



## wwPDB EM Validation Summary Report ⓘ

Oct 12, 2022 – 04:41 PM EDT

PDB ID : 7UND  
EMDB ID : EMD-26621  
Title : Pol II-DSIF-SPT6-PAF1c-TFIIS-nucleosome complex (stalled at +38)  
Authors : Filipovski, M.; Vos, S.M.; Farnung, L.  
Deposited on : 2022-04-10  
Resolution : 3.00 Å(reported)  
Based on initial models : 6TED, 3LZ0

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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 ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

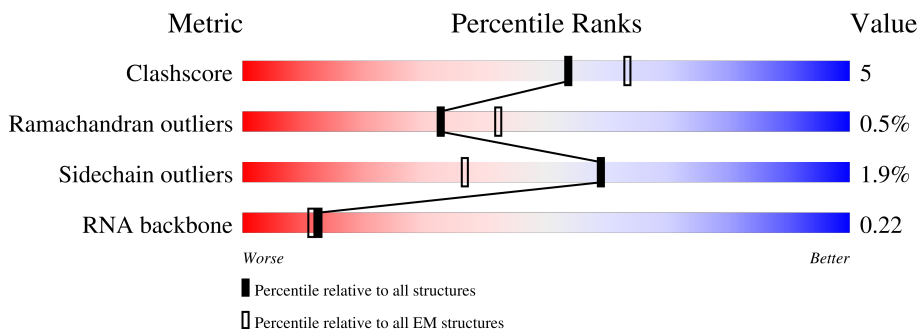
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 3.00 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.








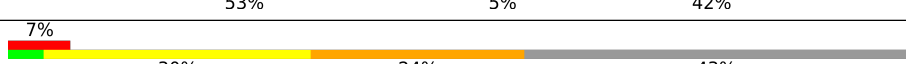
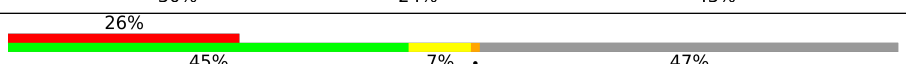
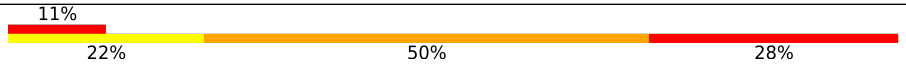


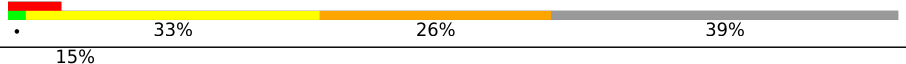

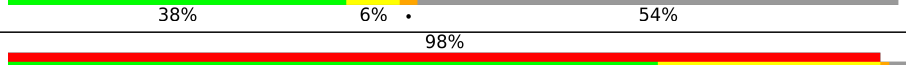

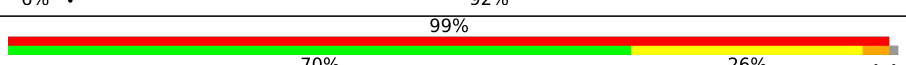
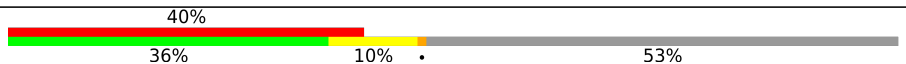









Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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  $\geq 3$ , 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  $\leq 5\%$ . 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	1984	
2	B	1251	
3	C	275	
4	D	184	
5	E	210	
6	F	127	
7	G	172	

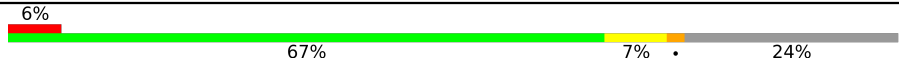
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Mol	Chain	Length	Quality of chain
8	H	150	
9	I	125	
10	J	67	
11	K	117	
12	L	58	
13	M	1729	
14	N	209	
15	O	304	
16	P	18	
17	Q	1179	
18	R	713	
19	T	215	
20	U	666	
21	V	531	
22	W	305	
23	X	531	
24	Y	117	
25	Z	1087	
26	a	136	
26	e	136	
27	b	103	
27	f	103	
28	c	130	
28	g	130	
29	d	123	

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Mol	Chain	Length	Quality of chain
29	h	123	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
30	ZN	C	301	-	-	X	-

## 2 Entry composition [i](#)

There are 31 unique types of molecules in this entry. The entry contains 129470 atoms, of which 61557 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	H	N	O	P S		
1	A	1426	22640	7074	11385	2014	2095	2 70	0	0

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

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	B	1122	18004	5684	9024	1576	1656	64	0	0

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

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	C	258	4093	1300	2021	356	410	6	0	0

- Molecule 4 is a protein called RPOL4c domain-containing protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
4	D	126	1985	630	981	170	200	4	0	0

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

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
5	E	209	3456	1089	1736	300	323	8	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
6	F	78	1284	401	658	106	114	5	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
7	G	171	2654	866	1321	214	245	8	0	0

- Molecule 8 is a protein called RPB8.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
8	H	149	2354	759	1157	195	238	5	0	0

- Molecule 9 is a protein called RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
9	I	116	1816	582	874	168	181	11	0	0

- Molecule 10 is a protein called RPB10.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
10	J	66	1065	339	541	88	91	6	0	0

- Molecule 11 is a protein called RPB11.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
11	K	115	1862	593	942	152	173	2	0	0

- Molecule 12 is a protein called RNA polymerase II subunit K.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
12	L	47	804	246	407	77	68	6	0	0

- Molecule 13 is a protein called Transcription elongation factor SPT6.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
13	M	1002	7565	2738	2638	1074	1108	7	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	-2	SER	-	expression tag	UNP Q7KZ85
M	-1	ASN	-	expression tag	UNP Q7KZ85
M	0	ALA	-	expression tag	UNP Q7KZ85

- Molecule 14 is a DNA chain called Non-template DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
14	N	120	3815	1169	1355	433	738	120	0	0

- Molecule 15 is a protein called Transcription elongation factor A protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	O	161	1274	778	234	248	14	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	-2	SER	-	expression tag	UNP P23193
O	-1	ASN	-	expression tag	UNP P23193
O	0	ALA	-	expression tag	UNP P23193

- Molecule 16 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
16	P	18	572	169	191	61	133	18	0	0

- Molecule 17 is a protein called RNA polymerase-associated protein CTR9 homolog.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
17	Q	890	14397	4579	7171	1264	1352	31	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	1174	GLU	-	expression tag	UNP Q6PD62
Q	1175	ASN	-	expression tag	UNP Q6PD62
Q	1176	LEU	-	expression tag	UNP Q6PD62
Q	1177	TYR	-	expression tag	UNP Q6PD62

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Chain	Residue	Modelled	Actual	Comment	Reference
Q	1178	PHE	-	expression tag	UNP Q6PD62
Q	1179	GLN	-	expression tag	UNP Q6PD62

- Molecule 18 is a protein called RNA polymerase-associated protein RTF1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
18	R	244	3537	1152	1701	340	337	7	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	-2	SER	-	expression tag	UNP Q92541
R	-1	ASN	-	expression tag	UNP Q92541
R	0	ALA	-	expression tag	UNP Q92541

- Molecule 19 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
19	T	131	4138	1267	1458	518	764	131	0	0

- Molecule 20 is a protein called RNA polymerase-associated protein LEO1.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
20	U	125	1544	538	687	151	167	1	0	0

- Molecule 21 is a protein called RNA polymerase II-associated factor 1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
21	V	244	3161	1066	1450	306	335	4	0	0

- Molecule 22 is a protein called WDR61.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
22	W	300	4580	1483	2247	392	454	4	0	0

- Molecule 23 is a protein called Parafibromin.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
23	X	43	725	220	372	69	64	0	0

- Molecule 24 is a protein called Transcription elongation factor SPT4.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
24	Y	116	1820	570	909	159	173	9	0	0

- Molecule 25 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms							AltConf	Trace
			Total	C	H	N	O	P	S		
25	Z	510	8071	2552	4046	709	745	1	18	0	0

- Molecule 26 is a protein called Histone H3.2.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
26	a	97	1643	506	841	155	138	3	0	0
26	e	97	1640	504	839	155	139	3	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	102	ALA	GLY	engineered mutation	UNP P84233
e	102	ALA	GLY	engineered mutation	UNP P84233

- Molecule 27 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
27	b	83	1372	418	710	129	114	1	0	0
27	f	78	1279	391	660	120	107	1	0	0

- Molecule 28 is a protein called Histone H2A.

