



wwPDB EM Validation Summary Report ⓘ

Mar 26, 2026 – 04:01 PM UTC

PDB ID : 7NKY / pdb_00007nky
EMDB ID : EMD-12450
Title : RNA Polymerase II-Spt4/5-nucleosome-FACT structure
Authors : Farnung, L.; Ochmann, M.; Engholm, M.; Cramer, P.
Deposited on : 2021-02-19
Resolution : 3.20 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ 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 ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

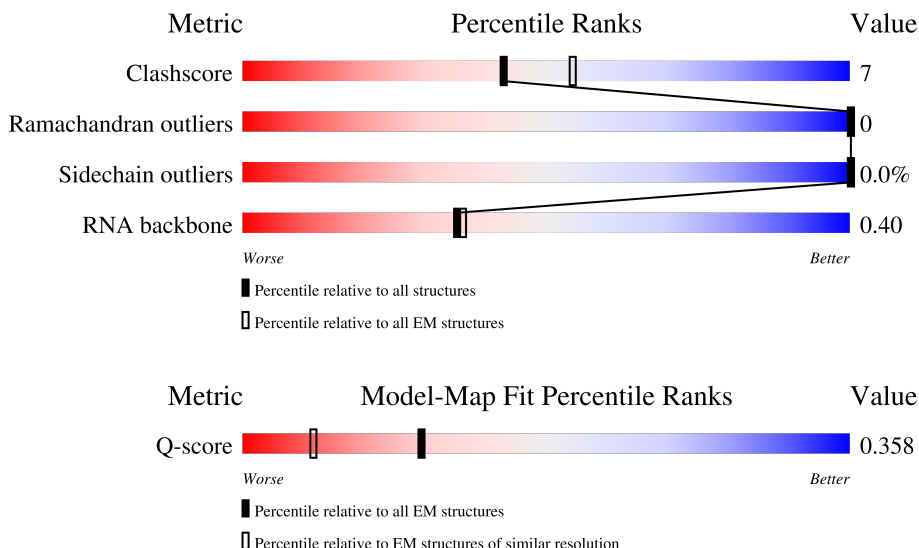
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.20 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	15020 (2.70 - 3.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	P	16	 12% (red), 50% (green), 31% (yellow), 19% (orange)
2	N	138	 91% (green), 9% (yellow)
3	T	148	 90% (green), 10% (yellow)

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Mol	Chain	Length	Quality of chain
4	A	1733	
5	B	1224	
6	C	318	
7	E	215	
8	F	155	
9	H	146	
10	I	122	
11	J	70	
12	K	120	
13	L	70	
14	Y	102	
15	Z	1064	
16	D	221	
17	G	171	
18	O	552	
19	Q	1035	
20	a	136	
20	e	136	
21	b	103	
21	f	103	
22	c	130	
22	g	130	
23	d	123	
23	h	123	

2 Entry composition

There are 25 unique types of molecules in this entry. The entry contains 51842 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called RNA (5'-R(P*UP*CP*UP*UP*UP*UP*AP*UP*UP*UP*UP*UP*UP*CP*UP*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
1	P	16	Total	C	N	O	P	0	0
			325	146	40	123	16		

- Molecule 2 is a DNA chain called DNA (138-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
2	N	138	Total	C	N	O	P	0	0
			2843	1346	526	833	138		

- Molecule 3 is a DNA chain called DNA (148-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
3	T	148	Total	C	N	O	P	0	0
			3022	1434	567	874	147		

- Molecule 4 is a protein called DNA-directed RNA polymerase II subunit RPB1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	1410	Total	C	N	O	S	0	0
			11092	6987	1941	2102	62		

- Molecule 5 is a protein called DNA-directed RNA polymerase II subunit RPB2.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	1116	Total	C	N	O	S	0	0
			8865	5611	1559	1640	55		

- Molecule 6 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	C	265	Total	C	N	O	S	0	0
			2086	1312	347	414	13		

- Molecule 7 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	E	214	Total	C	N	O	S	0	0
			1752	1111	309	321	11		

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	F	87	Total	C	N	O	S	0	0
			705	451	119	132	3		

- Molecule 9 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	H	133	Total	C	N	O	S	0	0
			1068	673	180	211	4		

- Molecule 10 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	I	119	Total	C	N	O	S	0	0
			971	596	179	186	10		

- Molecule 11 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	J	65	Total	C	N	O	S	0	0
			532	339	93	94	6		

- Molecule 12 is a protein called DNA-directed RNA polymerase II subunit RPB11.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	K	115	Total	C	N	O	S	0	1
			920	590	157	171	2		

- Molecule 13 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	L	44	Total	C	N	O	S	0	0
			351	217	70	60	4		

- Molecule 14 is a protein called Chromatin elongation factor SPT4.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	Y	98	Total	C	N	O	S	0	0
			739	461	126	142	10		

- Molecule 15 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Z	156	Total	C	N	O	S	0	0
			1252	804	224	221	3		

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Z	18	PHE	VAL	conflict	UNP A0A6L0ZFJ2
Z	98	THR	SER	conflict	UNP A0A6L0ZFJ2
Z	176	GLU	ASP	conflict	UNP A0A6L0ZFJ2
Z	376	LEU	LYS	conflict	UNP A0A6L0ZFJ2
Z	1064	PHE	-	expression tag	UNP A0A6L0ZFJ2

- Molecule 16 is a protein called DNA-directed RNA polymerase II subunit RPB4.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	D	180	Total	C	N	O	S	0	0
			1444	893	257	291	3		

- Molecule 17 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	G	171	Total	C	N	O	S	0	0
			1340	861	222	249	8		

- Molecule 18 is a protein called FACT complex subunit POB3.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	O	427	Total	C	N	O	S	0	0
			3481	2204	606	665	6		

- Molecule 19 is a protein called FACT complex subunit SPT16.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	Q	404	Total	C	N	O	S	0	0
			3264	2074	555	624	11		

- Molecule 20 is a protein called Histone H3.2.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	a	88	Total	C	N	O	S	0	0
			720	456	135	126	3		
20	e	94	Total	C	N	O	S	0	0
			775	490	149	133	3		

There are 2 discrepancies between the modelled and reference sequences:

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

- Molecule 21 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	b	83	Total	C	N	O	S	0	0
			662	418	129	114	1		
21	f	78	Total	C	N	O	S	0	0
			619	391	120	107	1		

- Molecule 22 is a protein called Histone H2A type 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	c	102	Total	C	N	O		0	0
			786	495	153	138			
22	g	97	Total	C	N	O		0	0
			747	468	148	131			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
c	99	ARG	GLY	conflict	UNP P06897
c	123	SER	ALA	conflict	UNP P06897
g	99	ARG	GLY	conflict	UNP P06897
g	123	SER	ALA	conflict	UNP P06897

- Molecule 23 is a protein called Histone H2B 1.1.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	d	95	Total	C	N	O	S	0	0
			745	469	134	140	2		

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Mol	Chain	Residues	Atoms					AltConf	Trace
23	h	93	Total	C	N	O	S	0	0
			726	457	130	137	2		

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	conflict	UNP P02281
h	0	MET	-	initiating methionine	UNP P02281
h	29	THR	SER	conflict	UNP P02281

- Molecule 24 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

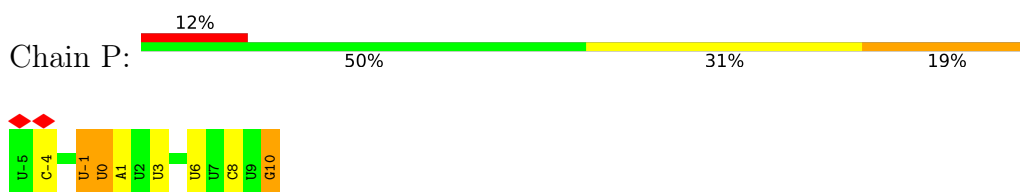
- Molecule 25 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

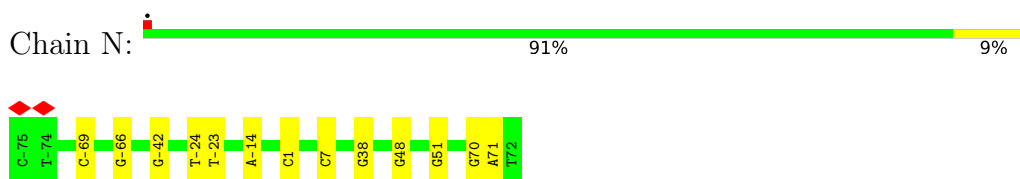
3 Residue-property plots [i](#)

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.

