



Full wwPDB EM Validation Report ⓘ

Mar 14, 2024 – 06:15 PM EDT

PDB ID : 8UHD
EMDB ID : EMD-42270
Title : Structure of paused transcription complex Pol II-DSIF-NELF - post-translocated
Authors : Su, B.G.; Vos, S.M.
Deposited on : 2023-10-08
Resolution : 2.80 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 ⓘ 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:

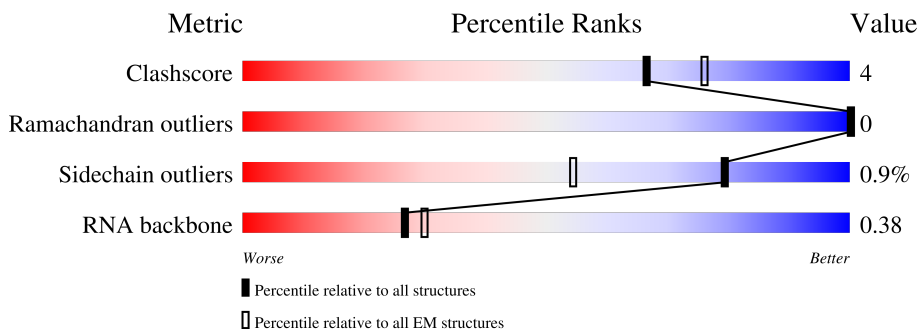
EMDB validation analysis : 0.0.1.dev70
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

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 2.80 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 ≥ 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	X	380	97%
2	Z	1087	13% (red), 40% (green), 57% (grey)
3	W	590	12% (red), 76% (green), 13% (yellow), 10% (grey)
4	V	580	32% (red), 80% (green), 14% (yellow), 5% (grey)
5	A	1970	64% (green), 8% (yellow), 28% (grey)
6	B	1174	88% (green), 8% (yellow), 8% (grey)
7	C	271	85% (green), 8% (yellow), 6% (grey)

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Mol	Chain	Length	Quality of chain
8	D	142	78% 9% 13%
9	E	210	81% 18%
10	F	127	55% 6% 39%
11	G	172	84% 15%
12	H	150	95%
13	I	125	78% 12% 9%
14	J	67	88% 9%
15	K	117	91% 7%
16	L	58	59% 17% 24%
17	N	50	42% 14% 44%
18	P	22	23% 23% 14% 9% 32%
19	T	50	48% 24% 24%
20	U	528	32% 5% 62%
21	Y	117	68% 95%

2 Entry composition

There are 23 unique types of molecules in this entry. The entry contains 94654 atoms, of which 47094 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 Negative elongation factor E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
1	X	12	217	68	114	19	16	0	0

- Molecule 2 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	Z	471	7618	2404	3840	664	693	17	0	0

- Molecule 3 is a protein called Negative elongation factor C/D.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
3	W	530	8431	2699	4214	704	790	24	0	0

- Molecule 4 is a protein called Negative elongation factor B.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
4	V	550	8908	2825	4498	751	810	24	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
5	A	1416	22554	7055	11338	2006	2084	71	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
6	B	1136	18187	5739	9111	1597	1676	64	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
7	C	254	Total	C	H	N	O	S	0	0
			4029	1282	1991	348	402	6		

- Molecule 8 is a protein called RNA polymerase Rpb4/RPC9 core domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
8	D	124	Total	C	H	N	O	S	0	0
			2016	632	1004	173	203	4		

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit E.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
9	E	207	Total	C	H	N	O	S	0	0
			3438	1083	1729	298	320	8		

- Molecule 10 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
10	F	77	Total	C	H	N	O	S	0	0
			1271	397	653	105	111	5		

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
11	G	171	Total	C	H	N	O	S	0	0
			2709	875	1358	219	249	8		

- Molecule 12 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
12	H	148	Total	C	H	N	O	S	0	0
			2333	750	1147	194	237	5		

- Molecule 13 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
13	I	114	Total	C	H	N	O	S	0	0
			1790	571	862	166	180	11		

- Molecule 14 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
14	J	65	1052	334	537	87	88	6	0	0

- Molecule 15 is a protein called RNA polymerase II subunit J.

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

- Molecule 16 is a protein called RNA polymerase II subunit K.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
16	L	44	751	231	378	72	64	6	0	0

- Molecule 17 is a DNA chain called Non-template DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
17	N	28	886	272	316	100	170	28	0	0

- Molecule 18 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
18	P	15	474	141	158	50	110	15	0	0

- Molecule 19 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
19	T	38	1208	371	426	148	225	38	0	0

- Molecule 20 is a protein called Negative elongation factor A.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
20	U	199	3092	965	1571	256	292	8	0	0

- Molecule 21 is a protein called Transcription elongation factor SPT4.

