266 (40%)	104 (99%)	1 (1%)	73	83
19	a	83/110 (76%)	83 (100%)	0	100	100
19	e	82/110 (74%)	80 (98%)	2 (2%)	44	66
20	b	65/79 (82%)	64 (98%)	1 (2%)	60	76
20	f	63/79 (80%)	62 (98%)	1 (2%)	58	75
21	c	82/100 (82%)	82 (100%)	0	100	100
21	g	83/100 (83%)	83 (100%)	0	100	100
22	d	81/105 (77%)	81 (100%)	0	100	100
22	h	79/105 (75%)	79 (100%)	0	100	100
23	U	161/451 (36%)	161 (100%)	0	100	100
24	V	485/515 (94%)	485 (100%)	0	100	100
25	W	480/530 (91%)	479 (100%)	1 (0%)	92	96
26	X	31/351 (9%)	31 (100%)	0	100	100
All	All	5810/8026 (72%)	5799 (100%)	11 (0%)	91	96

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	862	ARG
1	A	1102	MET
1	A	1133	LYS
2	B	335	ARG
2	B	610	ARG
18	M	228	MET
20	b	23	ARG
19	e	53	ARG
19	e	129	ARG
20	f	92	ARG

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Mol	Chain	Res	Type
25	W	371	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	143	HIS
1	A	721	HIS
2	B	319	ASN
4	E	95	GLN
19	a	108	ASN
22	d	81	ASN
23	U	62	HIS
25	W	263	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
12	P	11/42 (26%)	1 (9%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
12	P	11	C

There are no RNA pucker outliers to report.

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 10 ligands modelled in this entry, 10 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 (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

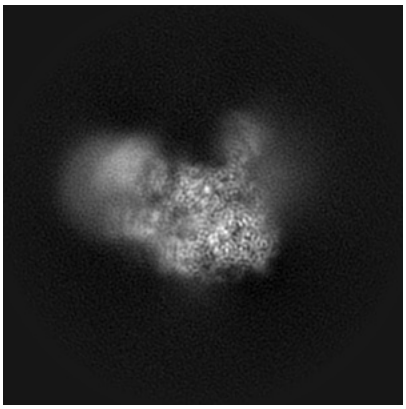
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-61058. These allow visual inspection of the internal detail of the map and identification of artifacts.

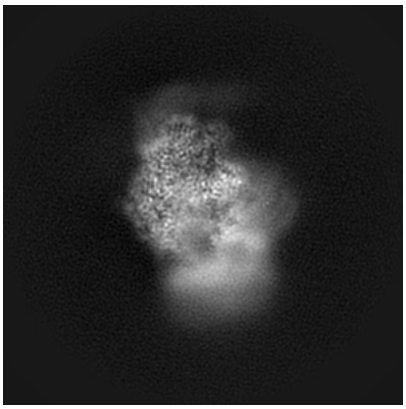
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