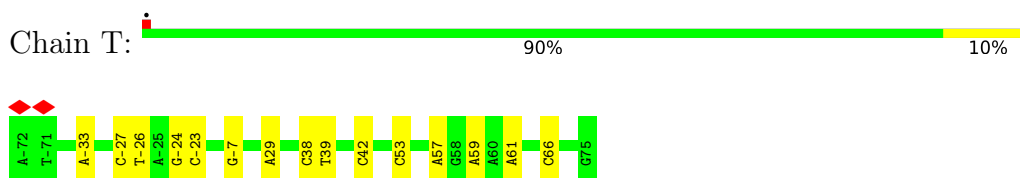
- Molecule 1: RNA (5'-R(P*UP*CP*UP*UP*UP*UP*AP*UP*UP*UP*UP*UP*UP*CP*UP*G)-3')



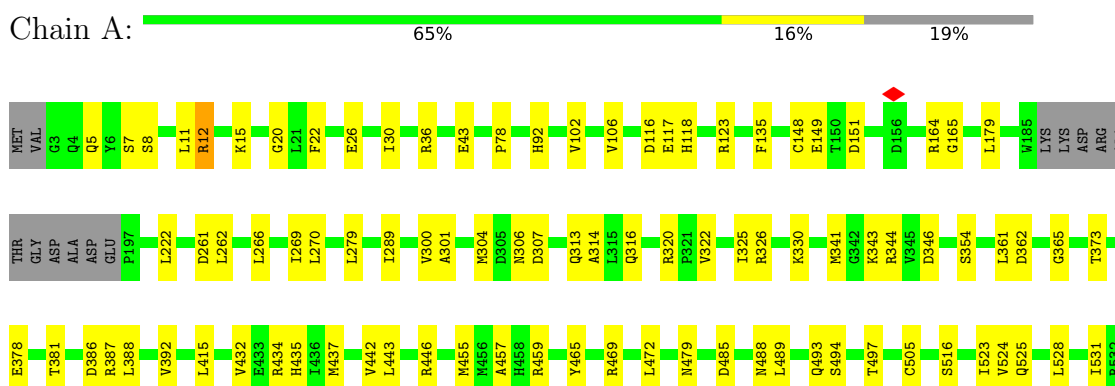
- Molecule 2: DNA (138-MER)

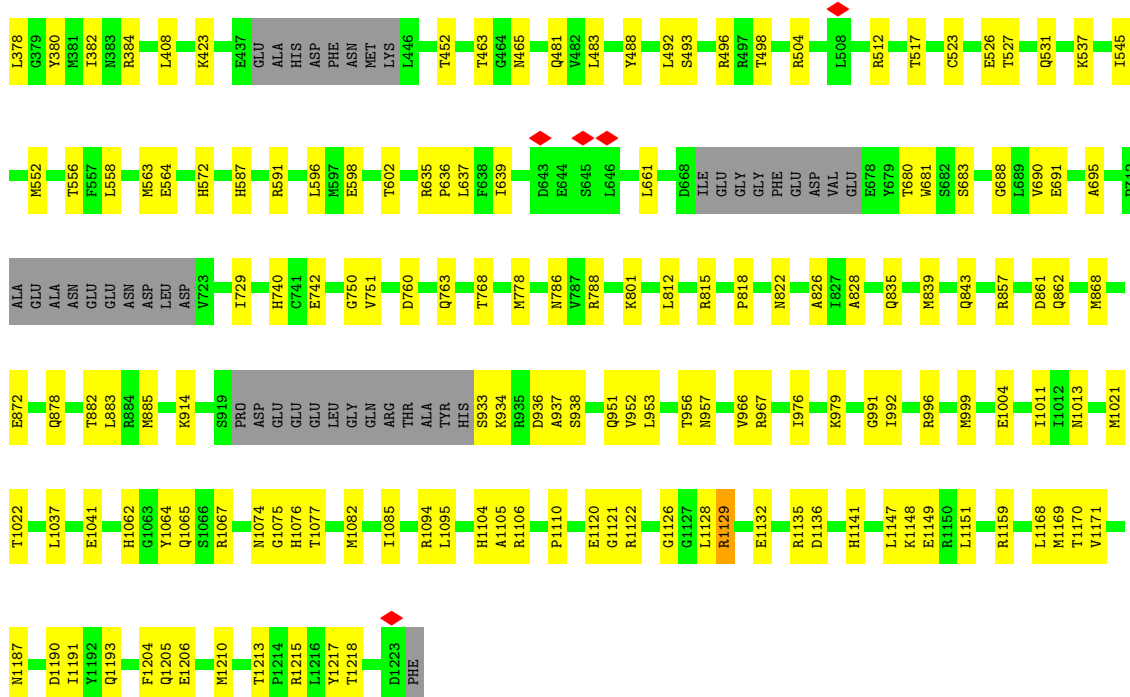


- Molecule 3: DNA (148-MER)



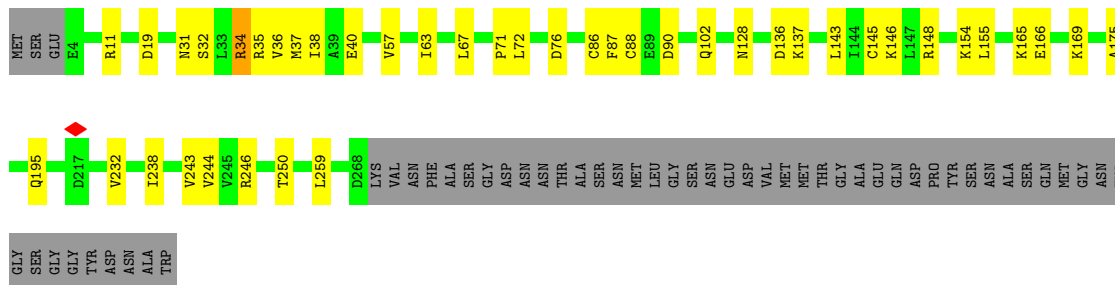
- Molecule 4: DNA-directed RNA polymerase II subunit RPB1





• Molecule 6: DNA-directed RNA polymerase II subunit RPB3

Chain C: 70% 13% 17%



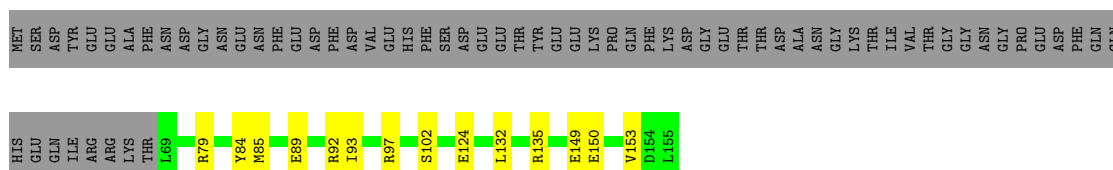
• Molecule 7: DNA-directed RNA polymerases I, II, and III subunit RPABC1

Chain E: 87% 13%

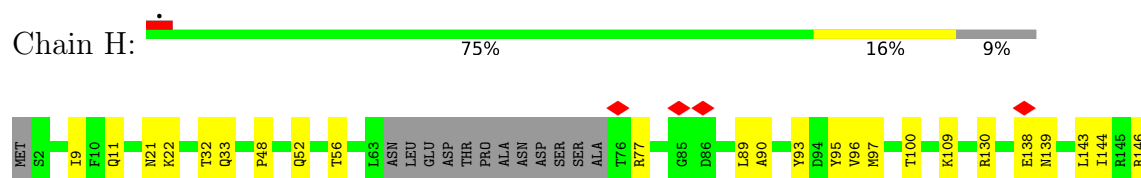


• Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC2

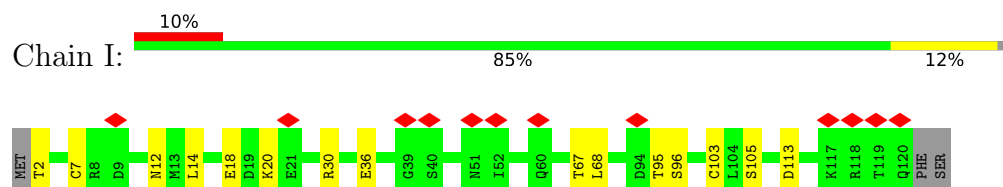
Chain F: 47% 9% 44%



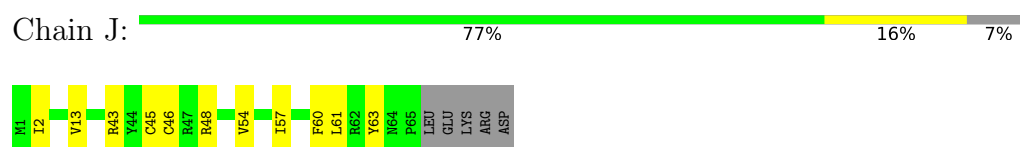
- Molecule 9: DNA-directed RNA polymerases I, II, and III subunit RPABC3