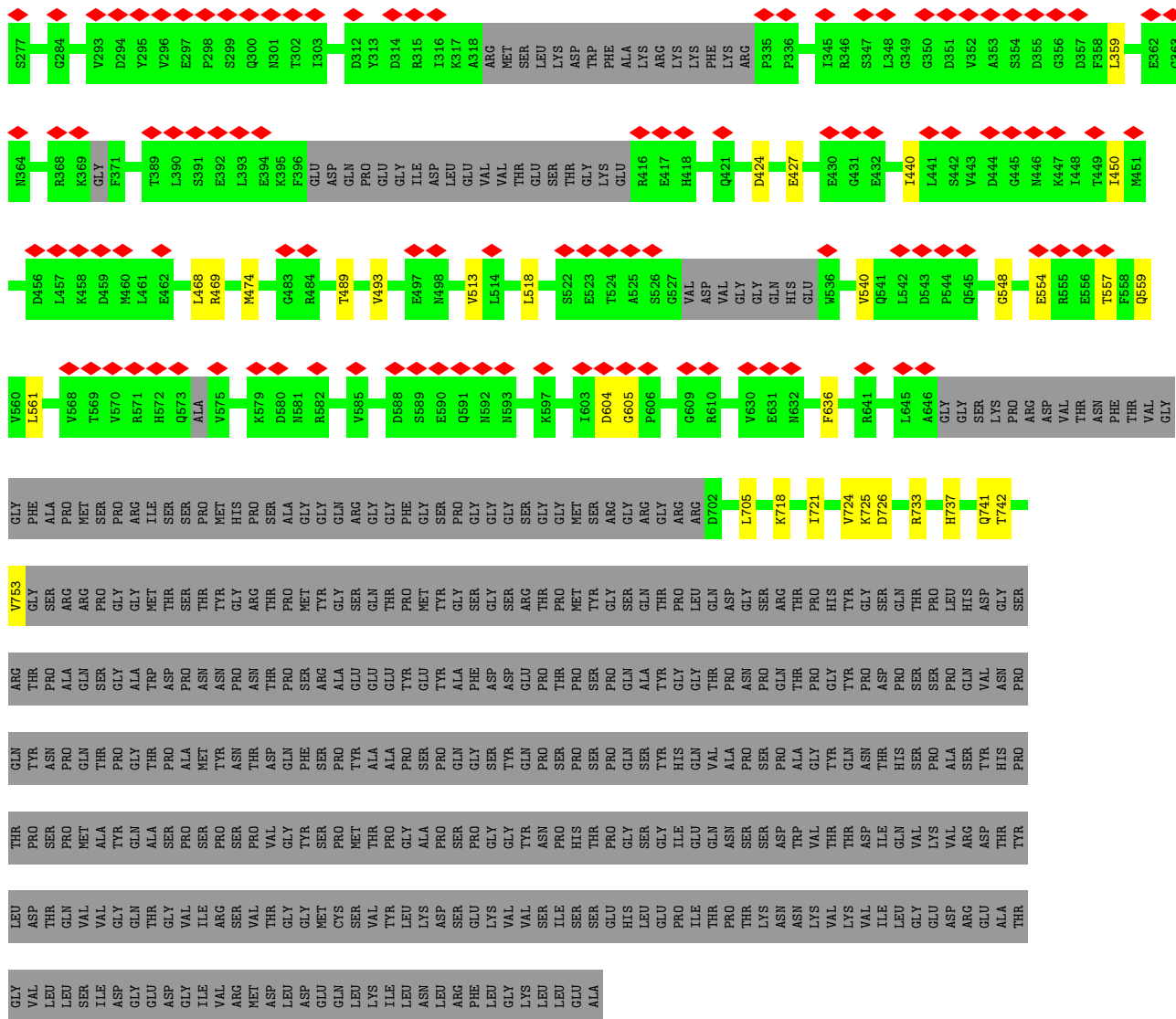
Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
21	Y	116	1818	570	907	159	173	9	0	0

- Molecule 22 is ZINC ION (three-letter code: ZN) (formula: Zn).

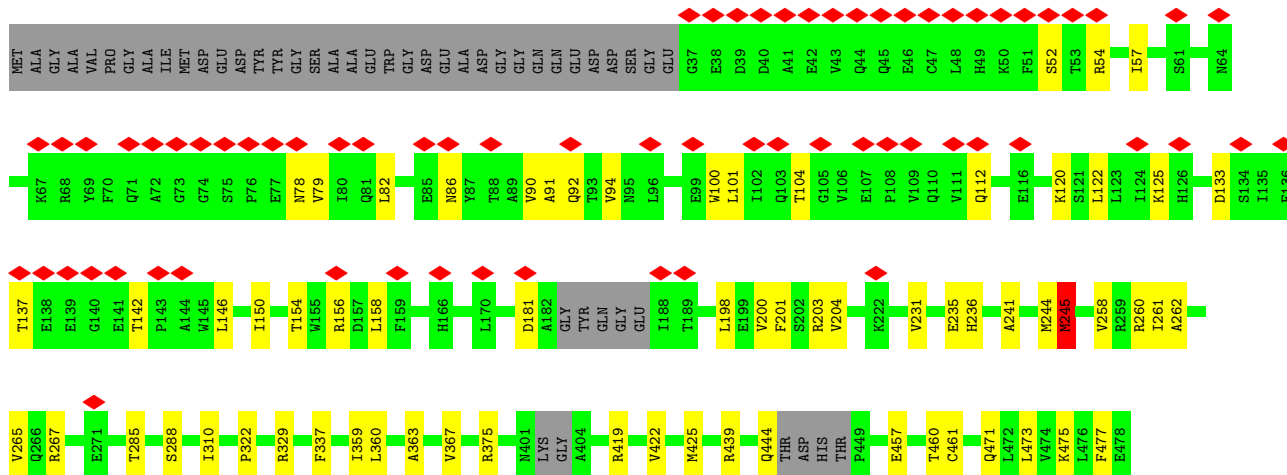
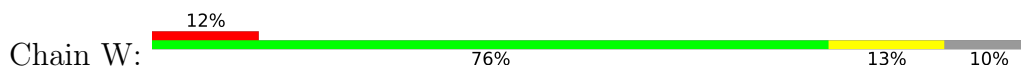
Mol	Chain	Residues	Atoms		AltConf
22	A	2	Total	Zn	0
			2	2	
22	B	1	Total	Zn	0
			1	1	
22	C	1	Total	Zn	0
			1	1	
22	I	2	Total	Zn	0
			2	2	
22	J	1	Total	Zn	0
			1	1	
22	L	1	Total	Zn	0
			1	1	
22	Y	1	Total	Zn	0
			1	1	