Mol	Chain	Residues	Atoms				AltConf	Trace	
			Total	C	H	N			O
28	c	103	1642	501	847	155	139	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
28	g	105	1674	510	865	158	141	0	0

- Molecule 29 is a protein called Histone H2B 1.1.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
29	d	95	1519	469	774	134	140	2	0	0
29	h	93	1475	457	749	130	137	2	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
d	0	MET	-	initiating methionine	UNP P02281
d	29	THR	SER	engineered mutation	UNP P02281
h	0	MET	-	initiating methionine	UNP P02281
h	29	THR	SER	engineered mutation	UNP P02281

- Molecule 30 is ZINC ION (three-letter code: ZN) (formula: Zn).

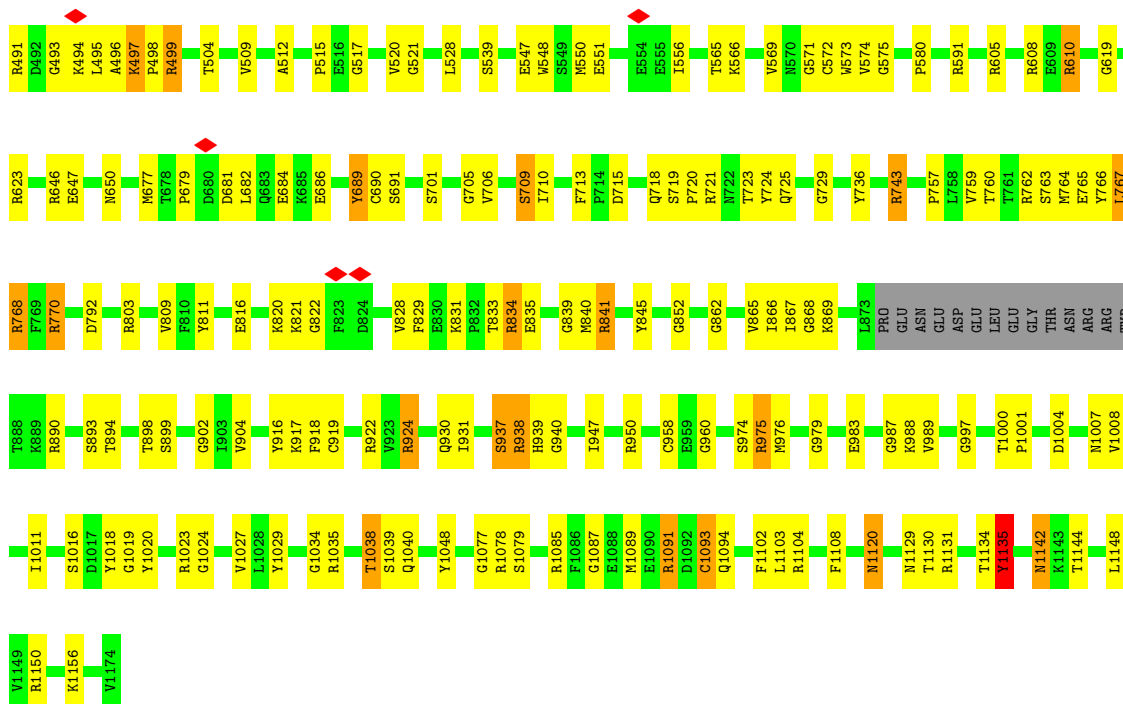
Mol	Chain	Residues	Atoms		AltConf
30	A	2	Total	Zn	0
			2	2	
30	B	1	Total	Zn	0
			1	1	
30	C	1	Total	Zn	0
			1	1	
30	I	2	Total	Zn	0
			2	2	
30	J	1	Total	Zn	0
			1	1	
30	R	1	Total	Zn	0
			1	1	
30	Y	1	Total	Zn	0
			1	1	

- Molecule 31 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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



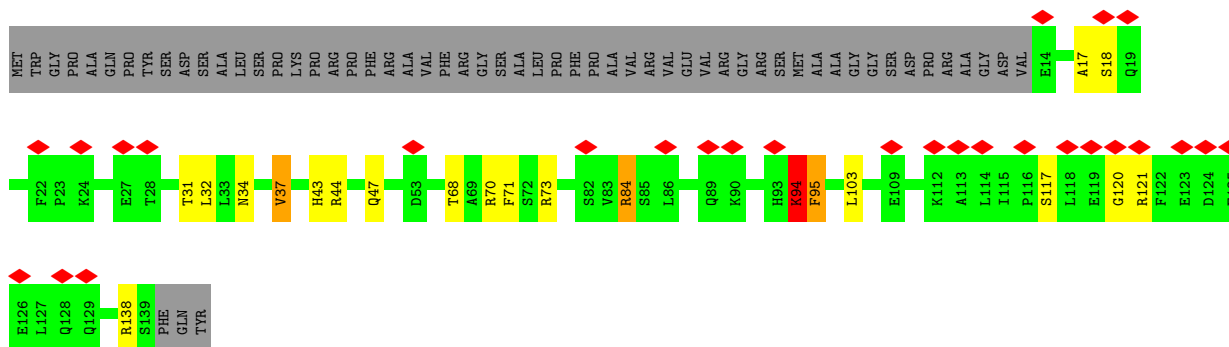




• Molecule 3: DNA-directed RNA polymerase II subunit RPB3

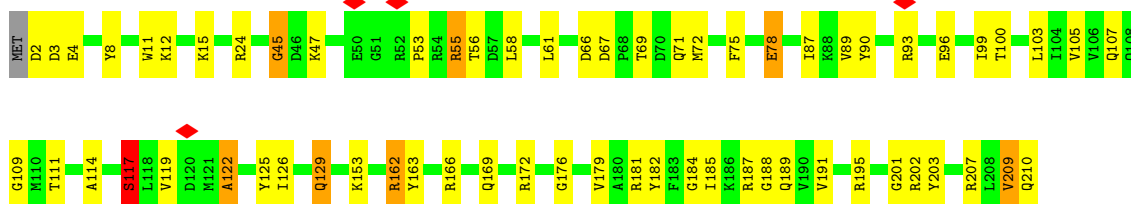


• Molecule 4: RPOL4c domain-containing protein



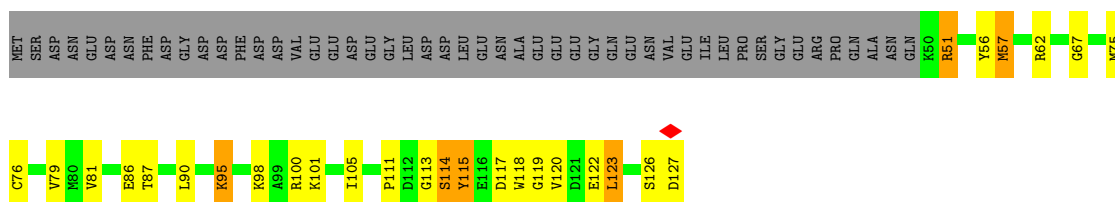
• Molecule 5: DNA-directed RNA polymerase II subunit E

Chain E:  69% 27%




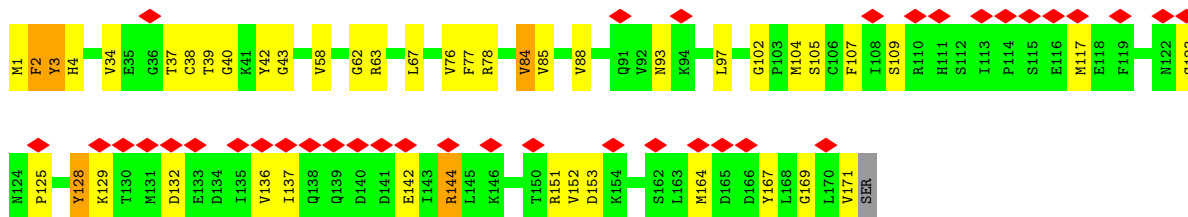
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F:  39% 18% 5% 39%




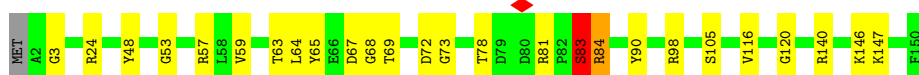
- Molecule 7: DNA-directed RNA polymerase II subunit RPB7