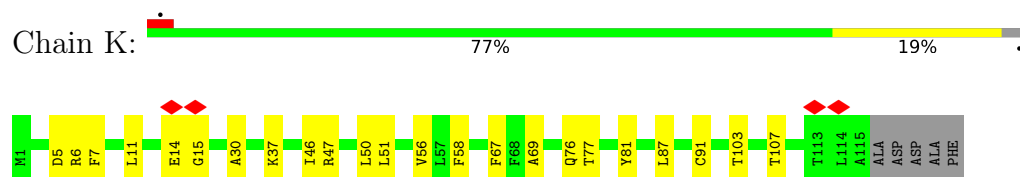
- Molecule 10: DNA-directed RNA polymerase II subunit RPB9



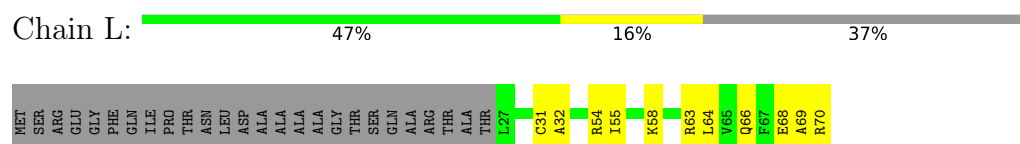
- Molecule 11: DNA-directed RNA polymerases I, II, and III subunit RPABC5



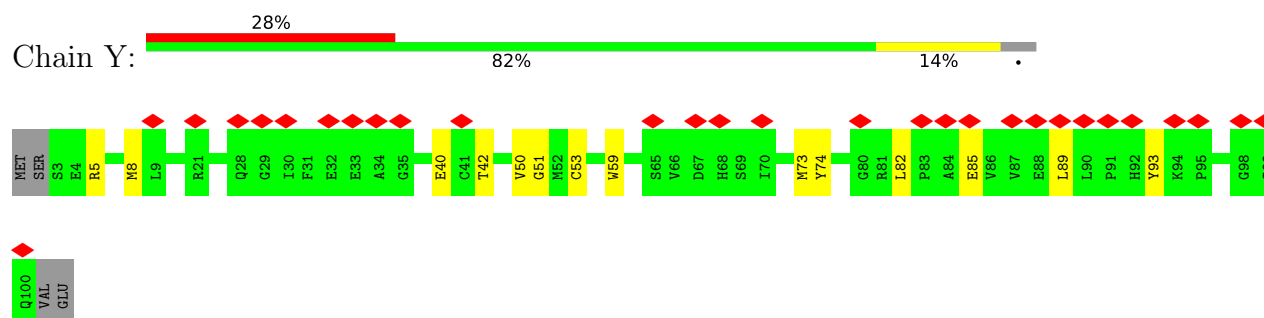
- Molecule 12: DNA-directed RNA polymerase II subunit RPB11