- Molecule 23 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

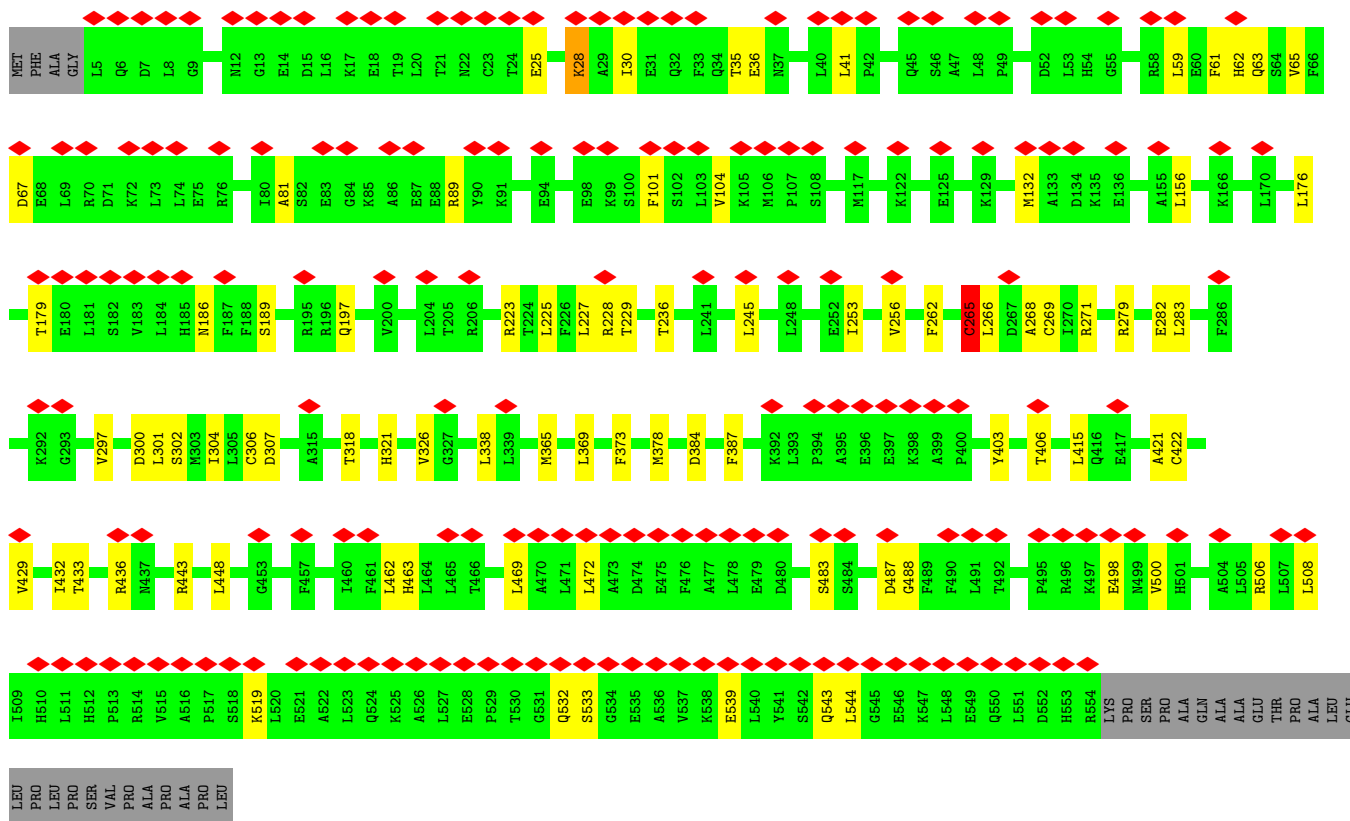
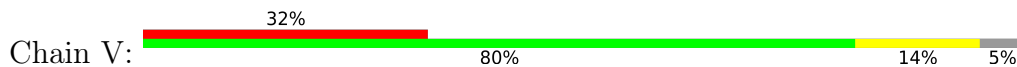