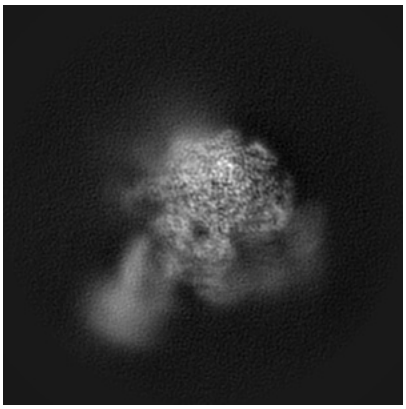
6.1.1 Primary map



X

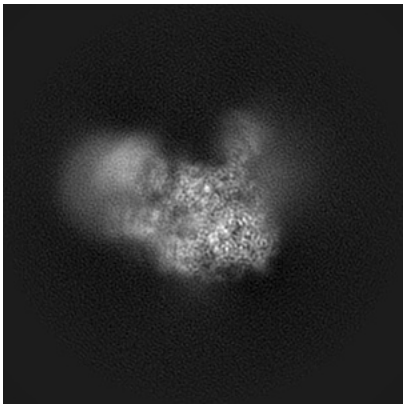


Y

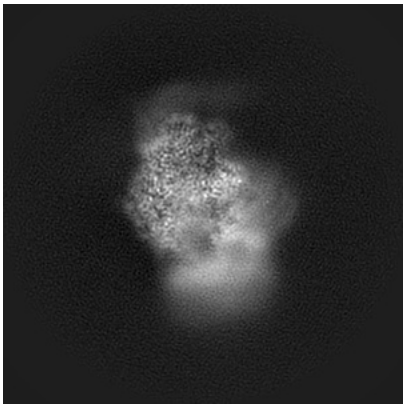


Z

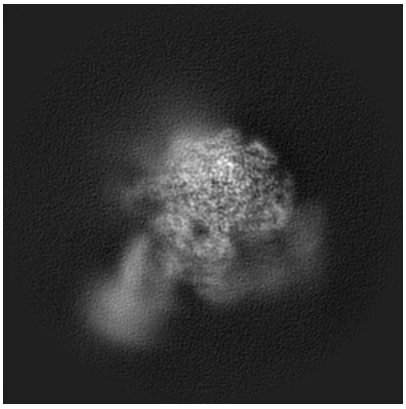
6.1.2 Raw map



X



Y

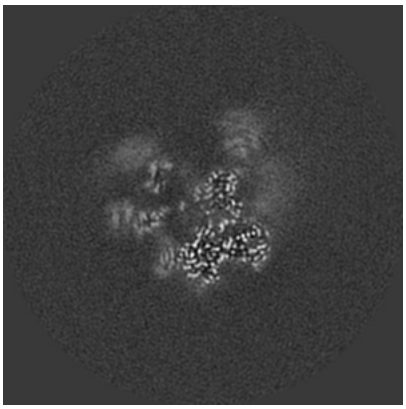


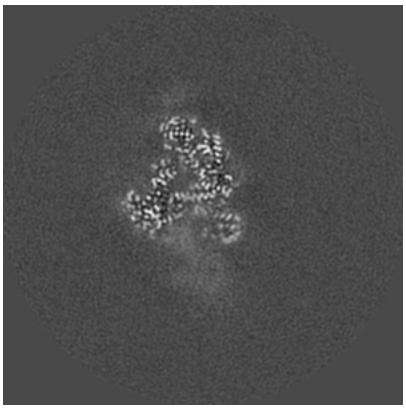
Z

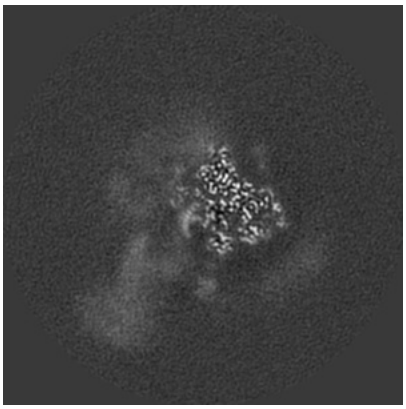
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

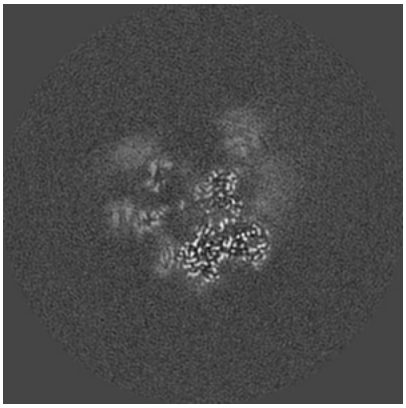
6.2.1 Primary map

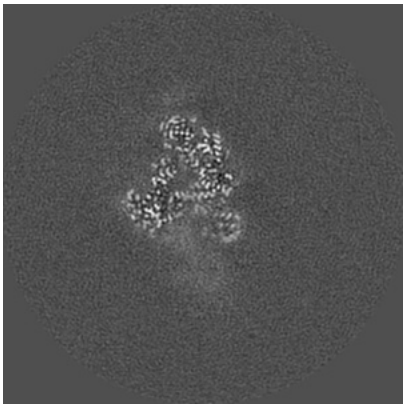

X Index: 120

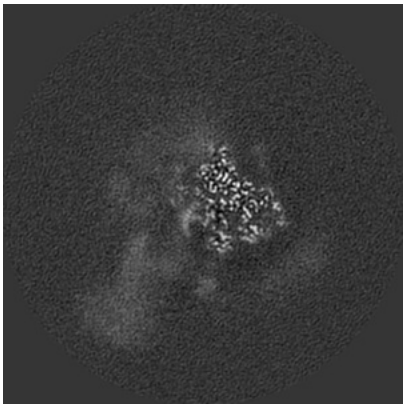

Y Index: 120


Z Index: 120

6.2.2 Raw map


X Index: 120

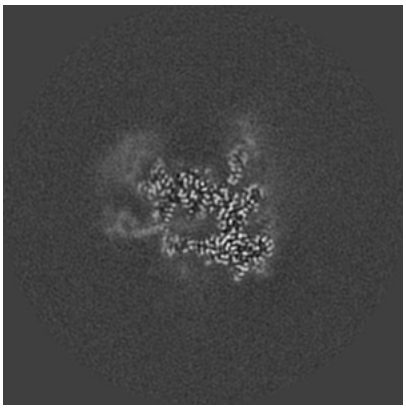

Y Index: 120

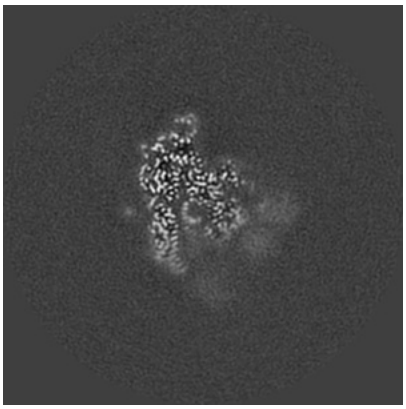

Z Index: 120

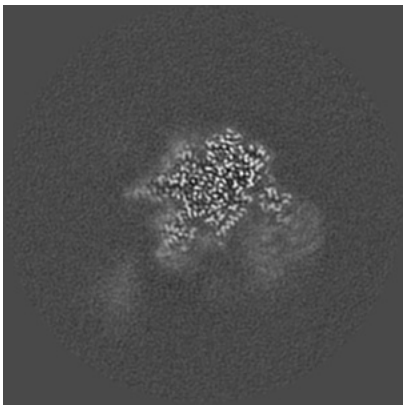
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