- Molecule 13: DNA-directed RNA polymerases I, II, and III subunit RPABC4

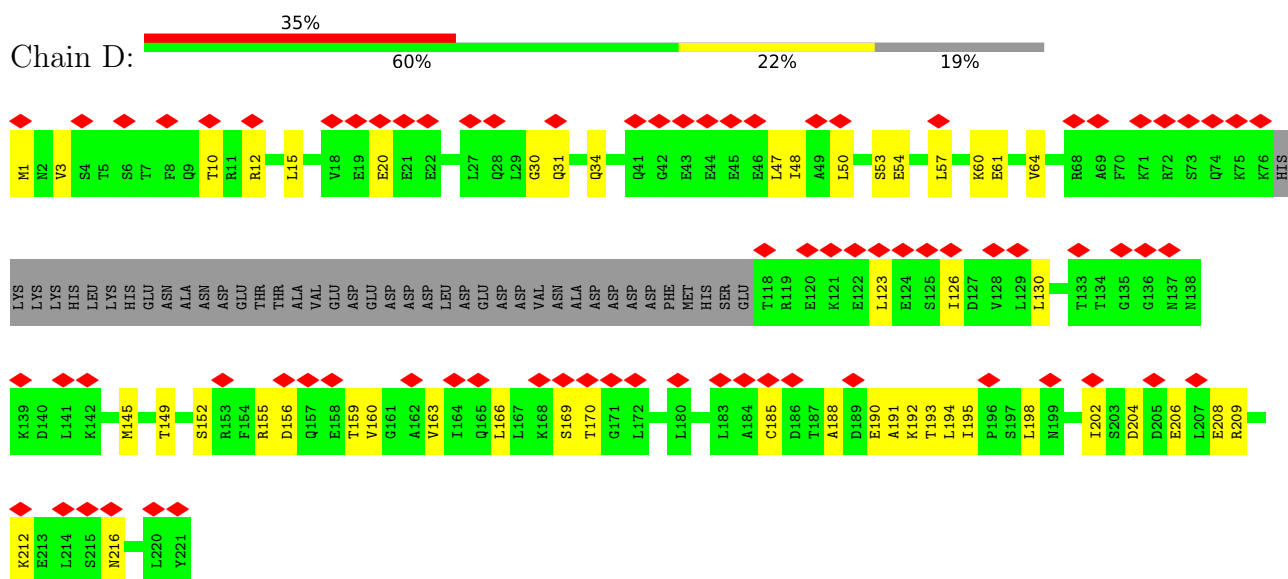


- Molecule 14: Chromatin elongation factor SPT4

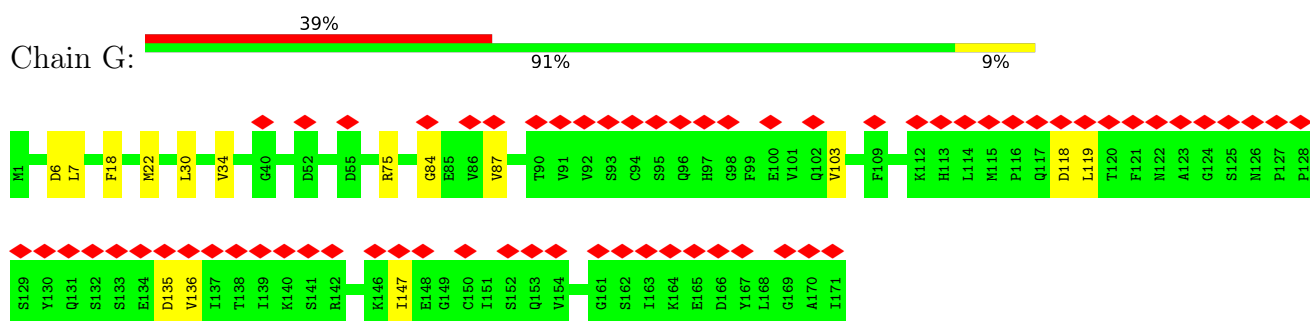


- Molecule 15: Transcription elongation factor SPT5

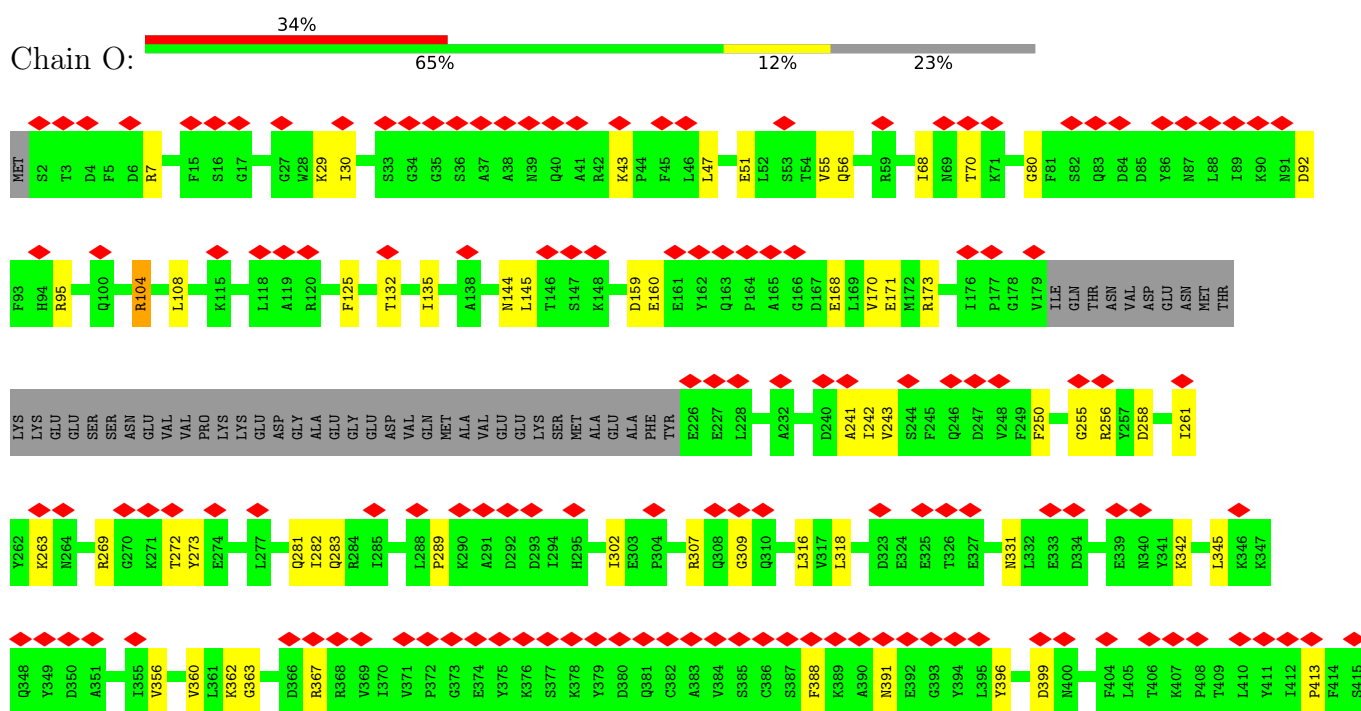


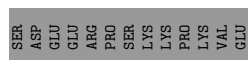


• Molecule 17: DNA-directed RNA polymerase II subunit RPB7

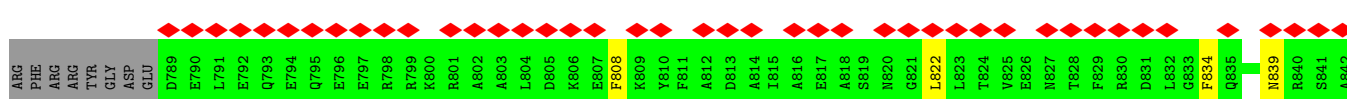
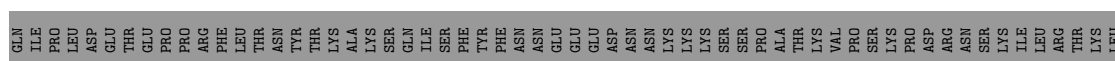


• Molecule 18: FACT complex subunit POB3





Chain Q:



LYS
LYS
THR
GLU
SER
SER
LYS
LYS
SER
ALA
LYS
SER
LYS

• Molecule 22: Histone H2A type 1



MET
SER
GLY
SER
ARG
GLY
LYS
GLN
GLY
LYS
THR
ARG
ALA
LYS
A14
K15
T16
S19
Q24
Y39
A47
V54
I62
L65
D72
P80
L83
Q84
L85
A86
N89
L93
I96
G106
H110
ILE
GLN
SER
VAL
LEU
LEU
PRO
LYS
THR

GLU
SER
SER
LYS
SER
ALA
LYS
LYS

• Molecule 23: Histone H2B 1.1



MET
ALA
LYS
SER
ALA
PRO
ALA
PRO
LYS
LYS
GLY
SER
LYS
LYS
ALA
VAL
THR
THR
GLN
LYS
ASP
GLY
LYS
LYS
ARG
K28
Y37
D48
T49
E73
A74
S75
R76
L77
A78
R83
S84
T85
I86
T93
A94
V95
R96
L97
A121
K122

• Molecule 23: Histone H2B 1.1



MET
ALA
LYS
SER
ALA
PRO
ALA
PRO
LYS
LYS
GLY
SER
LYS
LYS
VAL
THR
THR
GLN
LYS
ASP
GLY
LYS
LYS
ARG
K29
R30
K31
Y34
V38
Q44
A55
M59
E68
R69
I70
L77
T87
E90
T91
Q92
T93
A94
V95
L98
L99

A121
LYS

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	47138	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 ($e^-/\text{\AA}^2$)	40.25	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.041	Depositor
Minimum map value	-0.014	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.0023	Depositor
Map size (Å)	419.99997, 419.99997, 419.99997	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.05, 1.05, 1.05	Depositor

5 Model quality

5.1 Standard geometry

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

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	P	0.13	0/358	0.29	0/552
2	N	0.32	0/3189	0.59	0/4922
3	T	0.32	0/3392	0.59	0/5229
4	A	0.23	0/11289	0.50	0/15263
5	B	0.23	0/9037	0.48	1/12184 (0.0%)
6	C	0.24	0/2124	0.51	0/2879
7	E	0.22	0/1788	0.50	0/2406
8	F	0.24	0/717	0.54	0/967
9	H	0.25	0/1086	0.54	0/1470
10	I	0.27	0/989	0.64	0/1331
11	J	0.29	0/541	0.56	0/727
12	K	0.24	0/938	0.54	0/1267
13	L	0.19	0/353	0.49	0/468
14	Y	0.23	0/755	0.54	0/1021
15	Z	0.27	0/1271	0.59	0/1702
16	D	0.26	0/1454	0.63	0/1949
17	G	0.25	0/1368	0.57	0/1844
18	O	0.25	0/3550	0.55	2/4788 (0.0%)
19	Q	0.26	0/3329	0.56	0/4501
20	a	0.31	0/728	0.62	0/977
20	e	0.22	0/786	0.54	0/1055
21	b	0.27	0/669	0.58	0/894
21	f	0.21	0/626	0.49	0/837
22	c	0.21	0/796	0.49	0/1077
22	g	0.21	0/756	0.50	0/1020
23	d	0.24	0/756	0.54	0/1015
23	h	0.22	0/737	0.51	0/993
All	All	0.25	0/53382	0.54	3/73338 (0.0%)

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
4	A	0	3
6	C	0	1
8	F	0	1
9	H	0	1
19	Q	0	1
20	a	0	1
All	All	0	8

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
18	O	104	ARG	CA-C-N	5.45	131.50	121.70
18	O	104	ARG	C-N-CA	5.45	131.50	121.70
5	B	1129	ARG	CA-CB-CG	5.05	124.21	114.10

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	A	12	ARG	Sidechain
4	A	524	VAL	Peptide
4	A	782	ARG	Sidechain
6	C	34	ARG	Sidechain
8	F	135	ARG	Sidechain

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	P	325	0	165	5	0
2	N	2843	0	1552	18	0
3	T	3022	0	1657	13	0
4	A	11092	0	11159	207	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	8865	0	8922	164	0
6	C	2086	0	2046	32	0
7	E	1752	0	1776	18	0
8	F	705	0	731	12	0
9	H	1068	0	1040	19	0
10	I	971	0	927	12	0
11	J	532	0	542	10	0
12	K	920	0	929	19	0
13	L	351	0	375	10	0
14	Y	739	0	712	10	0
15	Z	1252	0	1331	24	0
16	D	1444	0	1467	32	0
17	G	1340	0	1357	9	0
18	O	3481	0	3421	45	0
19	Q	3264	0	3210	44	0
20	a	720	0	762	17	0
20	e	775	0	814	24	0
21	b	662	0	709	13	0
21	f	619	0	659	14	0
22	c	786	0	833	16	0
22	g	747	0	789	15	0
23	d	745	0	773	10	0
23	h	726	0	747	14	0
24	A	2	0	0	0	0
24	B	1	0	0	0	0
24	C	1	0	0	0	0
24	I	2	0	0	0	0
24	J	1	0	0	0	0
24	L	1	0	0	0	0
24	Y	1	0	0	0	0
25	A	1	0	0	0	0
All	All	51842	0	49405	665	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 665 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)
3:T:53:DC:OP1	4:A:330:LYS:NZ	2.09	0.86
4:A:343:LYS:NZ	5:B:1151:LEU:O	2.10	0.85

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:Y:73:MET:SD	15:Z:302:ARG:NH2	2.53	0.80
5:B:1004:GLU:OE1	5:B:1064:TYR:OH	1.99	0.80
16:D:10:THR:O	16:D:12:ARG:NH1	2.16	0.79

There are no symmetry-related clashes.