• Molecule 3: Negative elongation factor C/D

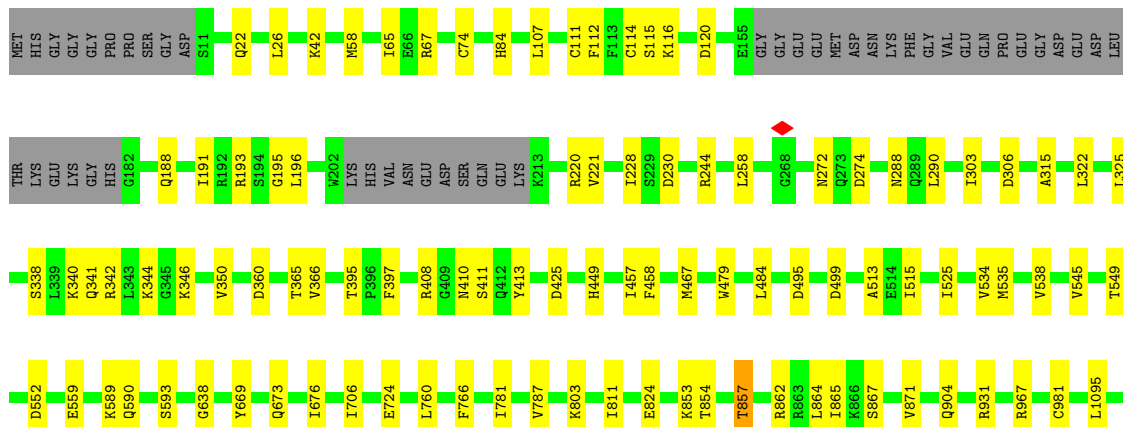


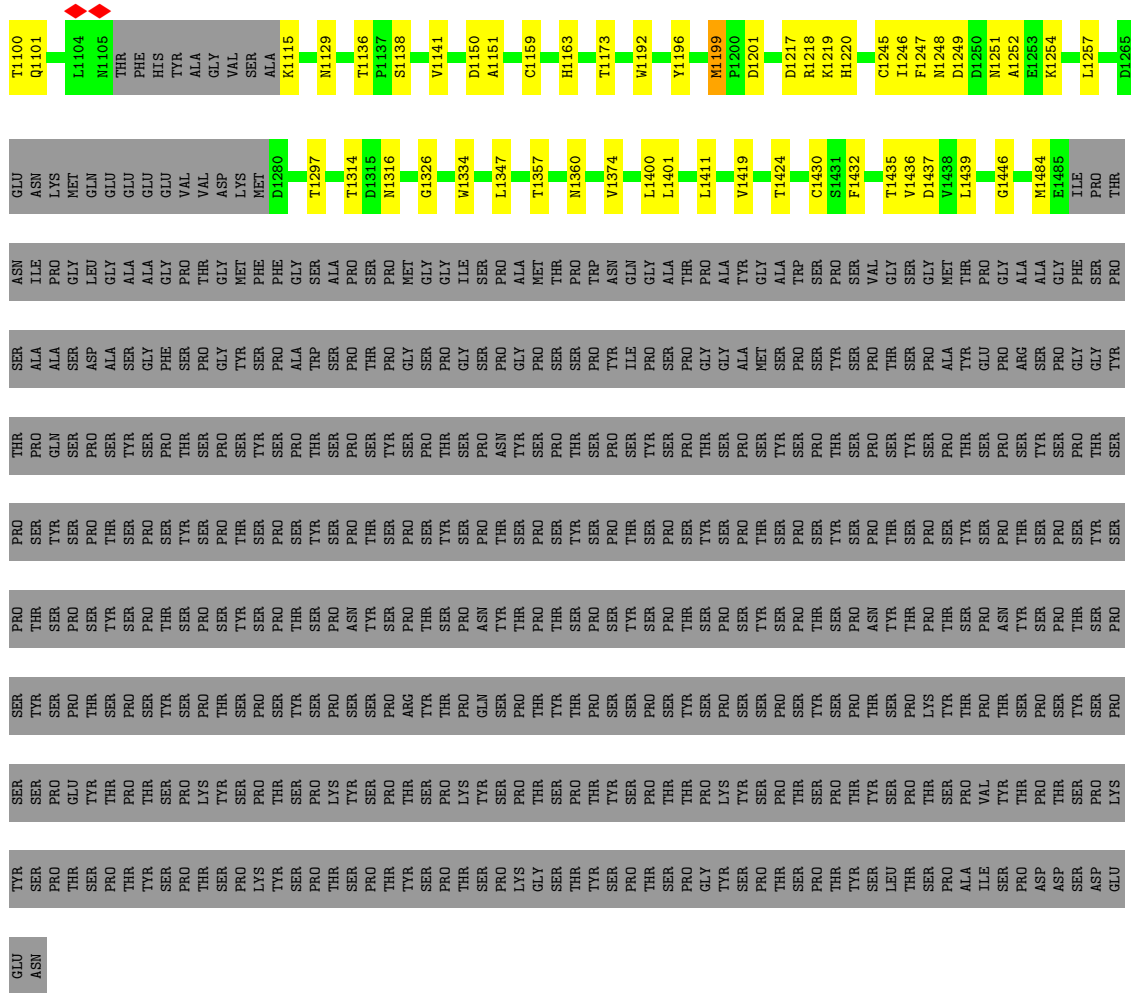


• Molecule 4: Negative elongation factor B



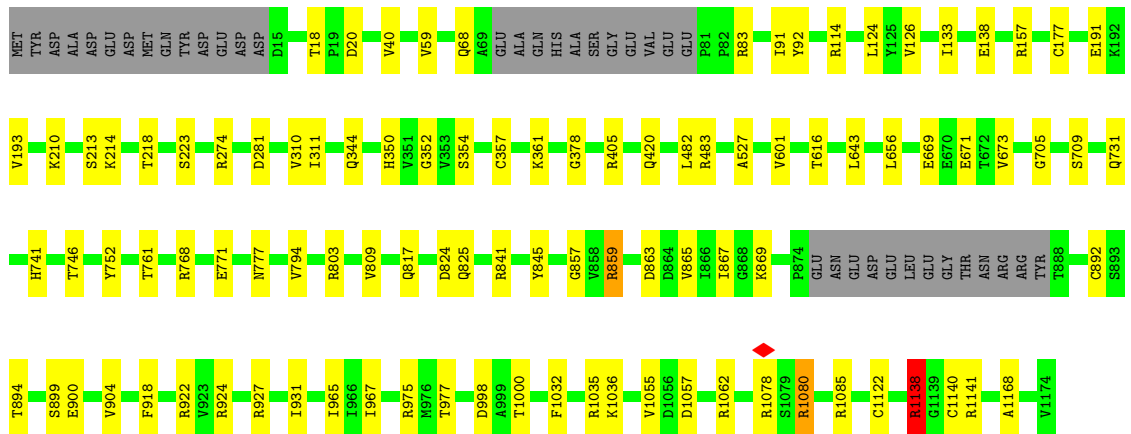
• Molecule 5: DNA-directed RNA polymerase subunit





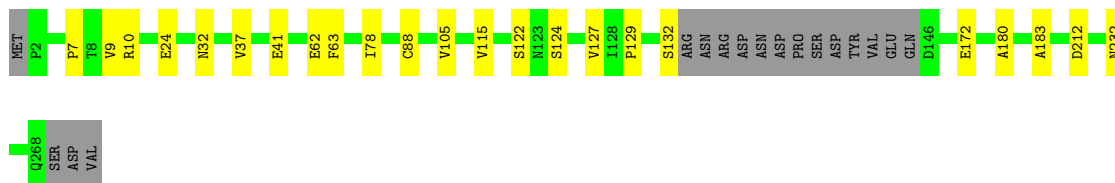
● Molecule 6: DNA-directed RNA polymerase subunit beta

Chain B: 88% 8%



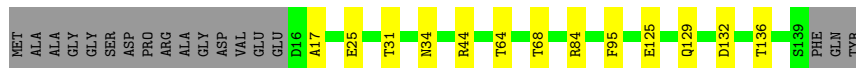
● Molecule 7: DNA-directed RNA polymerase II subunit RPB3

Chain C: 85% 8% 6%



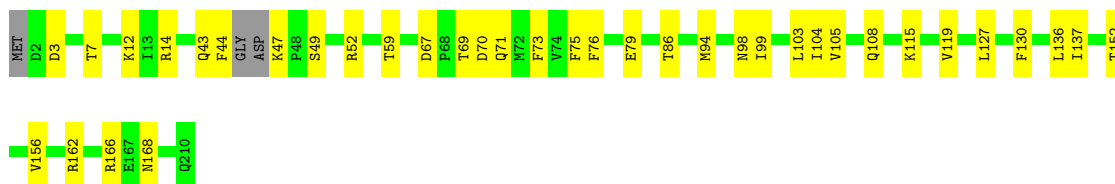
- Molecule 8: RNA polymerase Rpb4/RPC9 core domain-containing protein

Chain D: 78% 9% 13%



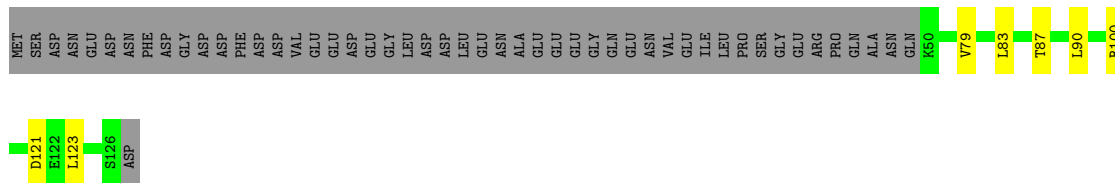
- Molecule 9: DNA-directed RNA polymerase II subunit E

Chain E: 81% 18%



- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F: 55% 6% 39%



- Molecule 11: DNA-directed RNA polymerase II subunit RPB7

Chain G: 84% 15%




- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain H: 95%




- Molecule 13: DNA-directed RNA polymerase II subunit RPB9

Chain I:  78% 12% 9%



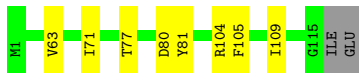
- Molecule 14: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain J:  88% 9%



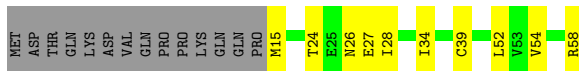
- Molecule 15: RNA polymerase II subunit J

Chain K:  91% 7%



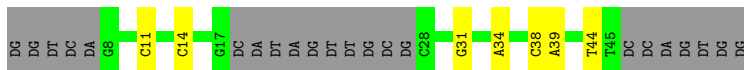
- Molecule 16: RNA polymerase II subunit K