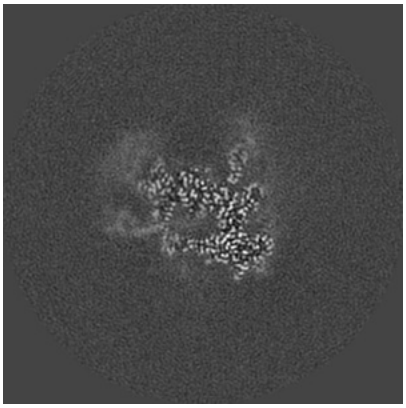
6.3.1 Primary map

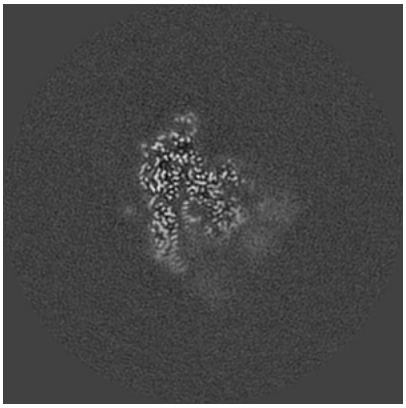

X Index: 130

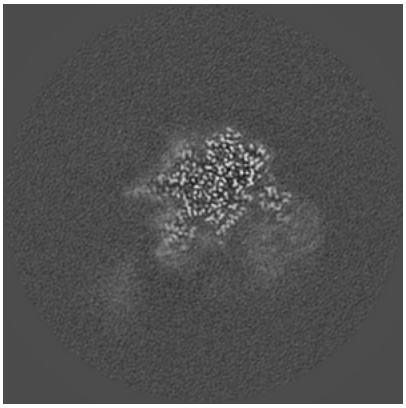

Y Index: 134


Z Index: 97

6.3.2 Raw map


X Index: 130

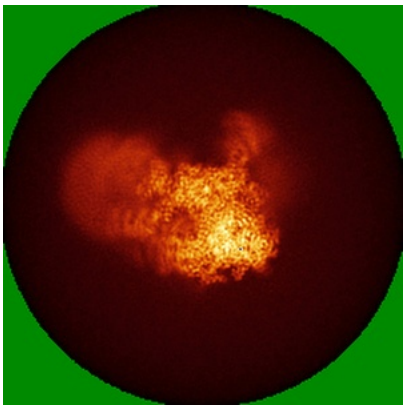

Y Index: 134

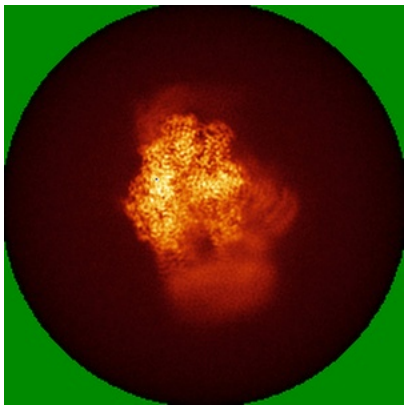

Z Index: 97

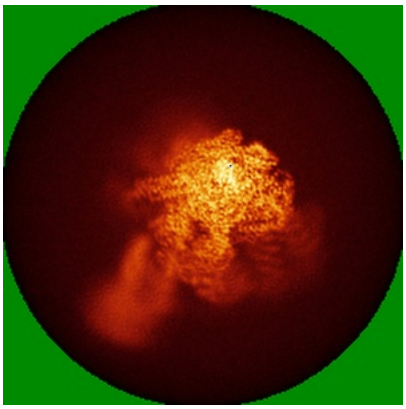
The images above show the largest variance slices of the map in three orthogonal directions.