Chain G:  22% 73% 23%



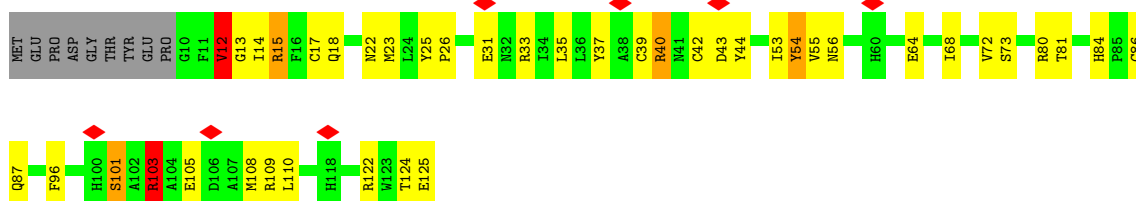
- Molecule 8: RPB8

Chain H:  82% 16%



- Molecule 9: RPB9

Chain I:  6% 59% 29% 7%

















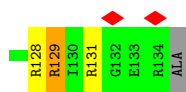




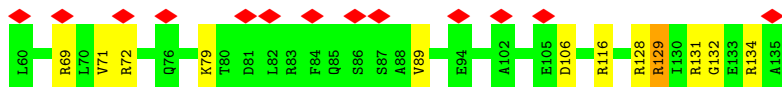
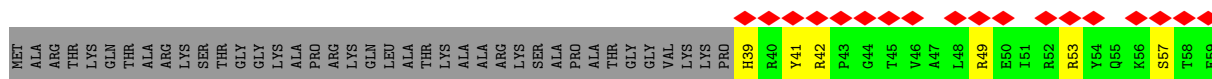




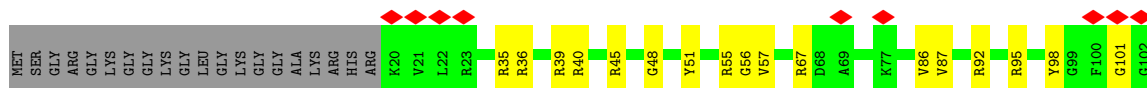




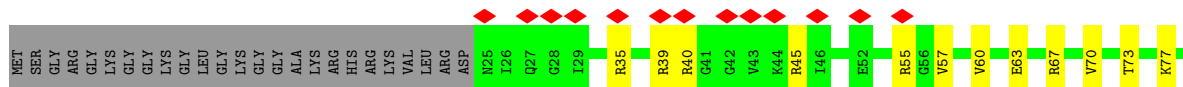
• Molecule 26: Histone H3.2



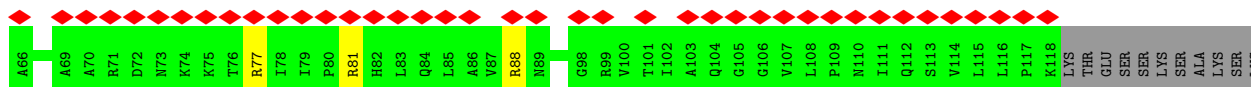
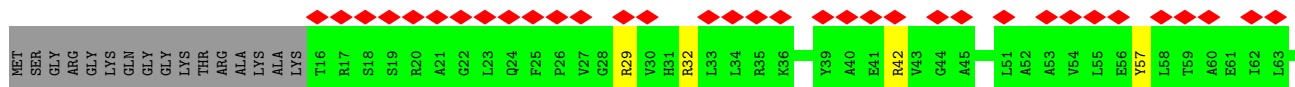
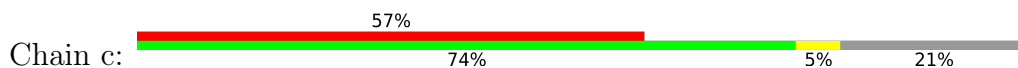
• Molecule 27: Histone H4



• Molecule 27: Histone H4



• Molecule 28: Histone H2A

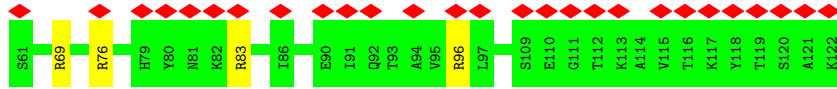
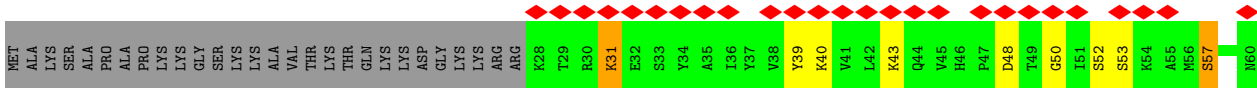
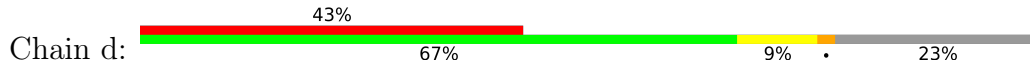


• Molecule 28: Histone H2A

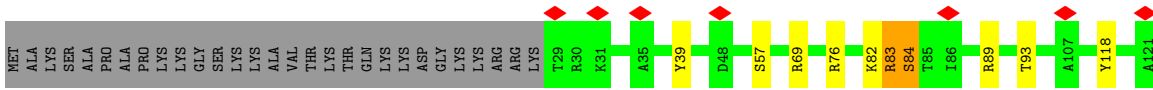




• Molecule 29: Histone H2B 1.1



• Molecule 29: Histone H2B 1.1



LYS

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	105420	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	52	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.935	Depositor
Minimum map value	-0.271	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.023	Depositor
Recommended contour level	0.0832	Depositor
Map size ( $\text{\AA}$ )	373.5, 373.5, 373.5	wwPDB
Map dimensions	450, 450, 450	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.83, 0.83, 0.83	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, TPO, SEP

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	1.72	230/11437 (2.0%)	1.50	109/15433 (0.7%)
2	B	1.78	203/9158 (2.2%)	1.55	90/12360 (0.7%)
3	C	1.91	53/2115 (2.5%)	1.62	18/2873 (0.6%)
4	D	1.55	14/1017 (1.4%)	1.36	6/1368 (0.4%)
5	E	1.86	47/1751 (2.7%)	1.50	23/2366 (1.0%)
6	F	2.18	25/636 (3.9%)	1.76	7/859 (0.8%)
7	G	1.79	38/1364 (2.8%)	1.52	14/1853 (0.8%)
8	H	1.49	19/1219 (1.6%)	1.41	8/1644 (0.5%)
9	I	1.89	25/964 (2.6%)	1.59	8/1305 (0.6%)
10	J	1.10	2/533 (0.4%)	1.20	2/719 (0.3%)
11	K	2.02	23/939 (2.4%)	1.65	6/1271 (0.5%)
12	L	1.45	6/403 (1.5%)	1.41	5/536 (0.9%)
13	M	0.93	24/4988 (0.5%)	1.18	29/6450 (0.4%)
14	N	1.68	41/2752 (1.5%)	2.95	218/4246 (5.1%)
15	O	0.63	0/1287	0.98	9/1721 (0.5%)
16	P	2.39	26/423 (6.1%)	4.27	98/657 (14.9%)
17	Q	1.08	63/7365 (0.9%)	0.98	24/9927 (0.2%)
18	R	1.45	27/1866 (1.4%)	1.33	8/2519 (0.3%)
19	T	1.73	51/3012 (1.7%)	2.66	279/4641 (6.0%)
20	U	1.52	13/872 (1.5%)	1.39	10/1187 (0.8%)
21	V	1.31	21/1739 (1.2%)	1.24	5/2375 (0.2%)
22	W	0.43	1/2392 (0.0%)	0.56	0/3257
23	X	0.58	1/356 (0.3%)	0.65	0/478
24	Y	1.78	21/927 (2.3%)	1.51	8/1250 (0.6%)
25	Z	1.34	46/4084 (1.1%)	1.24	16/5498 (0.3%)
26	a	1.35	7/814 (0.9%)	1.40	12/1092 (1.1%)
26	e	1.73	19/812 (2.3%)	1.58	10/1088 (0.9%)
27	b	1.57	12/669 (1.8%)	1.54	10/894 (1.1%)
27	f	1.39	10/626 (1.6%)	1.37	9/837 (1.1%)
28	c	1.11	4/805 (0.5%)	1.18	6/1088 (0.6%)
28	g	1.22	9/819 (1.1%)	1.30	10/1106 (0.9%)
29	d	1.09	7/756 (0.9%)	1.17	5/1015 (0.5%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
29	h	1.31	7/737 (0.9%)	1.25	4/993 (0.4%)
All	All	1.52	1095/69637 (1.6%)	1.59	1066/94906 (1.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	10
2	B	0	10
3	C	0	3
4	D	0	1
9	I	0	1
10	J	0	4
13	M	0	3
14	N	0	37
16	P	0	1
18	R	0	1
19	T	0	32
25	Z	0	1
26	a	0	1
28	c	0	1
28	g	0	4
29	h	0	1
All	All	0	111

The worst 5 of 1095 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	496	ALA	C-N	11.39	1.60	1.34
14	N	105	DG	C3'-O3'	11.07	1.58	1.44
19	T	-113	DG	C3'-O3'	11.07	1.58	1.44
16	P	42	C	C4-N4	-10.47	1.24	1.33
16	P	30	C	C5-C6	-9.40	1.26	1.34

The worst 5 of 1066 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	N	107	DC	OP1-P-O3'	-45.63	4.81	105.20
14	N	85	DG	OP1-P-O3'	-45.29	5.57	105.20
19	T	-71	DG	OP1-P-O3'	-45.29	5.57	105.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	N	86	DT	OP1-P-O3'	-45.28	5.58	105.20
19	T	-133	DG	OP1-P-O3'	-45.26	5.63	105.20

There are no chirality outliers.