Chain L:  59% 17% 24%



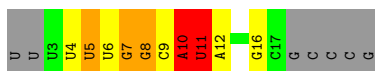
- Molecule 17: Non-template DNA

Chain N:  42% 14% 44%



- Molecule 18: RNA

Chain P:  23% 23% 14% 9% 32%

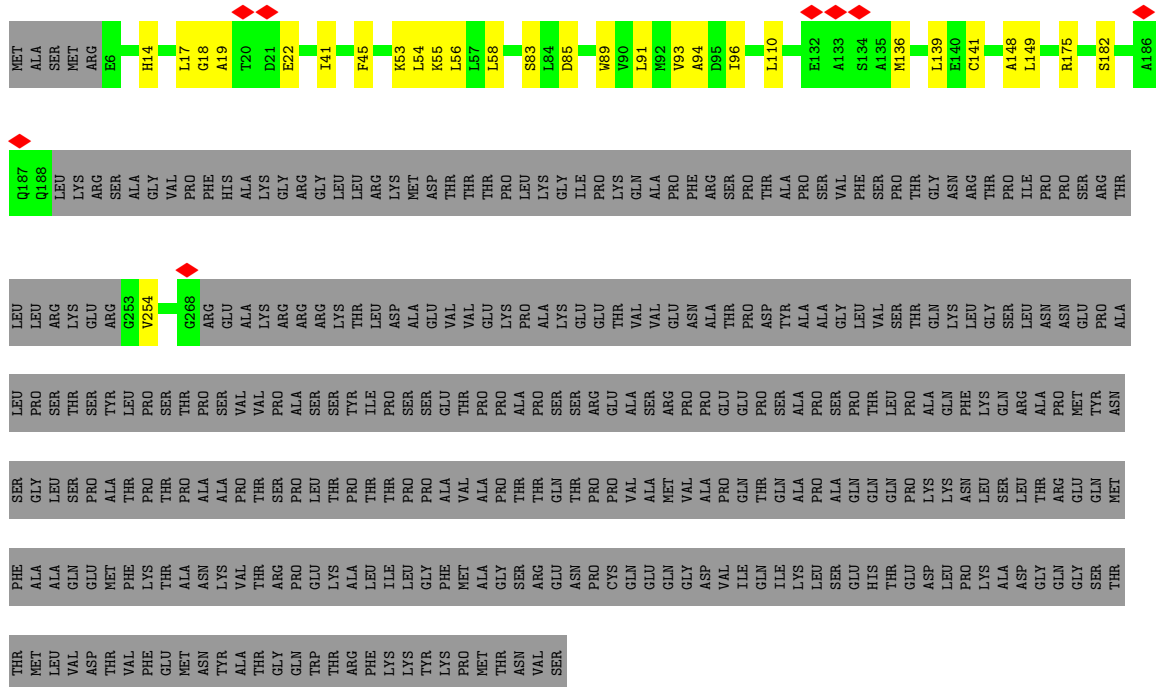


- Molecule 19: Template DNA

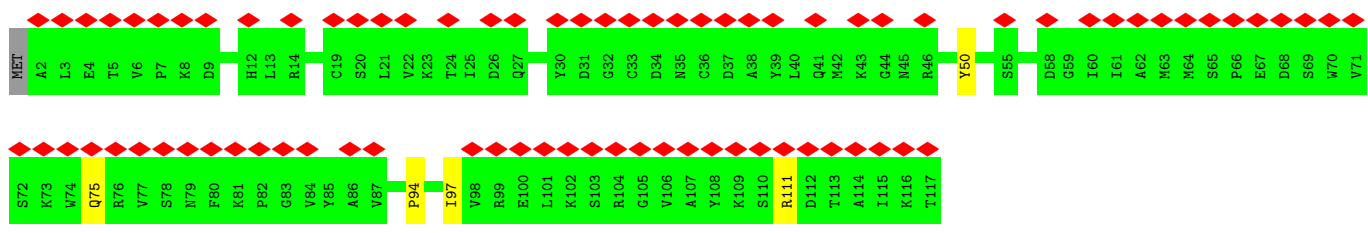
Chain T:  48% 24% 24%



- Molecule 20: Negative elongation factor A



● Molecule 21: Transcription elongation factor SPT4



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	50535	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 ($e^-/\text{\AA}^2$)	51	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.780	Depositor
Minimum map value	-0.819	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.086	Depositor
Recommended contour level	0.35	Depositor
Map size (Å)	420.864, 420.864, 420.864	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.822, 0.822, 0.822	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: 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	X	0.82	0/103	1.41	1/132 (0.8%)
2	Z	0.29	0/3841	0.60	0/5167
3	W	0.33	0/4302	0.60	1/5835 (0.0%)
4	V	0.35	1/4495 (0.0%)	0.63	0/6074
5	A	0.32	0/11420	0.65	0/15418
6	B	0.32	0/9257	0.65	0/12493
7	C	0.31	0/2081	0.63	0/2828
8	D	0.33	0/1025	0.62	0/1376
9	E	0.33	0/1739	0.65	0/2347
10	F	0.30	0/628	0.62	0/848
11	G	0.32	0/1382	0.61	0/1874
12	H	0.30	0/1207	0.64	0/1628
13	I	0.31	0/949	0.66	0/1284
14	J	0.30	0/524	0.66	0/707
15	K	0.31	0/939	0.59	0/1271
16	L	0.33	0/378	0.77	0/500
17	N	1.03	2/636 (0.3%)	1.22	2/976 (0.2%)
18	P	0.70	0/351	1.58	12/544 (2.2%)
19	T	1.11	5/878 (0.6%)	1.27	10/1353 (0.7%)
20	U	0.32	0/1544	0.59	0/2094
21	Y	0.28	0/927	0.62	0/1250
All	All	0.37	8/48606 (0.0%)	0.68	26/65999 (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
5	A	0	2
6	B	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
13	I	0	1
20	U	0	1
All	All	0	6

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
19	T	36	DC	C3'-O3'	7.80	1.54	1.44
19	T	36	DC	C1'-N1	7.00	1.58	1.49
19	T	43	DT	C1'-N1	6.21	1.57	1.49
19	T	13	DC	C1'-N1	5.46	1.56	1.49
17	N	38	DC	C1'-N1	5.41	1.56	1.49
4	V	265	CYS	CB-SG	5.21	1.91	1.82
17	N	11	DC	C1'-N1	5.21	1.56	1.49
19	T	25	DG	C3'-O3'	-5.16	1.37	1.44