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

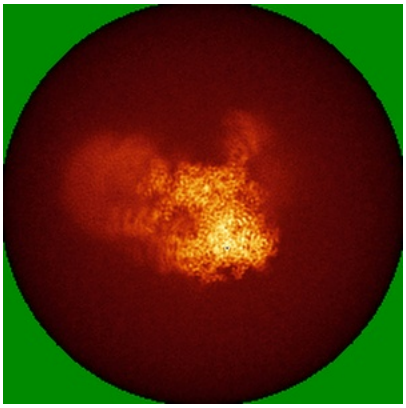
6.4.1 Primary map

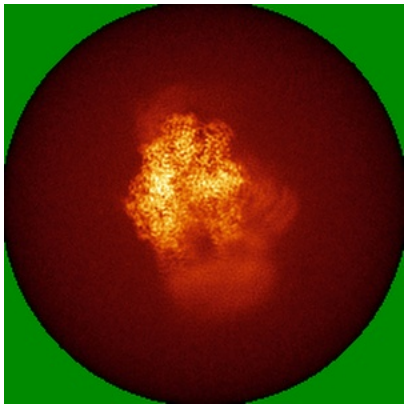

X

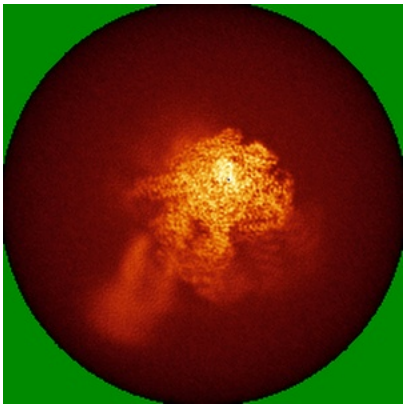

Y


Z

6.4.2 Raw map


X

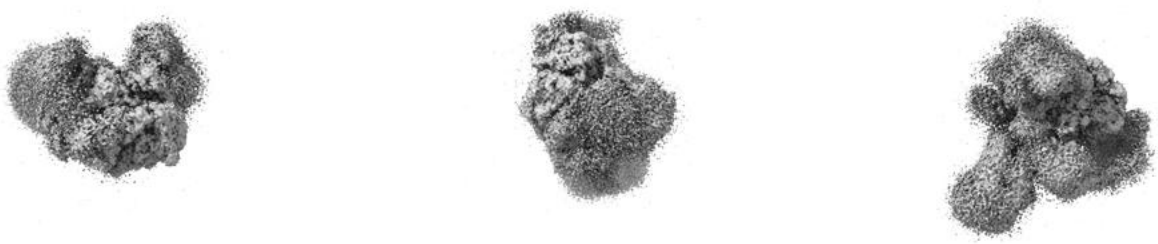

Y


Z

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

6.5 Orthogonal surface views (i)

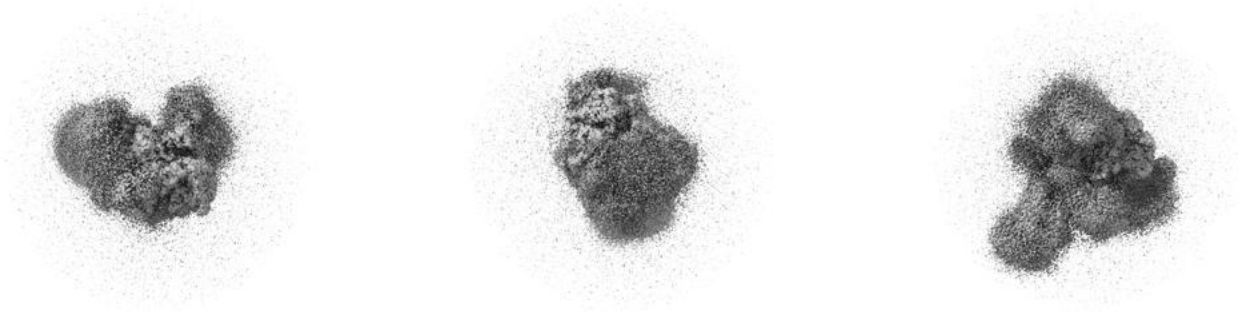
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.013. 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.

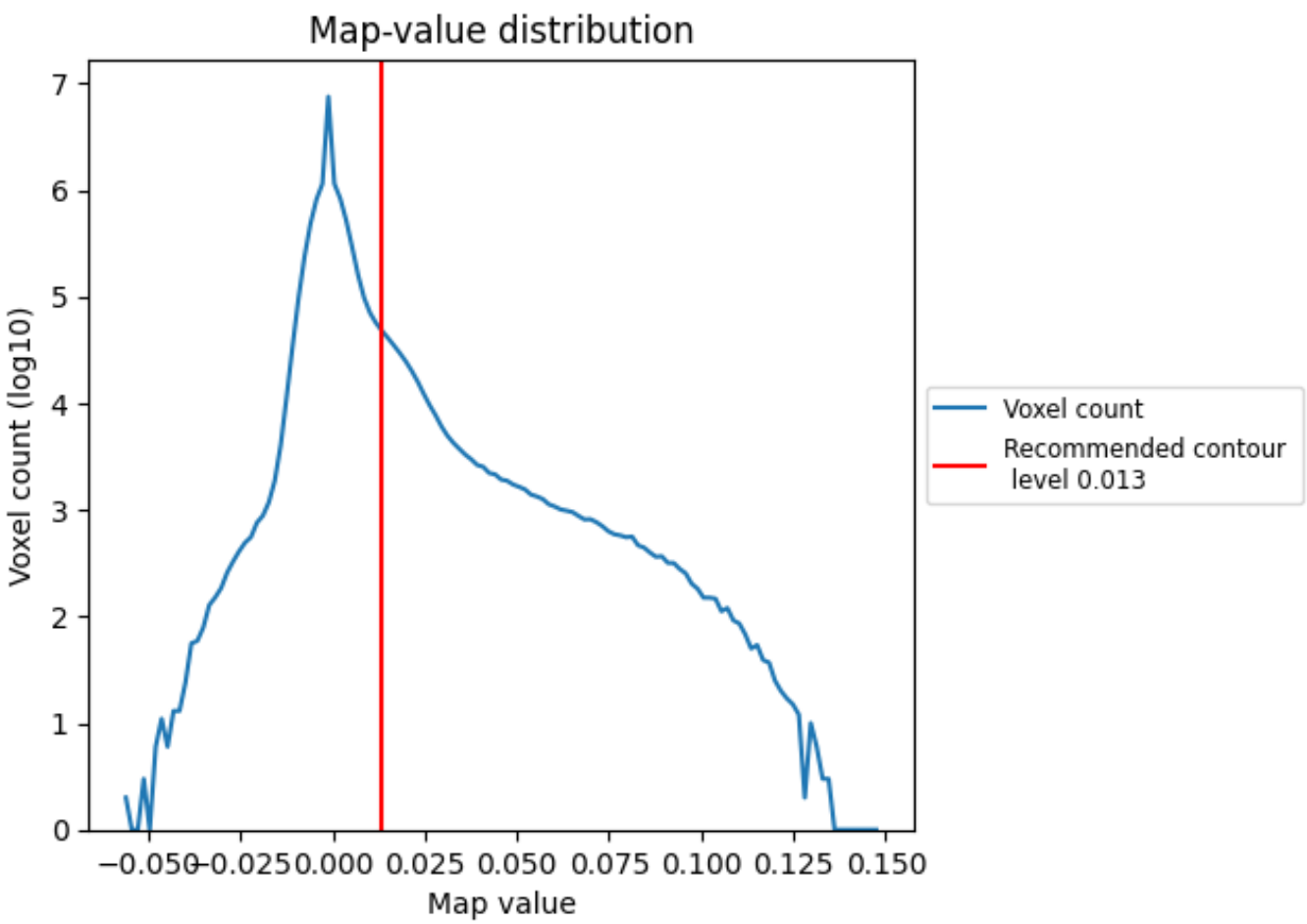
6.6 Mask visualisation (i)