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	
4	A	1399/1733 (81%)	1330 (95%)	69 (5%)	0	100	100
5	B	1102/1224 (90%)	1056 (96%)	46 (4%)	0	100	100
6	C	263/318 (83%)	248 (94%)	15 (6%)	0	100	100
7	E	212/215 (99%)	206 (97%)	6 (3%)	0	100	100
8	F	85/155 (55%)	80 (94%)	5 (6%)	0	100	100
9	H	129/146 (88%)	120 (93%)	9 (7%)	0	100	100
10	I	117/122 (96%)	105 (90%)	12 (10%)	0	100	100
11	J	63/70 (90%)	61 (97%)	2 (3%)	0	100	100
12	K	113/120 (94%)	109 (96%)	4 (4%)	0	100	100
13	L	42/70 (60%)	38 (90%)	4 (10%)	0	100	100
14	Y	96/102 (94%)	92 (96%)	4 (4%)	0	100	100
15	Z	152/1064 (14%)	143 (94%)	9 (6%)	0	100	100
16	D	176/221 (80%)	162 (92%)	14 (8%)	0	100	100
17	G	169/171 (99%)	162 (96%)	7 (4%)	0	100	100
18	O	419/552 (76%)	390 (93%)	29 (7%)	0	100	100
19	Q	398/1035 (38%)	367 (92%)	31 (8%)	0	100	100
20	a	86/136 (63%)	86 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
20	e	92/136 (68%)	91 (99%)	1 (1%)	0	100	100
21	b	81/103 (79%)	80 (99%)	1 (1%)	0	100	100
21	f	76/103 (74%)	73 (96%)	3 (4%)	0	100	100
22	c	100/130 (77%)	97 (97%)	3 (3%)	0	100	100
22	g	95/130 (73%)	95 (100%)	0	0	100	100
23	d	93/123 (76%)	92 (99%)	1 (1%)	0	100	100
23	h	91/123 (74%)	90 (99%)	1 (1%)	0	100	100
All	All	5649/8302 (68%)	5373 (95%)	276 (5%)	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	
4	A	1233/1520 (81%)	1233 (100%)	0	100	100
5	B	967/1061 (91%)	967 (100%)	0	100	100
6	C	233/274 (85%)	233 (100%)	0	100	100
7	E	196/197 (100%)	196 (100%)	0	100	100
8	F	77/137 (56%)	77 (100%)	0	100	100
9	H	117/128 (91%)	117 (100%)	0	100	100
10	I	113/116 (97%)	113 (100%)	0	100	100
11	J	60/65 (92%)	60 (100%)	0	100	100
12	K	99/102 (97%)	99 (100%)	0	100	100
13	L	39/57 (68%)	39 (100%)	0	100	100
14	Y	82/87 (94%)	82 (100%)	0	100	100
15	Z	136/877 (16%)	136 (100%)	0	100	100
16	D	161/200 (80%)	161 (100%)	0	100	100
17	G	152/152 (100%)	152 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
18	O	382/489 (78%)	382 (100%)	0	100	100
19	Q	365/935 (39%)	365 (100%)	0	100	100
20	a	77/111 (69%)	77 (100%)	0	100	100
20	e	82/111 (74%)	81 (99%)	1 (1%)	63	79
21	b	68/79 (86%)	68 (100%)	0	100	100
21	f	63/79 (80%)	63 (100%)	0	100	100
22	c	81/102 (79%)	81 (100%)	0	100	100
22	g	75/102 (74%)	75 (100%)	0	100	100
23	d	81/103 (79%)	81 (100%)	0	100	100
23	h	79/103 (77%)	79 (100%)	0	100	100
All	All	5018/7187 (70%)	5017 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
20	e	116	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 31 such sidechains are listed below:

Mol	Chain	Res	Type
5	B	1025	HIS
23	d	81	ASN
6	C	131	HIS
22	g	24	GLN
22	c	24	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	P	15/16 (93%)	5 (33%)	1 (6%)

All (5) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	P	-4	C
1	P	0	U

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Mol	Chain	Res	Type
1	P	1	A
1	P	8	C
1	P	10	G

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	P	-1	U

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
18	O	3
2	N	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	N	-65:DG	O3'	-54:DT	P	30.81
1	O	241:ALA	C	242:ILE	N	5.38
1	O	239:GLY	C	240:ASP	N	5.32
1	O	237:VAL	C	238:ALA	N	3.21

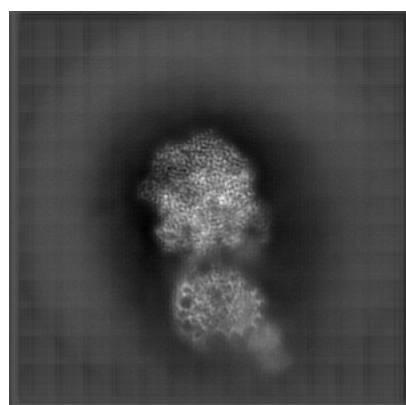
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12450. These allow visual inspection of the internal detail of the map and identification of artifacts.

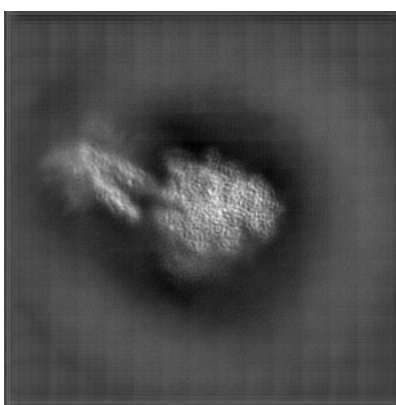
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

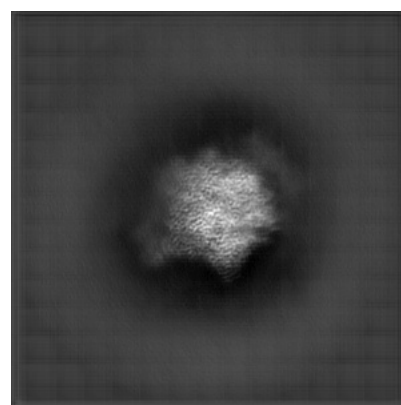
6.1.1 Primary map



X



Y

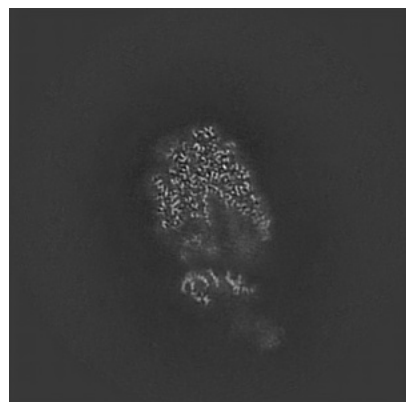


Z

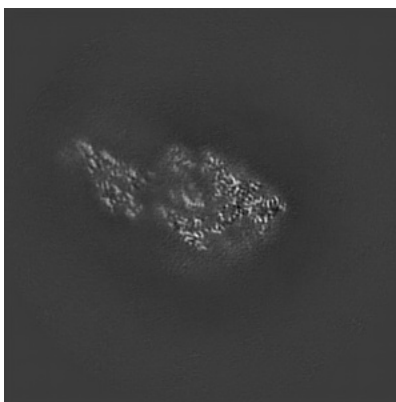
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

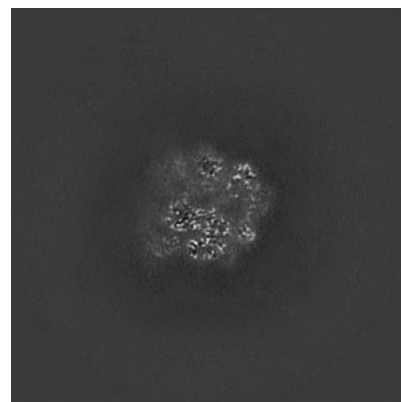
6.2.1 Primary map



X Index: 200



Y Index: 200

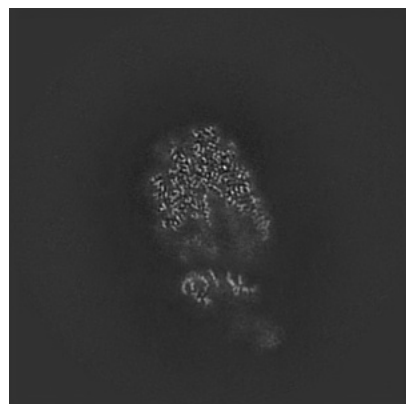


Z Index: 200

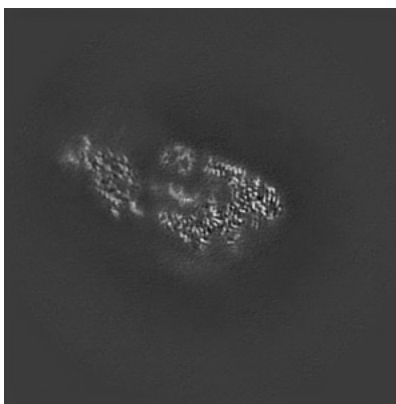
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