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
19	T	36	DC	O4'-C1'-N1	10.16	115.11	108.00
18	P	11	U	O5'-P-OP1	-9.48	97.16	105.70
18	P	10	A	O4'-C1'-N9	8.14	114.71	108.20
19	T	36	DC	P-O3'-C3'	7.86	129.13	119.70
1	X	21	LYS	CA-CB-CG	7.64	130.21	113.40
19	T	12	DT	O4'-C1'-N1	7.58	113.30	108.00
18	P	4	U	C6-N1-C2	-7.24	116.66	121.00
17	N	34	DA	O4'-C1'-N9	7.18	113.02	108.00
18	P	9	C	C6-N1-C2	-7.01	117.50	120.30
19	T	36	DC	C1'-O4'-C4'	-6.72	103.38	110.10
19	T	33	DA	O5'-P-OP2	-6.61	99.75	105.70
18	P	5	U	C5-C6-N1	-6.34	119.53	122.70
3	W	245	MET	CG-SD-CE	6.23	110.17	100.20
18	P	11	U	C6-N1-C2	-6.02	117.39	121.00
18	P	4	U	C5-C6-N1	6.01	125.71	122.70
18	P	11	U	C5-C6-N1	5.81	125.60	122.70
19	T	36	DC	OP1-P-O3'	5.79	117.93	105.20
18	P	5	U	C4-C5-C6	5.65	123.09	119.70
19	T	12	DT	O4'-C1'-C2'	-5.50	101.50	105.90
18	P	9	C	N3-C4-N4	5.47	121.83	118.00
19	T	36	DC	O4'-C1'-C2'	-5.41	101.58	105.90
18	P	4	U	N3-C2-O2	-5.27	118.51	122.20
19	T	36	DC	C2-N1-C1'	5.23	124.56	118.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	N	31	DG	C1'-O4'-C4'	-5.17	104.93	110.10
18	P	9	C	C5-C6-N1	5.12	123.56	121.00
19	T	11	DA	O4'-C4'-C3'	-5.10	102.46	104.50

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	A	1129	ASN	Peptide
5	A	538	VAL	Peptide
6	B	1138	ARG	Sidechain
6	B	859	ARG	Sidechain
13	I	122	ARG	Sidechain
20	U	182	SER	Mainchain

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	X	103	114	120	1	0
2	Z	3778	3840	3840	25	0
3	W	4217	4214	4221	57	0
4	V	4410	4498	4499	52	0
5	A	11216	11338	11342	95	0
6	B	9076	9111	9116	64	0
7	C	2038	1991	1989	15	0
8	D	1012	1004	1004	9	0
9	E	1709	1729	1729	18	0
10	F	618	653	653	5	0
11	G	1351	1358	1358	16	0
12	H	1186	1147	1147	4	0
13	I	928	862	859	11	0
14	J	515	537	534	5	0
15	K	920	942	942	6	0
16	L	373	378	378	6	0
17	N	570	316	318	3	0
18	P	316	158	158	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
19	T	782	426	427	9	0
20	U	1521	1571	1571	21	0
21	Y	911	907	907	3	0
22	A	2	0	0	0	0
22	B	1	0	0	0	0
22	C	1	0	0	0	0
22	I	2	0	0	0	0
22	J	1	0	0	0	0
22	L	1	0	0	0	0
22	Y	1	0	0	0	0
23	A	1	0	0	0	0
All	All	47560	47094	47112	369	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 4.