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

7 Map analysis (i)

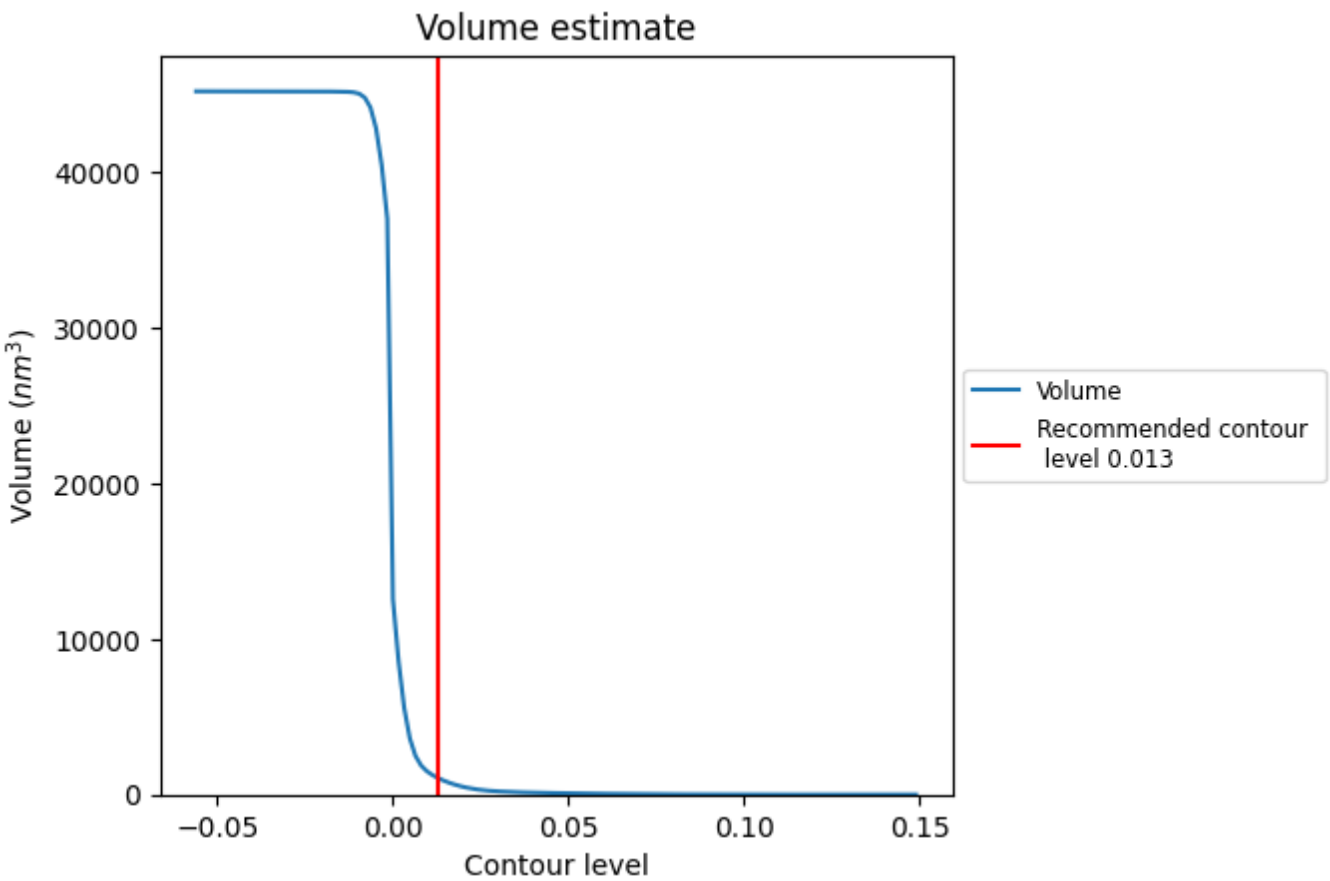
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution (i)