5 of 111 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	413	TYR	Sidechain
1	A	727	PRO	Mainchain
1	A	84	HIS	Sidechain
1	A	862	ARG	Sidechain
1	A	910	LYS	Peptide

## 5.2 Too-close contacts [i](#)

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	11255	11385	11372	207	0
2	B	8980	9024	9022	59	0
3	C	2072	2021	2022	18	0
4	D	1004	981	980	8	0
5	E	1720	1736	1736	22	0
6	F	626	658	657	10	0
7	G	1333	1321	1321	12	0
8	H	1197	1157	1156	5	0
9	I	942	874	872	17	0
10	J	524	541	542	2	0
11	K	920	942	942	4	0
12	L	397	407	405	3	0
13	M	4927	2638	2622	21	0
14	N	2460	1355	1345	23	0
15	O	1274	0	1277	107	0
16	P	381	191	186	34	0
17	Q	7226	7171	7169	92	0
18	R	1836	1701	1699	26	0
19	T	2680	1458	1441	39	0
20	U	857	687	684	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
21	V	1711	1450	1446	17	0
22	W	2333	2247	2246	49	0
23	X	353	372	371	8	0
24	Y	911	909	907	10	0
25	Z	4025	4046	4041	43	0
26	a	802	841	841	0	0
26	e	801	839	838	0	0
27	b	662	710	709	0	0
27	f	619	660	659	0	0
28	c	795	847	846	0	0
28	g	809	865	864	0	0
29	d	745	774	773	0	0
29	h	726	749	747	0	0
30	A	2	0	0	0	0
30	B	1	0	0	0	0
30	C	1	0	0	2	0
30	I	2	0	0	0	0
30	J	1	0	0	0	0
30	R	1	0	0	0	0
30	Y	1	0	0	0	0
31	A	1	0	0	0	0
All	All	67913	61557	62738	677	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 677 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)
1:A:1314:THR:CG2	15:O:297:ARG:HE	0.95	1.59
1:A:1314:THR:C	15:O:295:GLY:HA3	1.09	1.45
1:A:1314:THR:HG22	15:O:297:ARG:NE	1.31	1.38
1:A:1314:THR:C	15:O:295:GLY:CA	1.91	1.35
1:A:1314:THR:CG2	15:O:297:ARG:NE	1.79	1.35

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	1408/1984 (71%)	1296 (92%)	105 (8%)	7 (0%)	29	68
2	B	1112/1251 (89%)	1024 (92%)	85 (8%)	3 (0%)	41	76
3	C	254/275 (92%)	239 (94%)	13 (5%)	2 (1%)	19	57
4	D	124/184 (67%)	122 (98%)	2 (2%)	0	100	100
5	E	207/210 (99%)	197 (95%)	8 (4%)	2 (1%)	15	53
6	F	76/127 (60%)	71 (93%)	5 (7%)	0	100	100
7	G	169/172 (98%)	155 (92%)	13 (8%)	1 (1%)	25	64
8	H	147/150 (98%)	137 (93%)	10 (7%)	0	100	100
9	I	114/125 (91%)	104 (91%)	10 (9%)	0	100	100
10	J	64/67 (96%)	61 (95%)	2 (3%)	1 (2%)	9	40
11	K	113/117 (97%)	108 (96%)	5 (4%)	0	100	100
12	L	45/58 (78%)	40 (89%)	4 (9%)	1 (2%)	6	31
13	M	976/1729 (56%)	860 (88%)	98 (10%)	18 (2%)	8	37
15	O	157/304 (52%)	154 (98%)	3 (2%)	0	100	100
17	Q	888/1179 (75%)	838 (94%)	50 (6%)	0	100	100
18	R	240/713 (34%)	224 (93%)	16 (7%)	0	100	100
20	U	119/666 (18%)	93 (78%)	24 (20%)	2 (2%)	9	39
21	V	236/531 (44%)	200 (85%)	33 (14%)	3 (1%)	12	45
22	W	298/305 (98%)	269 (90%)	29 (10%)	0	100	100
23	X	41/531 (8%)	40 (98%)	1 (2%)	0	100	100
24	Y	114/117 (97%)	109 (96%)	5 (4%)	0	100	100
25	Z	497/1087 (46%)	452 (91%)	43 (9%)	2 (0%)	34	72
26	a	95/136 (70%)	92 (97%)	3 (3%)	0	100	100
26	e	95/136 (70%)	90 (95%)	5 (5%)	0	100	100
27	b	81/103 (79%)	79 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
27	f	76/103 (74%)	70 (92%)	6 (8%)	0	100	100
28	c	101/130 (78%)	99 (98%)	2 (2%)	0	100	100
28	g	103/130 (79%)	93 (90%)	10 (10%)	0	100	100
29	d	93/123 (76%)	89 (96%)	4 (4%)	0	100	100
29	h	91/123 (74%)	83 (91%)	8 (9%)	0	100	100
All	All	8134/12866 (63%)	7488 (92%)	604 (7%)	42 (0%)	32	68

5 of 42 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
13	M	294	LEU
13	M	373	VAL
13	M	376	ILE
13	M	385	GLU
13	M	779	ILE

### 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	1245/1761 (71%)	1216 (98%)	29 (2%)	50	80
2	B	986/1084 (91%)	958 (97%)	28 (3%)	43	77
3	C	235/252 (93%)	230 (98%)	5 (2%)	53	82
4	D	109/160 (68%)	108 (99%)	1 (1%)	78	92
5	E	191/192 (100%)	188 (98%)	3 (2%)	62	86
6	F	68/111 (61%)	67 (98%)	1 (2%)	65	87
7	G	146/153 (95%)	143 (98%)	3 (2%)	53	82
8	H	130/131 (99%)	126 (97%)	4 (3%)	40	75
9	I	104/112 (93%)	100 (96%)	4 (4%)	33	69
10	J	55/56 (98%)	54 (98%)	1 (2%)	59	85
11	K	104/106 (98%)	104 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
12	L	44/55 (80%)	42 (96%)	2 (4%)	27	64
13	M	207/1524 (14%)	205 (99%)	2 (1%)	76	91
15	O	140/268 (52%)	140 (100%)	0	100	100
17	Q	761/1011 (75%)	753 (99%)	8 (1%)	73	90
18	R	170/625 (27%)	167 (98%)	3 (2%)	59	85
20	U	66/590 (11%)	65 (98%)	1 (2%)	65	87
21	V	148/462 (32%)	143 (97%)	5 (3%)	37	72
22	W	255/260 (98%)	253 (99%)	2 (1%)	81	93
23	X	40/467 (9%)	39 (98%)	1 (2%)	47	79
24	Y	102/103 (99%)	101 (99%)	1 (1%)	76	91
25	Z	435/939 (46%)	431 (99%)	4 (1%)	78	92
26	a	85/111 (77%)	83 (98%)	2 (2%)	49	79
26	e	84/111 (76%)	81 (96%)	3 (4%)	35	70
27	b	68/79 (86%)	68 (100%)	0	100	100
27	f	63/79 (80%)	62 (98%)	1 (2%)	62	86
28	c	82/102 (80%)	82 (100%)	0	100	100
28	g	83/102 (81%)	81 (98%)	2 (2%)	49	79
29	d	81/103 (79%)	77 (95%)	4 (5%)	25	61
29	h	79/103 (77%)	75 (95%)	4 (5%)	24	60
All	All	6366/11212 (57%)	6242 (98%)	124 (2%)	59	84

5 of 124 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	15	THR
29	d	31	LYS
8	H	78	THR
26	a	129	ARG
28	g	19	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
21	V	300	ASN

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Mol	Chain	Res	Type
25	Z	234	HIS
29	d	44	GLN
24	Y	41	GLN
9	I	56	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
16	P	17/18 (94%)	6 (35%)	2 (11%)

5 of 6 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
16	P	30	C
16	P	31	G
16	P	36	U
16	P	37	G
16	P	39	U

All (2) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
16	P	36	U
16	P	38	G

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

3 non-standard protein/DNA/RNA residues are modelled in this entry.