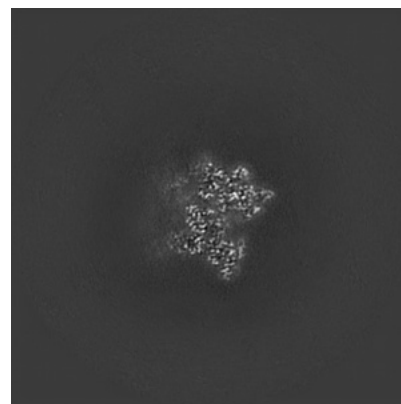
6.3.1 Primary map



X Index: 201



Y Index: 194

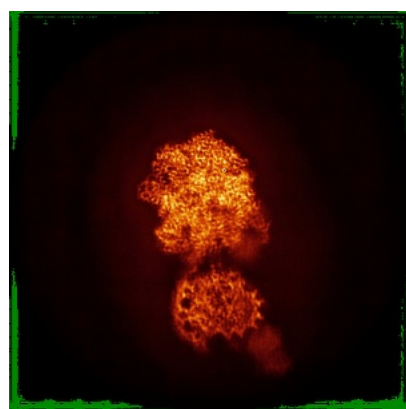


Z Index: 212

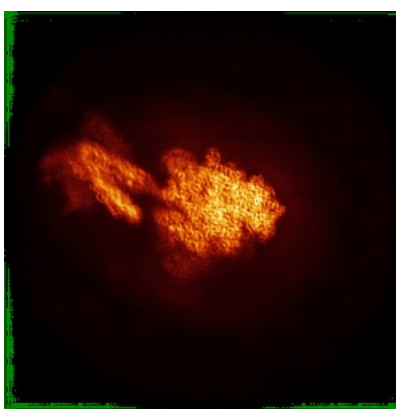
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

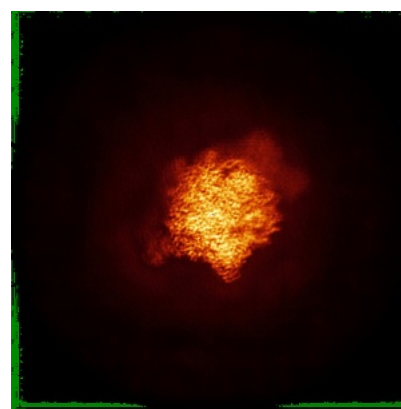
6.4.1 Primary map



X



Y

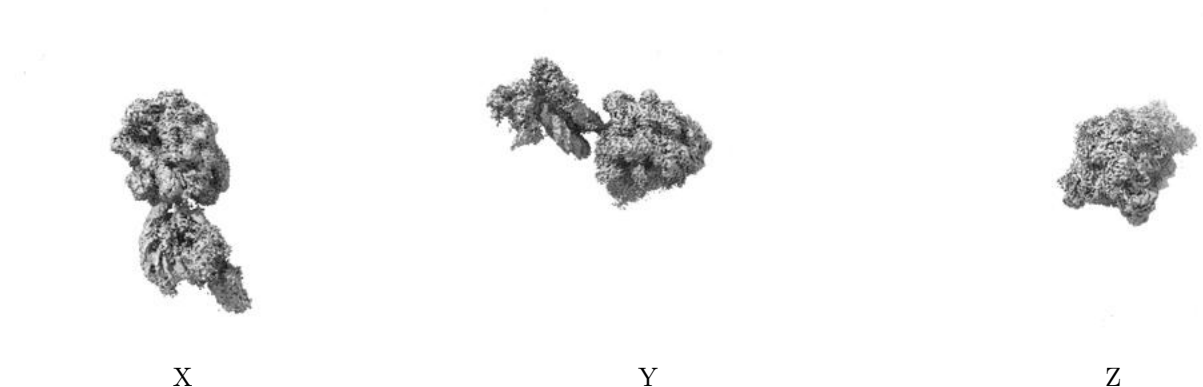


Z

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 0.0023. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

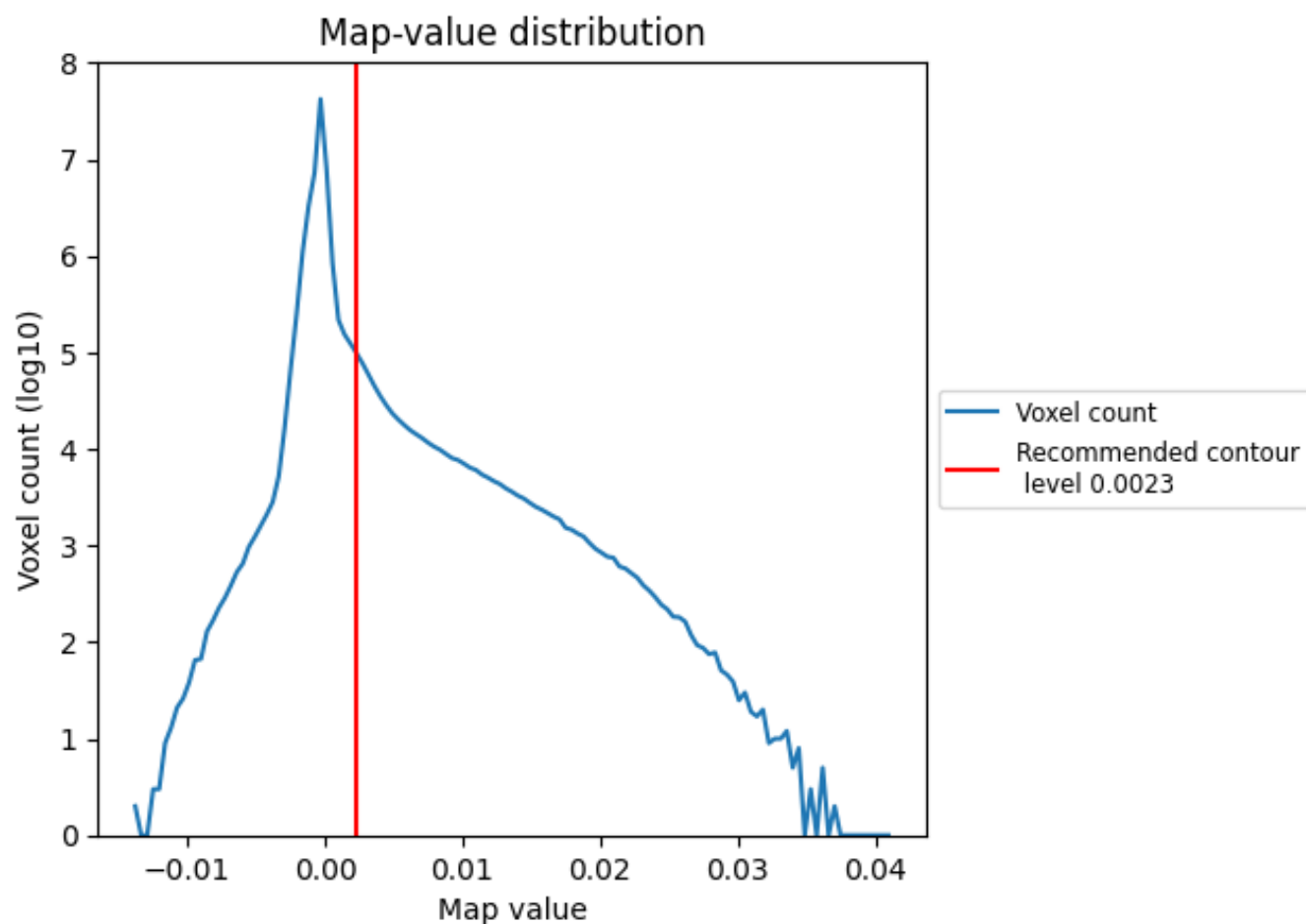
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