All (369) 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)
5:A:350:VAL:HG11	5:A:1435:THR:HG21	1.55	0.88
3:W:439:ARG:NH2	3:W:483:GLN:HG3	1.96	0.80
3:W:94:VAL:HG21	4:V:65:VAL:HG23	1.67	0.77
8:D:44:ARG:NH2	11:G:35:GLU:OE2	2.22	0.72
13:I:65:LEU:O	13:I:122:ARG:NH1	2.22	0.71
10:F:100:ARG:NH2	10:F:123:LEU:O	2.23	0.71
5:A:111:CYS:SG	5:A:188:GLN:NE2	2.64	0.71
2:Z:199:LYS:NZ	2:Z:240:GLU:O	2.25	0.70
6:B:483:ARG:NH2	6:B:527:ALA:O	2.25	0.69
6:B:274:ARG:NH2	6:B:281:ASP:OD1	2.26	0.69
5:A:513:ALA:HB2	10:F:90:LEU:HD21	1.74	0.68
6:B:357:CYS:SG	6:B:361:LYS:NZ	2.67	0.68
5:A:22:GLN:NE2	5:A:1446:GLY:O	2.27	0.67
8:D:25:GLU:OE1	11:G:41:LYS:NZ	2.27	0.67
11:G:1:MET:N	11:G:78:ARG:O	2.28	0.67
4:V:61:PHE:O	4:V:65:VAL:HG22	1.94	0.67
4:V:25:GLU:OE2	4:V:28:LYS:N	2.28	0.66
7:C:78:ILE:HG21	7:C:127:VAL:HG22	1.78	0.66
3:W:439:ARG:CZ	3:W:483:GLN:HG3	2.26	0.65
6:B:859:ARG:NH1	16:L:54:VAL:O	2.31	0.64
6:B:869:LYS:NZ	6:B:892:CYS:SG	2.69	0.64
3:W:498:ASP:OD1	3:W:532:TYR:OH	2.11	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:W:198:LEU:O	3:W:201:PHE:N	2.30	0.64
8:D:34:ASN:O	8:D:68:THR:OG1	2.16	0.64
4:V:508:LEU:HB3	4:V:544:LEU:HD21	1.79	0.63
5:A:1199:MET:SD	5:A:1199:MET:N	2.71	0.63
3:W:82:LEU:O	3:W:86:ASN:ND2	2.32	0.63
5:A:112:PHE:O	5:A:220:ARG:NH2	2.31	0.63
5:A:803:LYS:N	6:B:671:GLU:OE1	2.32	0.62
3:W:236:HIS:HB3	20:U:54:LEU:HD22	1.80	0.62
6:B:91:ILE:HG23	6:B:124:LEU:HD11	1.80	0.62
11:G:21:ASN:O	11:G:25:THR:OG1	2.15	0.62
2:Z:427:GLU:OE2	2:Z:469:ARG:NH2	2.32	0.62
6:B:768:ARG:NH1	6:B:771:GLU:OE2	2.33	0.62
2:Z:733:ARG:NH1	5:A:411:SER:O	2.32	0.62
3:W:133:ASP:O	3:W:137:THR:HG23	2.00	0.62
4:V:406:THR:O	4:V:443:ARG:NE	2.29	0.62
6:B:1032:PHE:O	7:C:32:ASN:ND2	2.33	0.62
9:E:94:MET:O	9:E:98:ASN:N	2.33	0.61
5:A:74:CYS:SG	5:A:84:HIS:CE1	2.93	0.61
13:I:85:PRO:O	13:I:87:GLN:NE2	2.33	0.61
9:E:12:LYS:NZ	9:E:136:LEU:O	2.26	0.61
13:I:86:CYS:SG	13:I:87:GLN:N	2.73	0.61
2:Z:721:ILE:HG22	2:Z:737:HIS:ND1	2.15	0.61
5:A:346:LYS:NZ	19:T:28:DC:OP2	2.17	0.61
3:W:245:MET:HG3	3:W:258:VAL:HG12	1.83	0.60
11:G:78:ARG:NH1	11:G:79:PRO:O	2.35	0.60
5:A:467:MET:HG2	5:A:534:VAL:HG21	1.84	0.60
9:E:3:ASP:OD1	9:E:49:SER:N	2.35	0.60
3:W:439:ARG:CZ	3:W:483:GLN:CG	2.79	0.60
3:W:504:LEU:HG	3:W:509:VAL:HG12	1.83	0.59
20:U:54:LEU:HD21	20:U:89:TRP:HB3	1.83	0.59
5:A:854:THR:O	5:A:857:THR:OG1	2.19	0.59
7:C:183:ALA:HB3	7:C:232:ASN:HB3	1.85	0.59
3:W:457:GLU:OE1	20:U:175:ARG:NE	2.35	0.59
5:A:1314:THR:OG1	5:A:1316:ASN:OD1	2.18	0.59
9:E:67:ASP:OD2	9:E:70:ASP:N	2.35	0.59
2:Z:718:LYS:NZ	7:C:88:CYS:O	2.36	0.59
5:A:535:MET:O	5:A:669:TYR:OH	2.20	0.59
3:W:285:THR:O	3:W:288:SER:OG	2.20	0.58
5:A:549:THR:O	5:A:589:LYS:NZ	2.33	0.58
10:F:100:ARG:NH2	10:F:121:ASP:O	2.37	0.58
4:V:384:ASP:HA	4:V:387:PHE:CE2	2.38	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:L:15:MET:N	16:L:27:GLU:OE2	2.37	0.58
7:C:180:ALA:O	14:J:42:ARG:NH2	2.38	0.57
6:B:1035:ARG:NH1	6:B:1036:LYS:O	2.37	0.57
5:A:1173:THR:OG1	13:I:56:ASN:OD1	2.23	0.57
5:A:706:ILE:HD11	5:A:787:VAL:HG21	1.85	0.57
6:B:899:SER:OG	6:B:900:GLU:OE1	2.19	0.57
15:K:77:THR:OG1	15:K:81:TYR:O	2.14	0.57
5:A:457:ILE:HD11	5:A:515:ILE:HD12	1.86	0.57
11:G:152:VAL:HG22	11:G:157:ILE:HG12	1.87	0.57
4:V:318:THR:HG23	4:V:338:LEU:HD11	1.87	0.57
21:Y:94:PRO:HD2	21:Y:97:ILE:HD12	1.87	0.57
5:A:1245:CYS:HB2	5:A:1257:LEU:HD11	1.88	0.56
6:B:133:ILE:HG23	6:B:138:GLU:O	2.06	0.56
7:C:10:ARG:NH2	7:C:24:GLU:OE2	2.39	0.56
3:W:439:ARG:NE	3:W:483:GLN:CG	2.47	0.56
4:V:176:LEU:O	4:V:463:HIS:ND1	2.38	0.56
6:B:927:ARG:NH2	6:B:1057:ASP:OD1	2.39	0.56
4:V:236:THR:OG1	4:V:307:ASP:OD1	2.08	0.55
4:V:268:ALA:O	4:V:271:ARG:NH1	2.40	0.55
8:D:44:ARG:NH1	11:G:48:VAL:O	2.39	0.55
13:I:15:ARG:HB3	13:I:24:LEU:HD12	1.86	0.55
3:W:528:SER:OG	5:A:1150:ASP:OD1	2.10	0.55
5:A:1248:ASN:ND2	5:A:1254:LYS:O	2.39	0.55
5:A:344:LYS:NZ	19:T:24:DG:OP2	2.33	0.55
5:A:193:ARG:NH2	5:A:195:GLY:O	2.40	0.55
3:W:54:ARG:O	4:V:59:LEU:HD22	2.07	0.55
4:V:433:THR:HG23	4:V:472:LEU:HD11	1.89	0.55
5:A:559:GLU:N	5:A:559:GLU:OE1	2.40	0.55
2:Z:725:LYS:NZ	6:B:863:ASP:OD2	2.39	0.54
9:E:47:LYS:O	9:E:52:ARG:N	2.40	0.54
6:B:1078:ARG:NH2	18:P:7:G:O5'	2.39	0.54
3:W:142:THR:HG21	3:W:146:LEU:HD23	1.89	0.54