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
1	TPO	A	1525	1	8,10,11	2.04	2 (25%)	10,14,16	1.86	2 (20%)
1	SEP	A	1547	1	8,9,10	2.01	2 (25%)	8,12,14	1.72	2 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
25	TPO	Z	775	25	8,10,11	1.66	1 (12%)	10,14,16	1.93	1 (10%)

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
1	TPO	A	1525	1	-	4/9/11/13	-
1	SEP	A	1547	1	-	0/5/8/10	-
25	TPO	Z	775	25	-	2/9/11/13	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1525	TPO	O-C	3.72	1.34	1.19
25	Z	775	TPO	O-C	3.71	1.34	1.19
1	A	1547	SEP	O-C	3.70	1.34	1.19
1	A	1547	SEP	P-O1P	3.39	1.61	1.50
1	A	1525	TPO	P-O1P	3.37	1.61	1.50

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
25	Z	775	TPO	P-OG1-CB	-5.34	107.06	123.21
1	A	1525	TPO	P-OG1-CB	-5.02	108.06	123.21
1	A	1547	SEP	OG-CB-CA	3.20	111.26	108.14
1	A	1547	SEP	P-OG-CB	-3.14	109.64	118.30
1	A	1525	TPO	CG2-CB-CA	-2.09	109.03	113.16

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1525	TPO	N-CA-CB-CG2
1	A	1525	TPO	N-CA-CB-OG1
1	A	1525	TPO	C-CA-CB-CG2
1	A	1525	TPO	O-C-CA-CB
25	Z	775	TPO	O-C-CA-CB

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	1525	TPO	2	0
25	Z	775	TPO	1	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides 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.

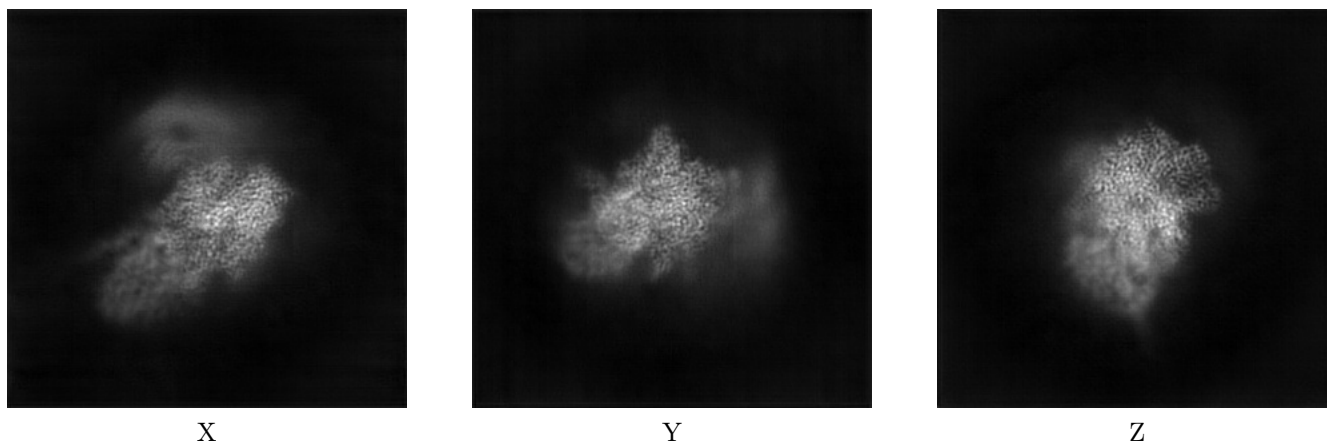
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-26621. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

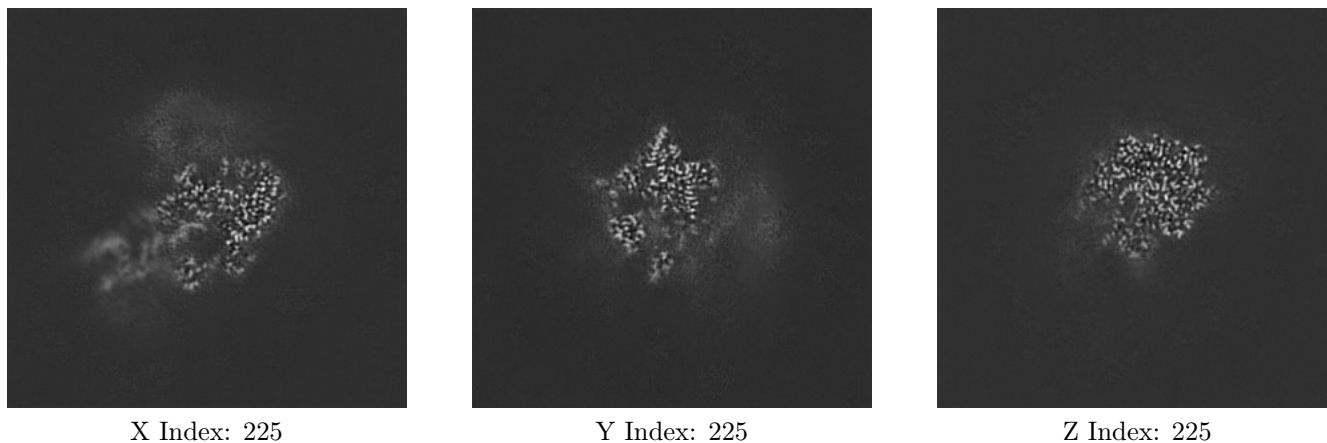
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

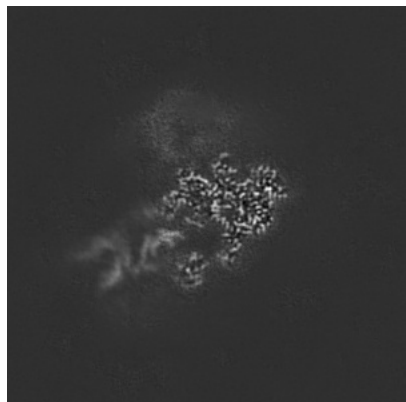
#### 6.2.1 Primary map



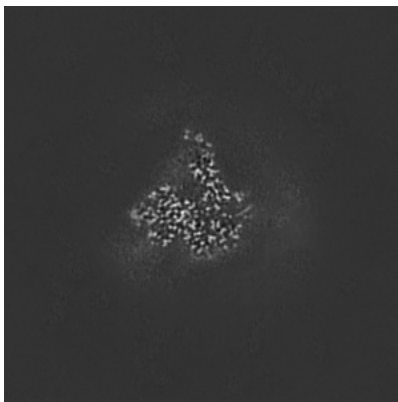
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

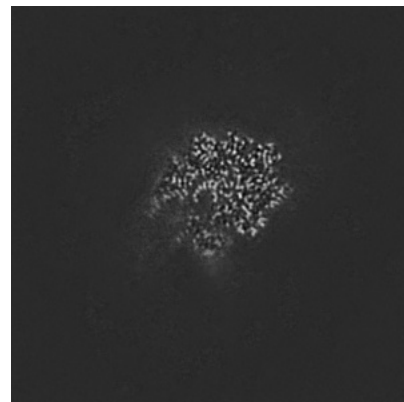
### 6.3.1 Primary map



X Index: 230



Y Index: 257



Z Index: 224

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0832. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

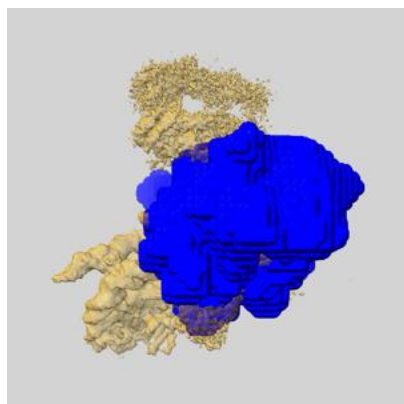
## 6.5 Mask visualisation [i](#)

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

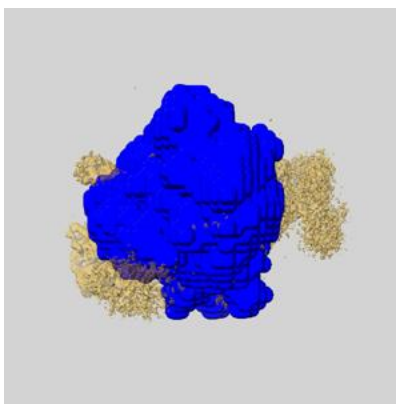
A mask typically either:

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

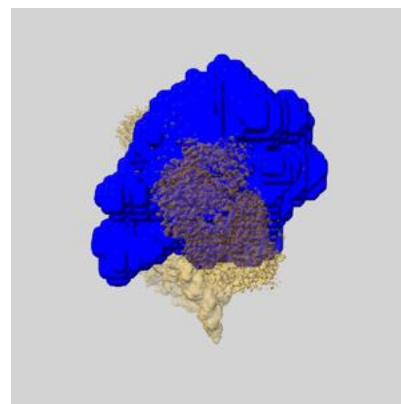
### 6.5.1 emd\_26621\_msk\_1.map [i](#)