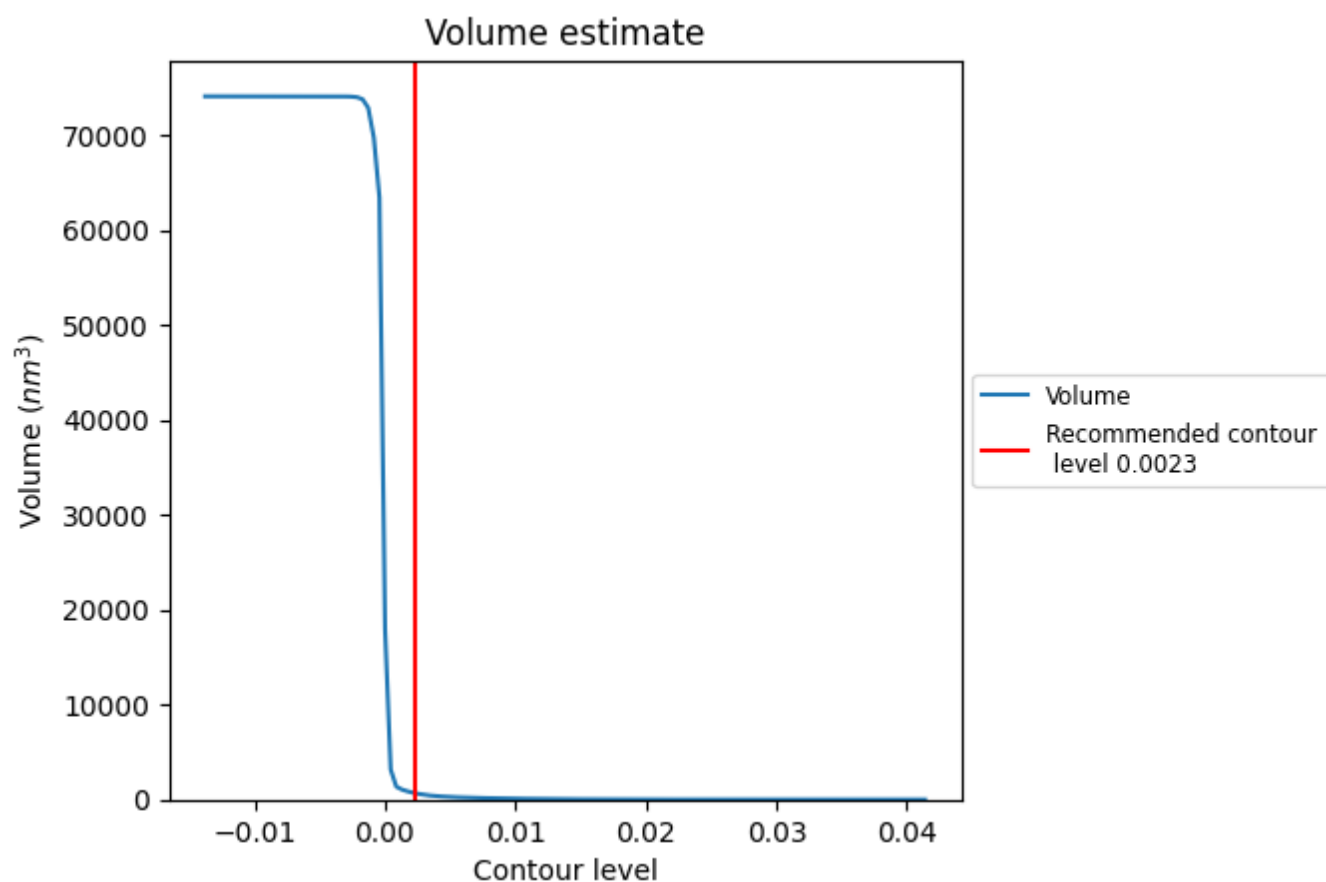
This section contains the results of statistical analysis of the map.

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.

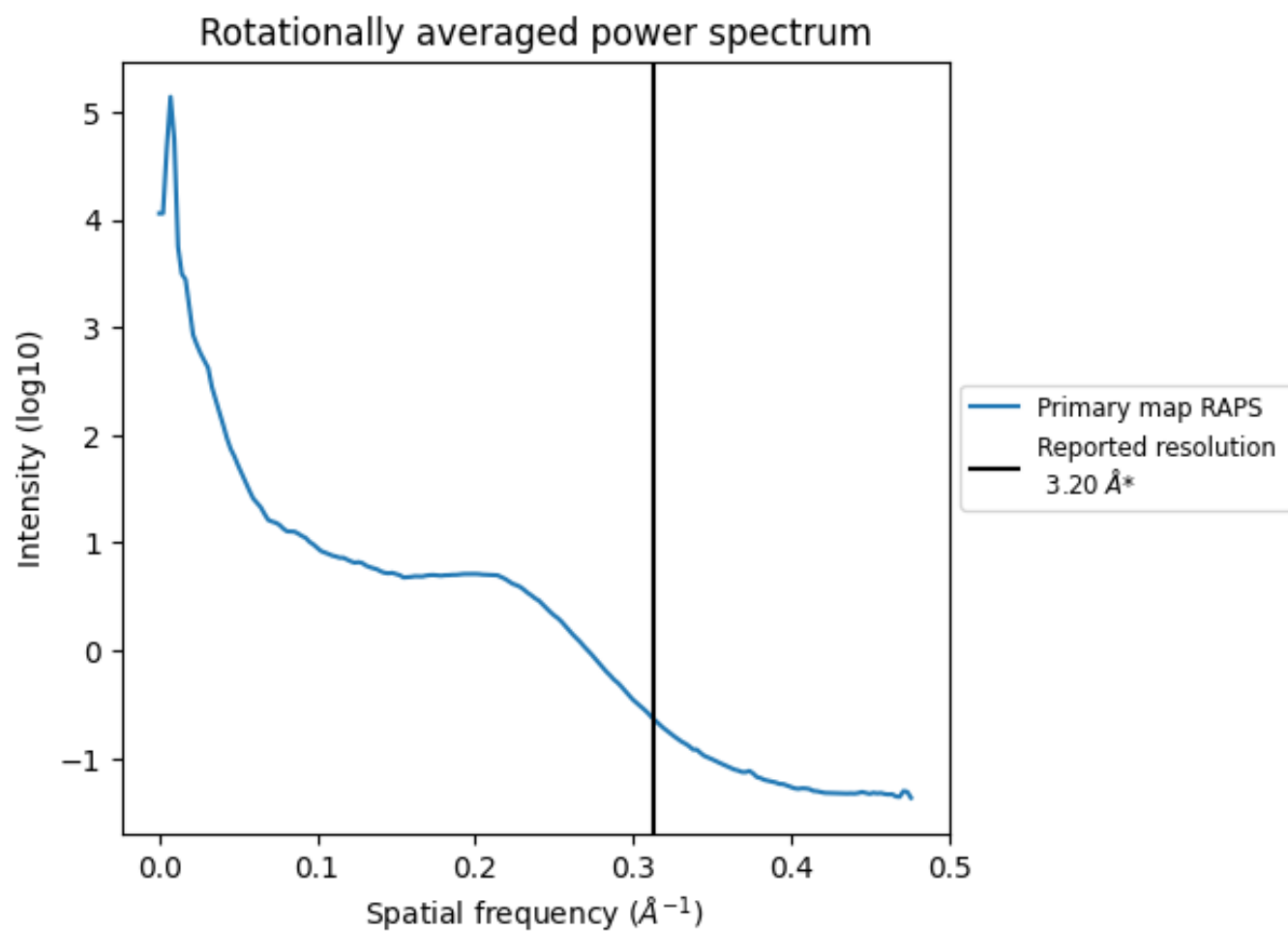
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 679 nm³; this corresponds to an approximate mass of 613 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.312 Å⁻¹

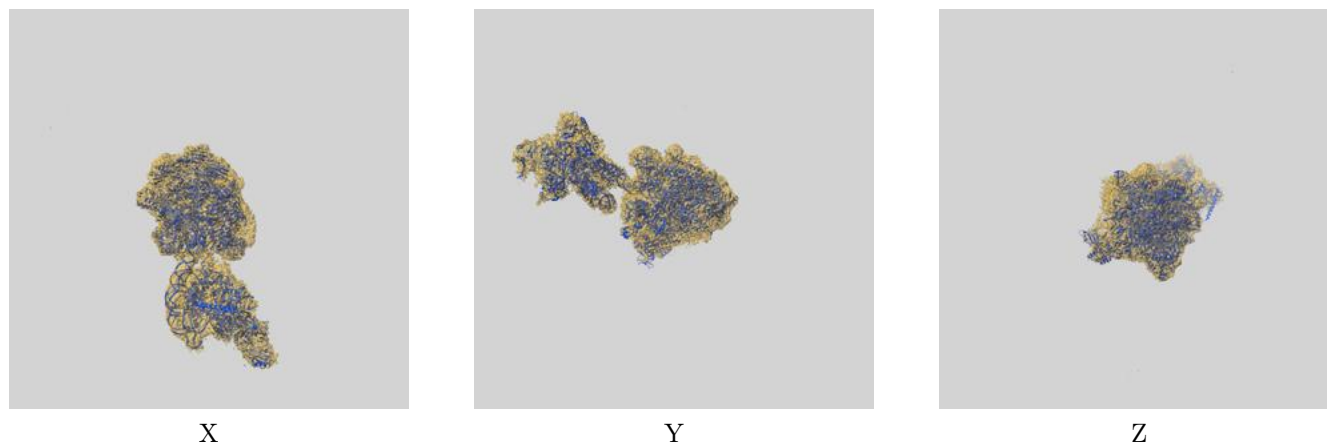
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