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

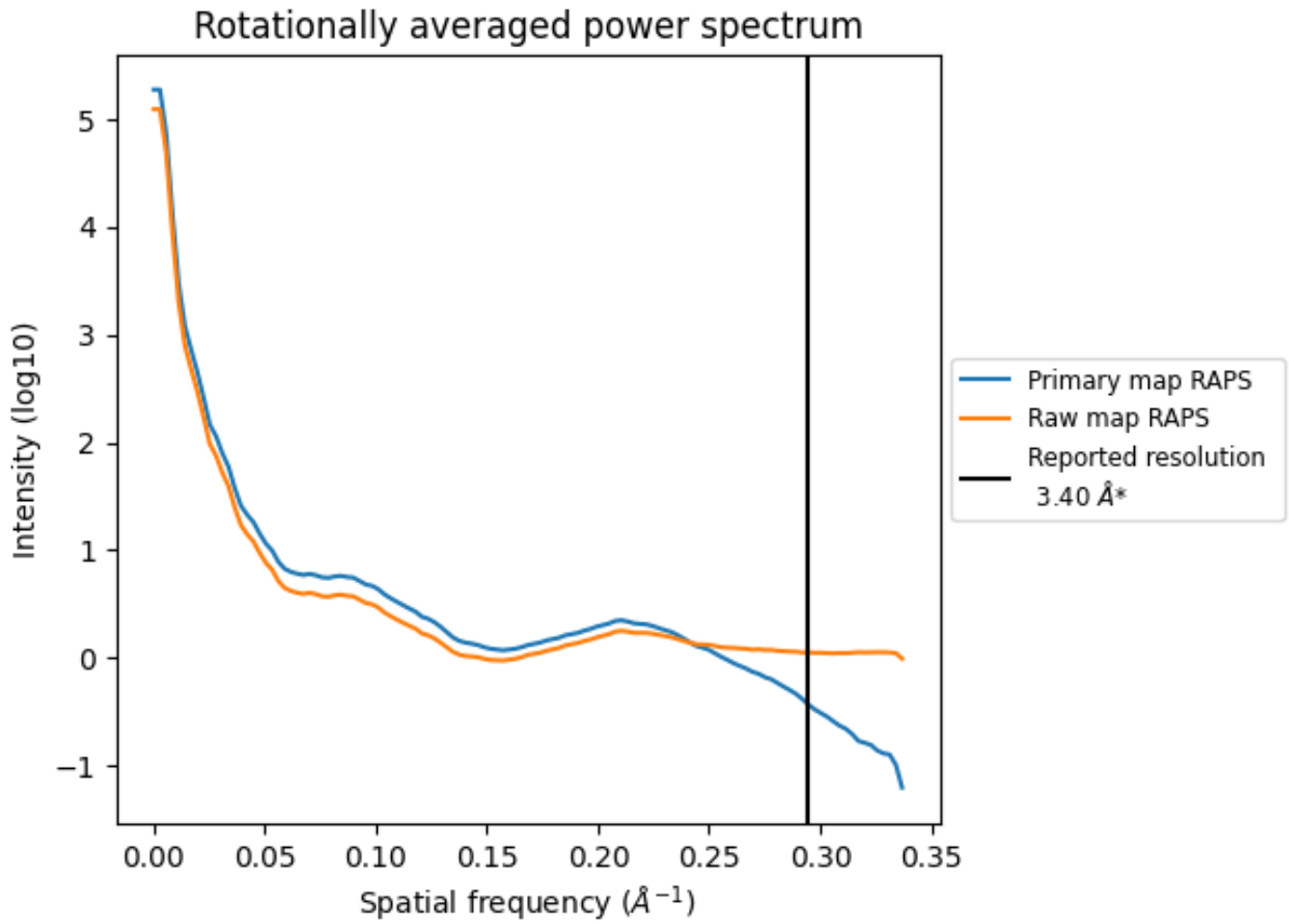
7.2 Volume estimate (i)



The volume at the recommended contour level is 1050 nm^3; this corresponds to an approximate mass of 948 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)