X

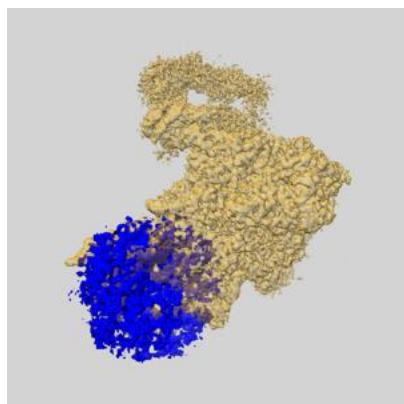


Y

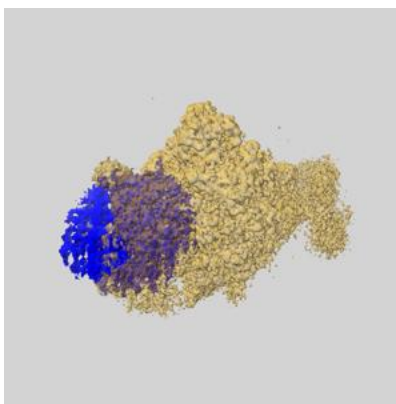


Z

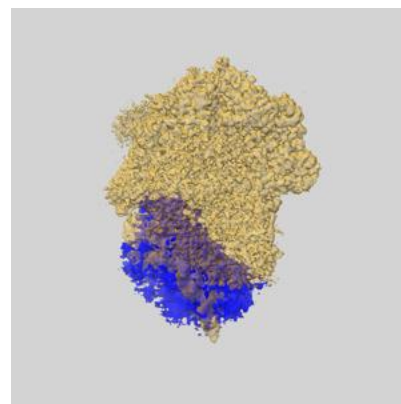
### 6.5.2 emd\_26621\_msk\_2.map [i](#)



X

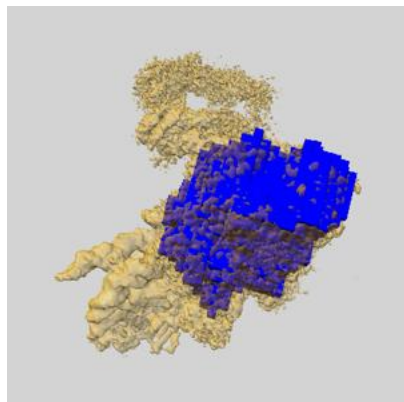


Y

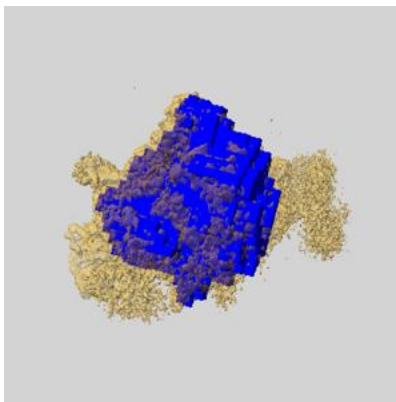


Z

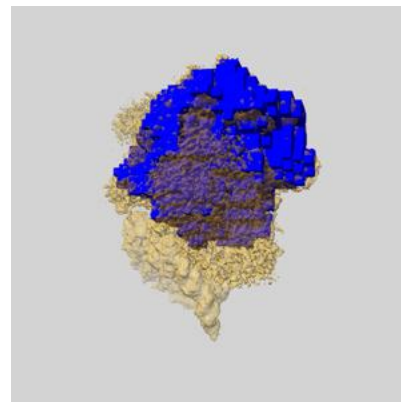


6.5.3 emd\_26621\_msk\_3.map [i](#)