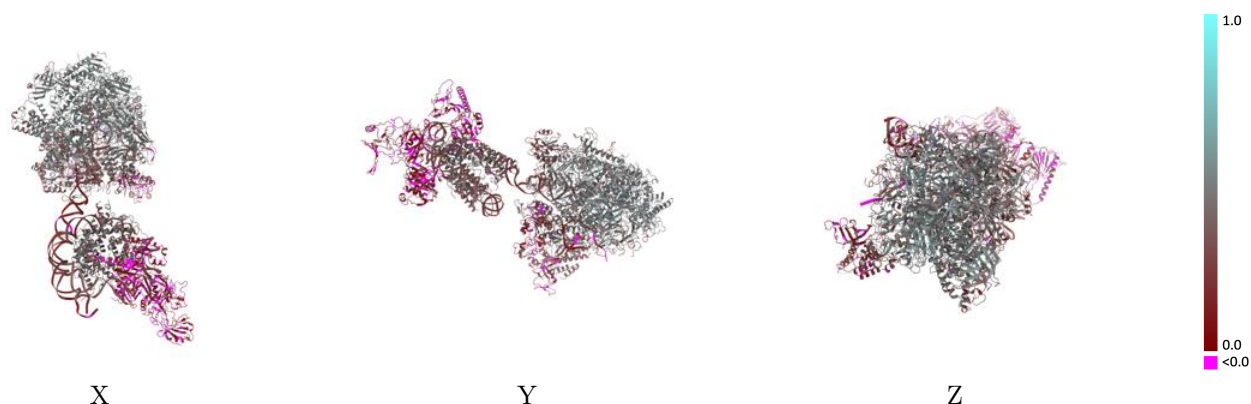
This section contains information regarding the fit between EMDB map EMD-12450 and PDB model 7NKY. Per-residue inclusion information can be found in [section 3](#) on [page 9](#).

9.1 Map-model overlay [i](#)



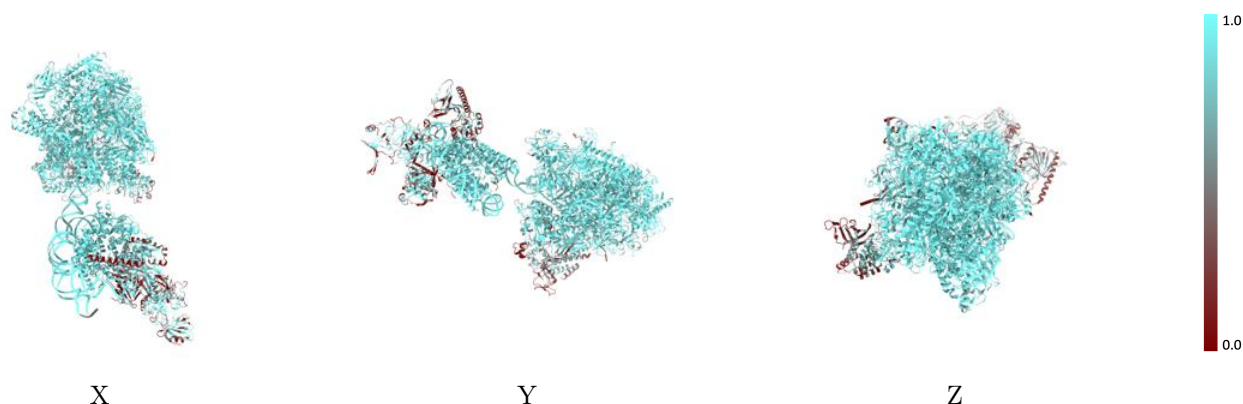
The images above show the 3D surface view of the map at the recommended contour level 0.0023 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



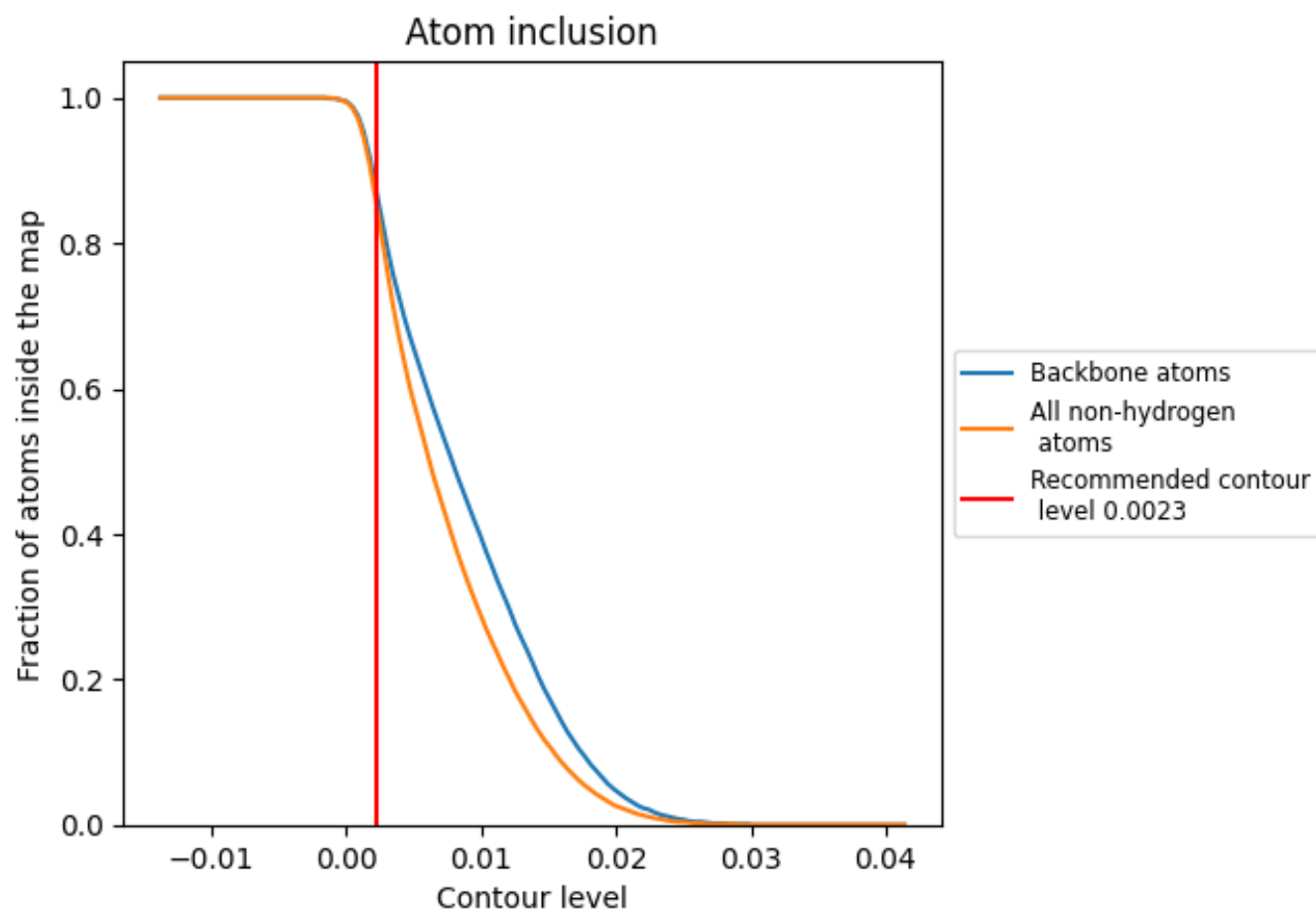
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0023).

9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 85% 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 (0.0023) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8460	 0.3580
A	 0.9510	 0.4510
B	 0.9660	 0.4630
C	 0.9500	 0.4760
D	 0.4680	 0.2060
E	 0.9560	 0.4440
F	 0.9390	 0.4840
G	 0.5120	 0.2440
H	 0.8910	 0.4460
I	 0.8260	 0.3360
J	 0.9810	 0.4940
K	 0.9260	 0.4840
L	 0.9000	 0.3860
N	 0.9120	 0.2540
O	 0.4990	 0.1010
P	 0.8060	 0.2940
Q	 0.4500	 0.0840
T	 0.9220	 0.2670
Y	 0.6440	 0.1750
Z	 0.7370	 0.2450
a	 0.9300	 0.3960
b	 0.9150	 0.4240
c	 0.9380	 0.4350
d	 0.9090	 0.4130
e	 0.9560	 0.4050
f	 0.9750	 0.4390
g	 0.9140	 0.3900
h	 0.9040	 0.3910