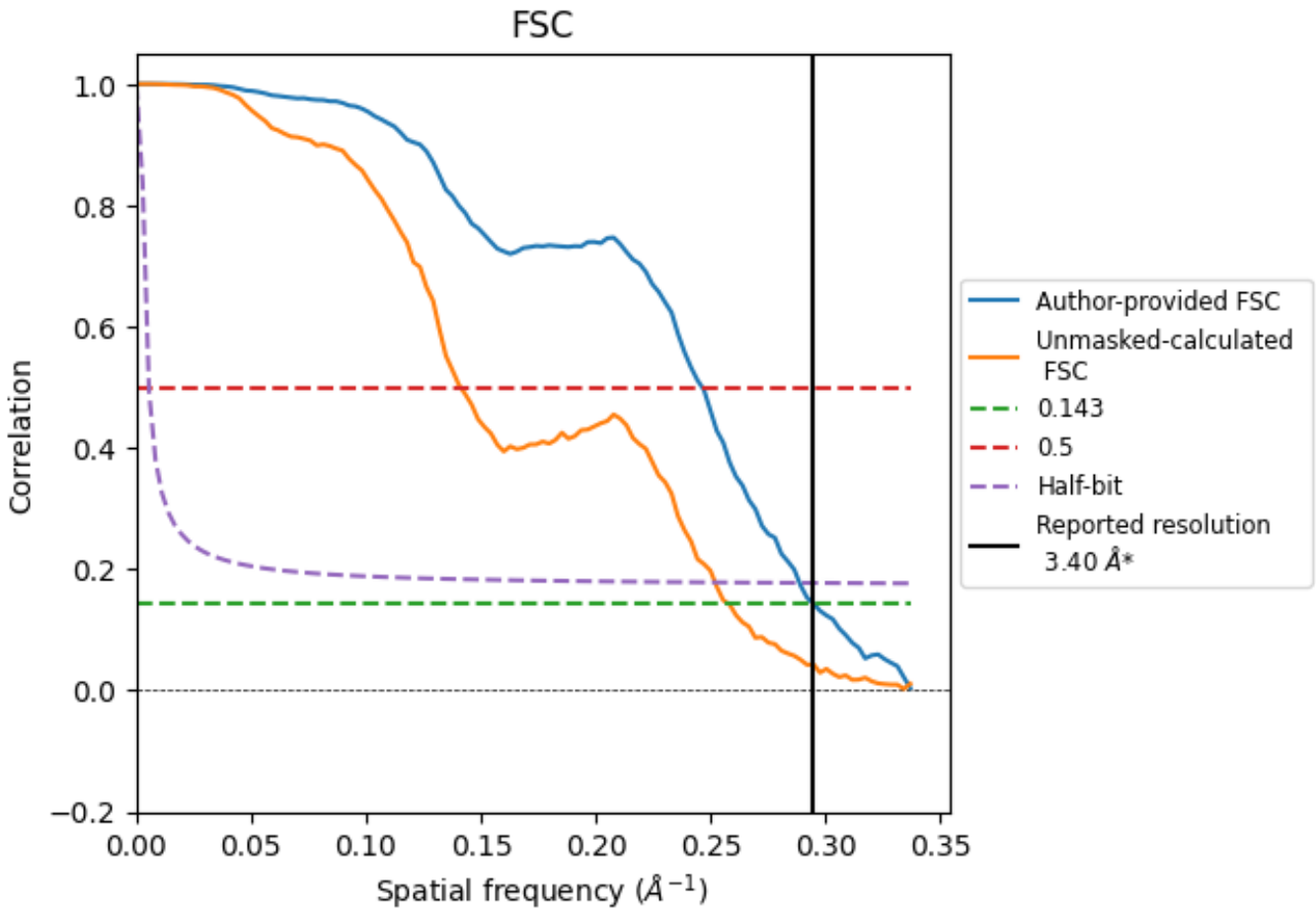


*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation (i)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC (i)



*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8.2 Resolution estimates (i)

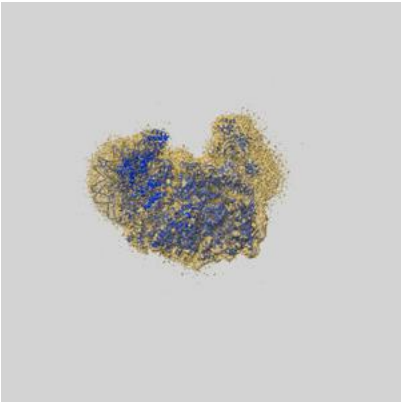
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.39	4.06	3.46
Unmasked-calculated*	3.88	7.09	3.97

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.88 differs from the reported value 3.4 by more than 10 %

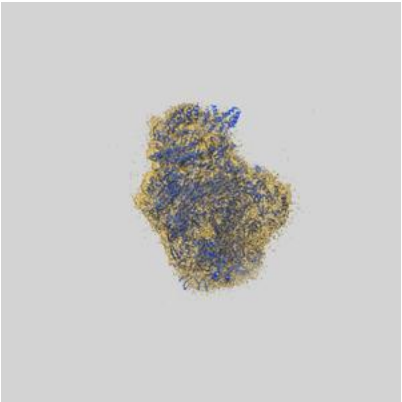
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-61058 and PDB model 9J0N. Per-residue inclusion information can be found in section 3 on page 11.

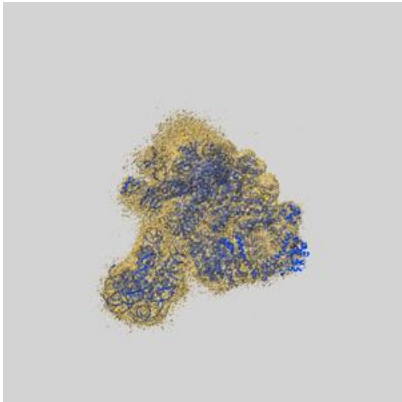
9.1 Map-model overlay (i)



X



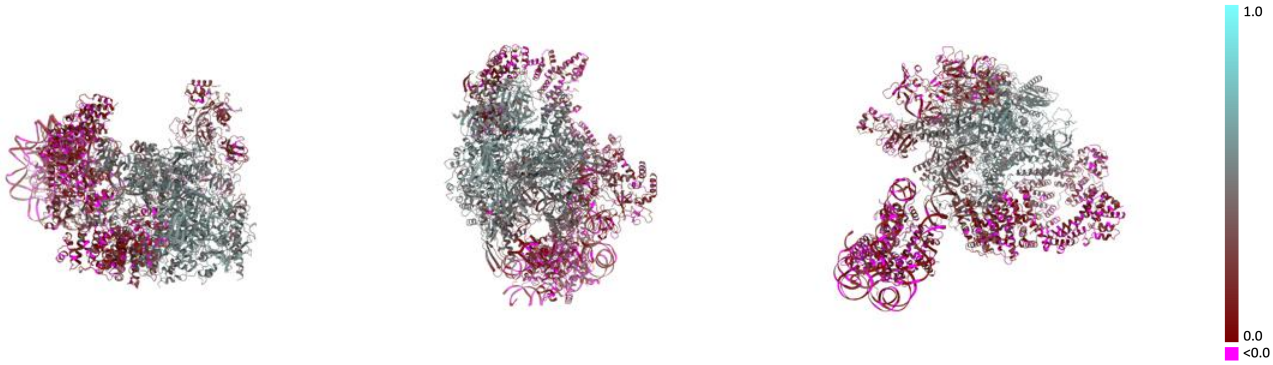
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.013 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.

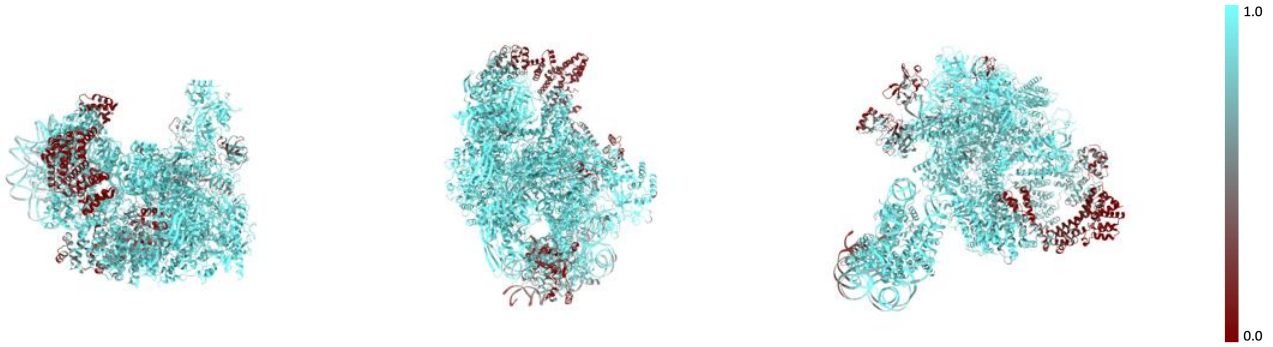
9.2 Q-score mapped to coordinate model (i)



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.