X



Y

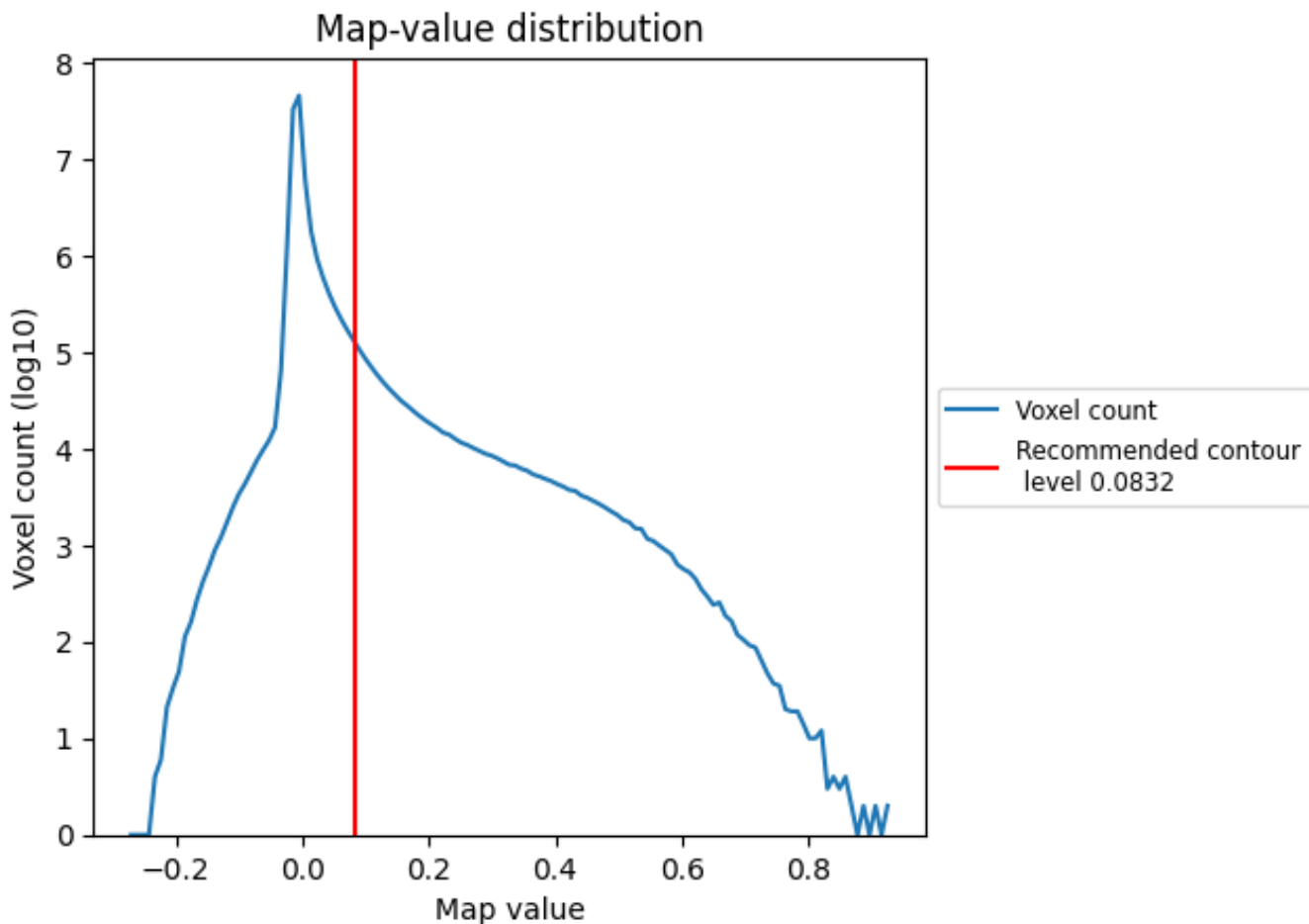


Z

## 7 Map analysis [i](#)

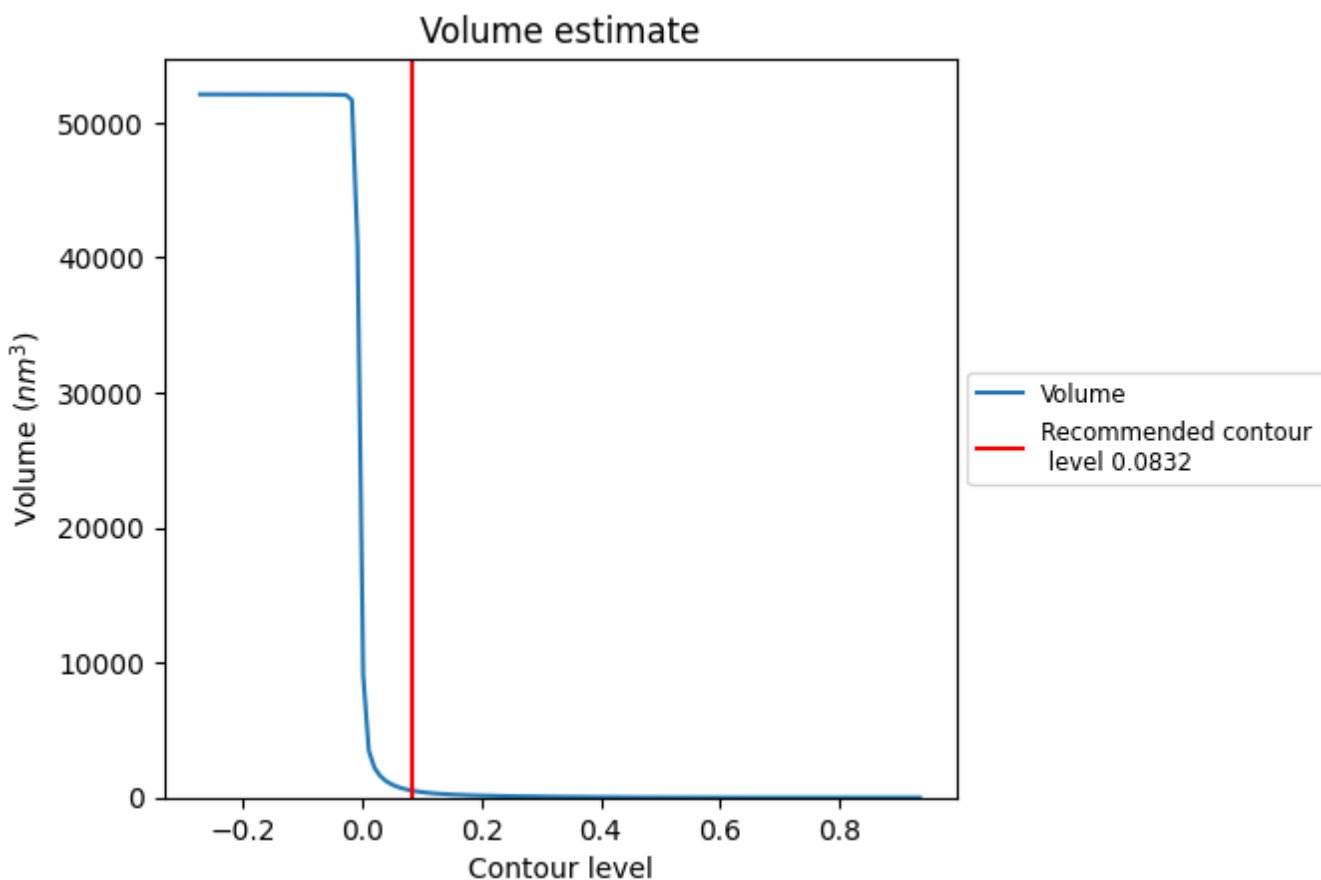
This section contains the results of statistical analysis of the map.

### 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.

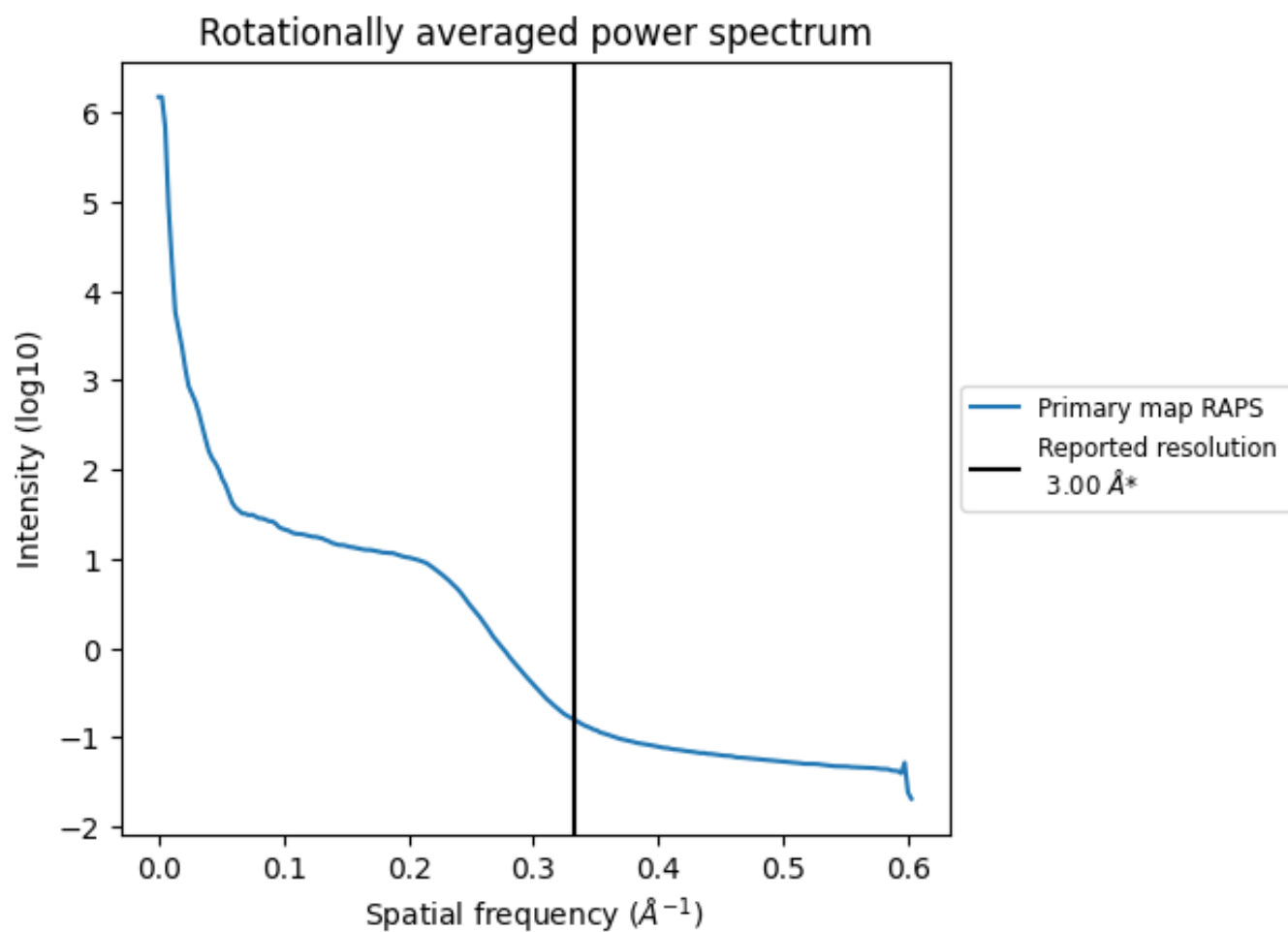
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 522  $\text{nm}^3$ ; this corresponds to an approximate mass of 472 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  $0.333 \text{\AA}^{-1}$

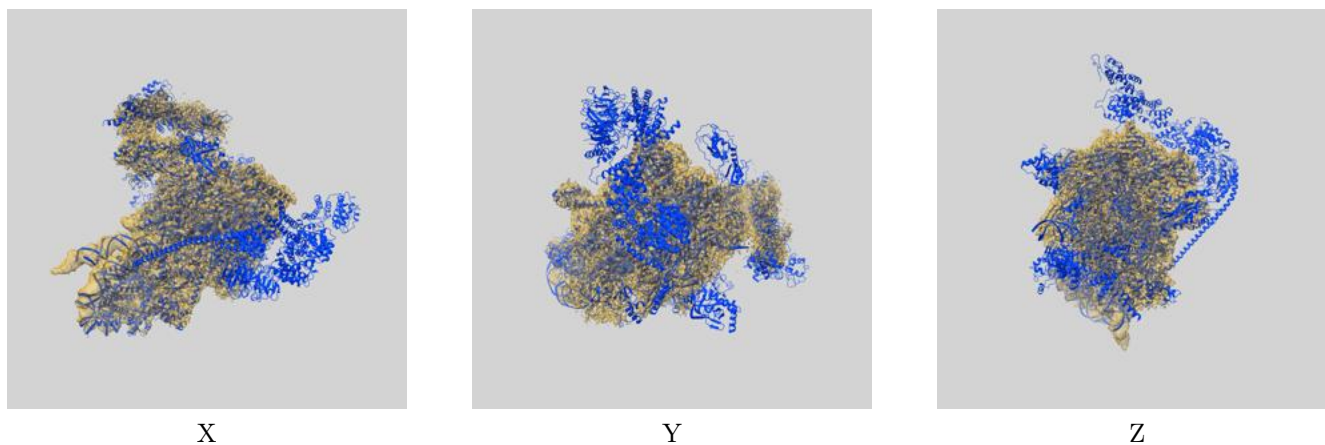
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