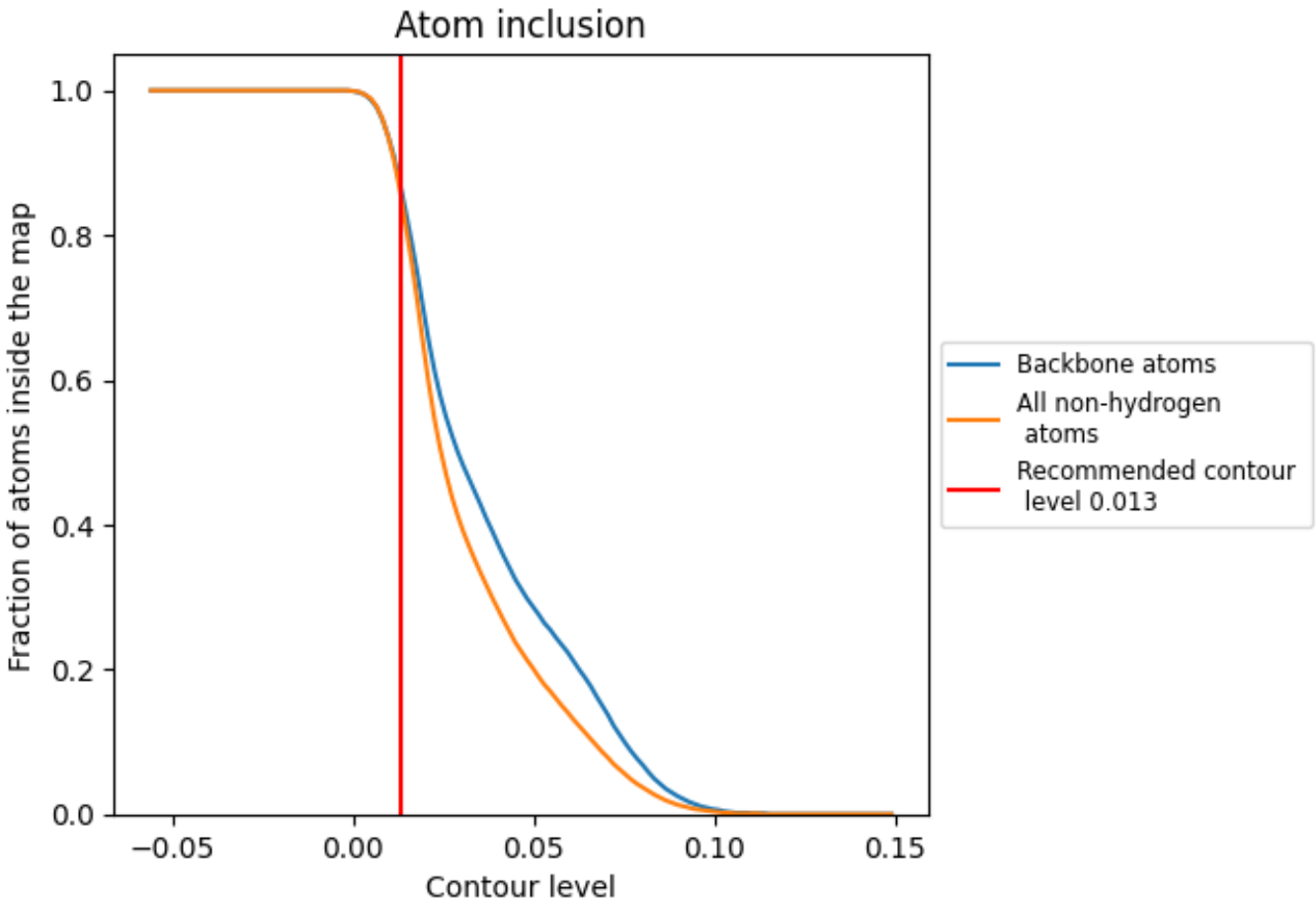
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.013).

9.4 Atom inclusion (i)



At the recommended contour level, 87% of all backbone atoms, 86% 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 (0.013) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8600	0.3160
A	0.9810	0.4880
B	0.9860	0.4900
C	0.9940	0.5290
D	0.9500	0.2200
E	0.9770	0.4660
F	0.9950	0.5280
G	0.9850	0.3000
H	0.9880	0.5240
I	0.9650	0.3810
J	0.9750	0.5280
K	0.9950	0.5260
L	0.9840	0.4120
M	0.9410	0.2780
N	0.8400	0.1090
P	1.0000	0.4780
T	0.8330	0.1420
U	0.5100	0.1570
V	0.5860	0.1400
W	0.5980	0.1600
X	0.9470	0.1960
Y	0.4020	0.1790
Z	0.6160	0.1920
a	0.9690	0.1250
b	0.9820	0.1030
c	0.8570	0.0880
d	0.8710	0.0860
e	0.9270	0.1050
f	0.9730	0.0870
g	0.9540	0.1210
h	0.9620	0.1140