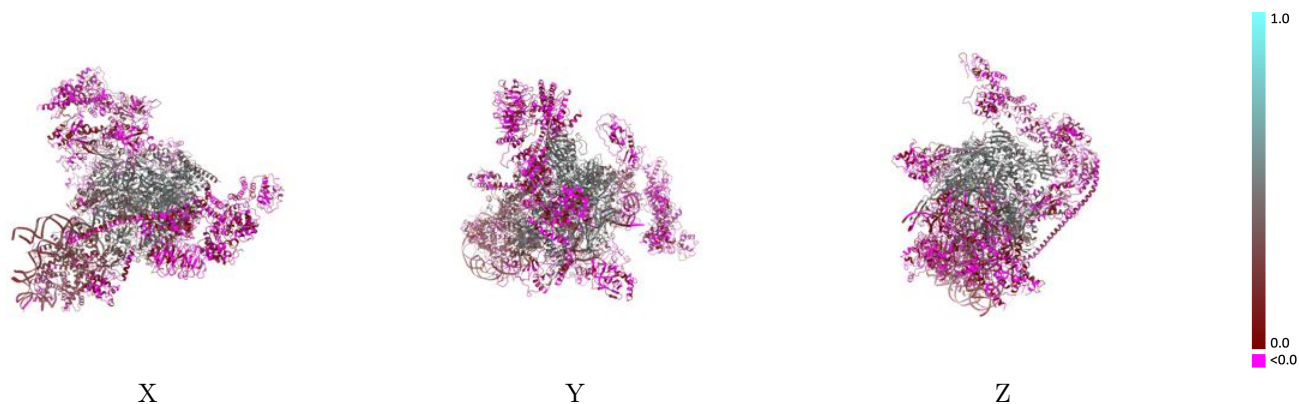
This section contains information regarding the fit between EMDB map EMD-26621 and PDB model 7UND. Per-residue inclusion information can be found in section 3 on page 11.

### 9.1 Map-model overlay [i](#)



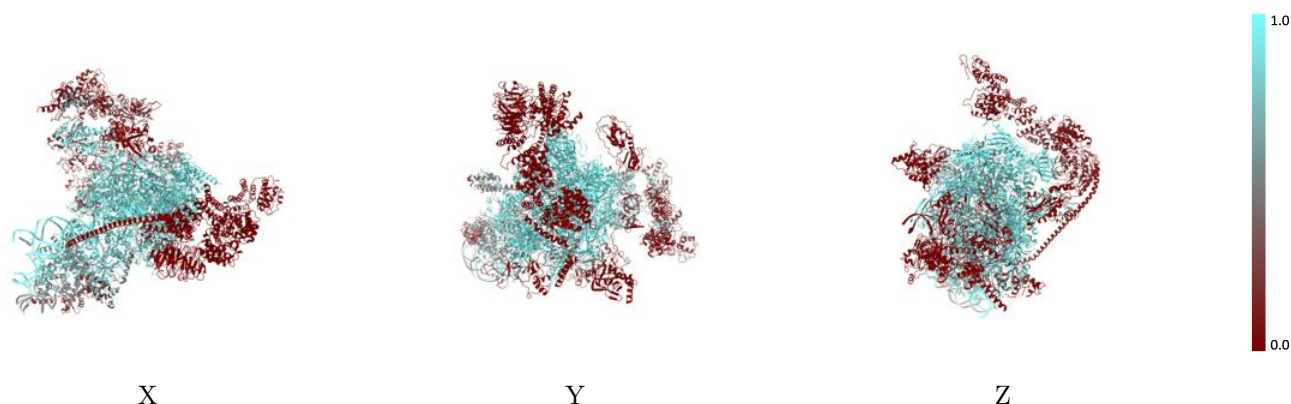
The images above show the 3D surface view of the map at the recommended contour level 0.0832 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



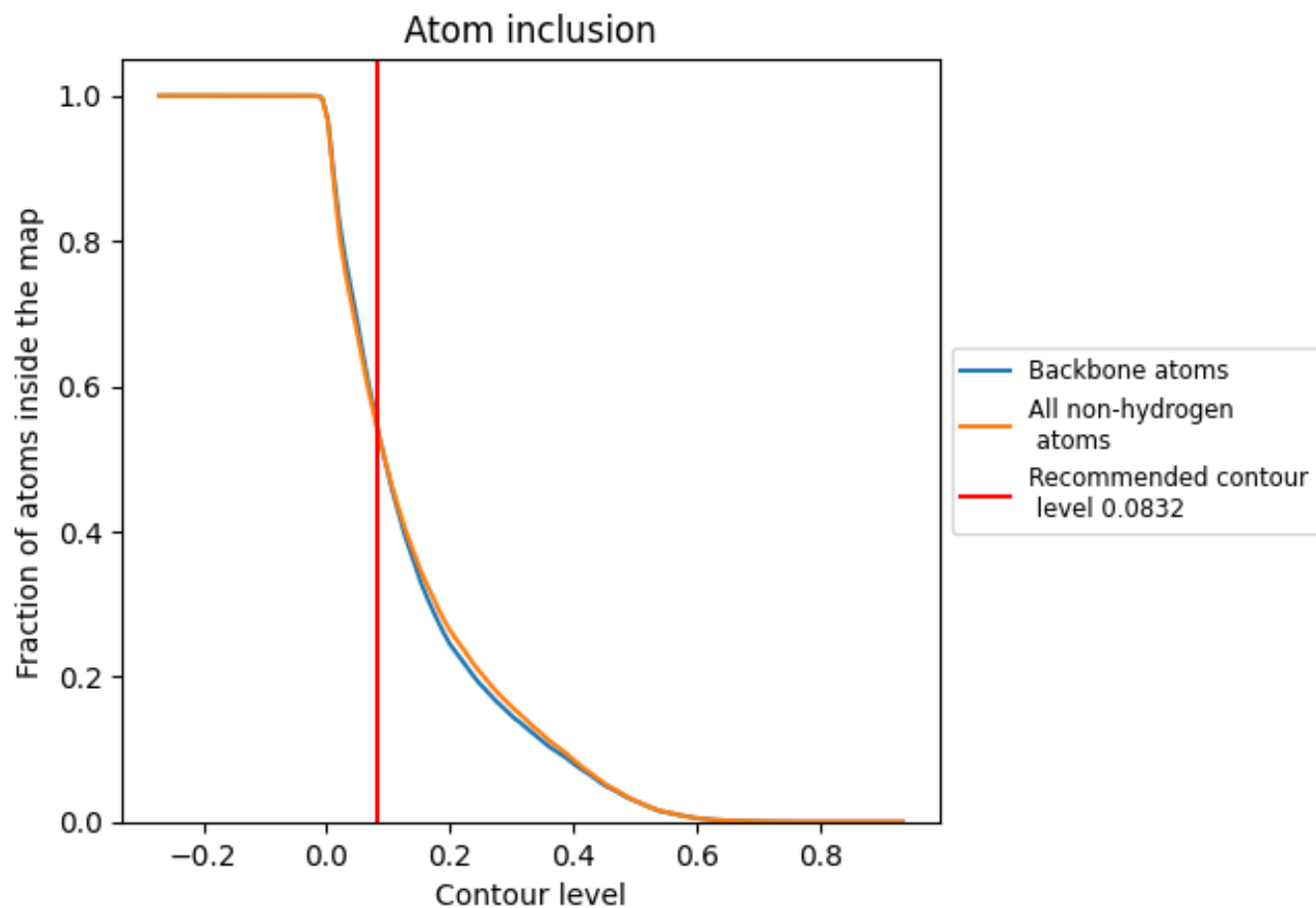
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0832).

## 9.4 Atom inclusion [i](#)







































































At the recommended contour level, 54% of all backbone atoms, 54% 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 (0.0832) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5372	 0.2160
A	 0.8900	 0.4080
B	 0.9014	 0.4260
C	 0.9345	 0.4660
D	 0.6276	 0.0950
E	 0.8755	 0.3370
F	 0.9127	 0.4550
G	 0.6575	 0.1730
H	 0.9017	 0.4280
I	 0.8039	 0.2330
J	 0.9062	 0.4630
K	 0.9265	 0.4680
L	 0.8526	 0.3870
M	 0.0875	 0.0240
N	 0.7614	 0.1640
O	 0.4135	 0.0160
P	 0.7664	 0.2450
Q	 0.0013	 0.0130
R	 0.0156	 0.0010
T	 0.8045	 0.2060
U	 0.2168	 0.0850
V	 0.0902	 0.0480
W	 0.0000	 -0.0010
X	 0.0000	 0.0470
Y	 0.0000	 0.0160
Z	 0.1408	 0.0610
a	 0.7445	 0.1410
b	 0.6761	 0.1640
c	 0.2519	 0.1160
d	 0.3352	 0.1300
e	 0.5610	 0.0830
f	 0.6353	 0.1020
g	 0.7806	 0.1820
h	 0.7236	 0.1610