3:W:200:VAL:O	3:W:204:VAL:HG23	2.07	0.54
4:V:35:THR:OG1	4:V:36:GLU:OE1	2.18	0.54
4:V:487:ASP:OD2	4:V:519:LYS:NZ	2.40	0.54
5:A:495:ASP:OD1	5:A:499:ASP:OD2	2.25	0.54
6:B:344:GLN:NE2	6:B:354:SER:O	2.40	0.54
11:G:30:LEU:O	11:G:34:VAL:HG22	2.08	0.54
20:U:58:LEU:CD1	20:U:93:VAL:HG21	2.37	0.54
4:V:462:LEU:HD11	4:V:500:VAL:HG22	1.89	0.54
4:V:429:VAL:HG21	4:V:448:LEU:HD11	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:V:432:ILE:O	4:V:436:ARG:N	2.39	0.54
4:V:539:GLU:OE2	4:V:543:GLN:NE2	2.40	0.54
2:Z:705:LEU:HG	2:Z:724:VAL:HG21	1.89	0.54
20:U:14:HIS:O	20:U:18:GLY:N	2.41	0.53
3:W:267:ARG:NH2	20:U:139:LEU:HD11	2.24	0.53
5:A:760:LEU:HD11	5:A:781:ILE:HG21	1.90	0.53
9:E:115:LYS:O	9:E:119:VAL:HG23	2.09	0.53
5:A:525:ILE:O	5:A:534:VAL:HG22	2.07	0.53
3:W:531:ARG:NH2	3:W:562:ILE:HD13	2.23	0.53
2:Z:554:GLU:OE1	2:Z:557:THR:OG1	2.27	0.53
4:V:227:LEU:HD23	4:V:228:ARG:NH1	2.23	0.53
5:A:1430:CYS:O	5:A:1435:THR:HG22	2.08	0.53
6:B:900:GLU:OE1	6:B:900:GLU:N	2.41	0.53
3:W:444:GLN:NE2	5:A:724:GLU:O	2.42	0.53
12:H:115:TYR:OH	12:H:124:ARG:NH2	2.42	0.53
5:A:589:LYS:NZ	5:A:638:GLY:O	2.41	0.52
17:N:39:DA:N6	19:T:13:DC:N3	2.57	0.52
4:V:179:THR:HG23	4:V:506:ARG:HB2	1.91	0.52
4:V:186:ASN:OD1	4:V:189:SER:OG	2.18	0.52
6:B:223:SER:OG	6:B:350:HIS:ND1	2.25	0.52
6:B:824:ASP:OD1	6:B:825:GLN:N	2.42	0.52
13:I:18:GLN:OE1	13:I:44:TYR:OH	2.13	0.52
15:K:80:ASP:OD1	15:K:80:ASP:N	2.42	0.52
5:A:340:LYS:HG3	5:A:1436:VAL:HG11	1.92	0.52
4:V:369:LEU:HD12	4:V:373:PHE:HB3	1.91	0.52
5:A:1100:THR:OG1	5:A:1101:GLN:OE1	2.27	0.52
9:E:14:ARG:NH1	9:E:43:GLN:OE1	2.43	0.52
10:F:79:VAL:HG11	10:F:83:LEU:HD23	1.92	0.52
11:G:27:LYS:HG2	11:G:51:ILE:HD13	1.92	0.51
20:U:85:ASP:O	20:U:91:LEU:HD21	2.11	0.51
3:W:101:LEU:O	3:W:104:THR:OG1	2.27	0.51
5:A:864:LEU:O	5:A:867:SER:OG	2.24	0.51
6:B:310:VAL:HG23	6:B:311:ILE:HD12	1.92	0.51
6:B:1085:ARG:N	19:T:29:DA:OP1	2.41	0.51
20:U:45:PHE:O	20:U:53:LYS:NZ	2.40	0.51
13:I:60:HIS:O	13:I:60:HIS:ND1	2.43	0.51
3:W:244:MET:SD	3:W:244:MET:N	2.84	0.51
4:V:266:LEU:HD22	4:V:304:ILE:HG22	1.92	0.51
4:V:415:LEU:HD23	4:V:422:CYS:HA	1.93	0.51
3:W:245:MET:SD	3:W:262:ALA:N	2.84	0.51
13:I:91:HIS:CG	13:I:116:ALA:HB2	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:Z:741:GLN:NE2	2:Z:742:THR:O	2.44	0.50
5:A:338:SER:OG	5:A:341:GLN:NE2	2.44	0.50
4:V:225:LEU:O	4:V:229:THR:OG1	2.18	0.50
4:V:384:ASP:HA	4:V:387:PHE:CD2	2.46	0.50
2:Z:260:MET:O	2:Z:263:VAL:HG22	2.12	0.50
2:Z:424:ASP:HB2	2:Z:440:ILE:HD12	1.93	0.50
5:A:58:MET:HG2	5:A:258:LEU:HD11	1.93	0.50
6:B:741:HIS:O	6:B:922:ARG:NH2	2.44	0.50
20:U:141:CYS:HB3	20:U:149:LEU:HD11	1.93	0.50
6:B:705:GLY:O	6:B:709:SER:OG	2.15	0.50
3:W:245:MET:HG2	3:W:262:ALA:HB2	1.94	0.50
6:B:803:ARG:NH1	14:J:9:THR:O	2.45	0.50
16:L:28:ILE:HG21	16:L:34:ILE:HG22	1.92	0.50
5:A:1249:ASP:OD2	5:A:1251:ASN:ND2	2.45	0.50
6:B:771:GLU:O	14:J:55:LEU:HD21	2.12	0.50
2:Z:753:VAL:HG11	16:L:52:LEU:HD21	1.93	0.50
5:A:397:PHE:HB3	10:F:87:THR:HG23	1.94	0.49
2:Z:513:VAL:HG21	2:Z:518:LEU:HD21	1.94	0.49
5:A:1347:LEU:HB3	9:E:137:ILE:HD13	1.94	0.49
3:W:475:LYS:O	3:W:479:THR:HG23	2.12	0.49
5:A:350:VAL:HG11	5:A:1435:THR:CG2	2.34	0.49
5:A:811:ILE:HD12	13:I:79:PRO:HB3	1.94	0.49
5:A:1437:ASP:N	5:A:1437:ASP:OD1	2.44	0.49
11:G:28:GLN:O	11:G:32:THR:HG23	2.12	0.49
4:V:469:LEU:HD23	4:V:472:LEU:HD12	1.93	0.49
3:W:120:LYS:HG3	3:W:158:LEU:HD13	1.94	0.49
2:Z:554:GLU:OE2	2:Z:559:GLN:NE2	2.46	0.48
7:C:9:VAL:HG11	15:K:105:PHE:CD1	2.48	0.48
3:W:91:ALA:HB2	4:V:62:HIS:CE1	2.49	0.48
3:W:57:ILE:HD11	4:V:30:ILE:HD11	1.94	0.48
3:W:538:LEU:HD23	3:W:541:ILE:HD11	1.95	0.48
12:H:40:ILE:HD12	12:H:124:ARG:HD2	1.95	0.48
4:V:81:ALA:O	4:V:89:ARG:NH1	2.46	0.48
5:A:1192:TRP:HZ3	5:A:1246:ILE:HG22	1.77	0.48
2:Z:219:GLU:OE2	21:Y:50:TYR:OH	2.32	0.48
6:B:669:GLU:O	6:B:673:VAL:HG23	2.14	0.48
13:I:17:CYS:HA	13:I:24:LEU:HD21	1.96	0.48
3:W:329:ARG:NE	3:W:363:ALA:O	2.43	0.48
3:W:90:VAL:O	3:W:94:VAL:HG23	2.13	0.48
6:B:213:SER:OG	6:B:214:LYS:N	2.47	0.48
4:V:483:SER:O	4:V:488:GLY:N	2.46	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:B:899:SER:OG	6:B:1080:ARG:NH1	2.46	0.48
9:E:166:ARG:NH1	9:E:168:ASN:OD1	2.47	0.48
4:V:186:ASN:N	4:V:189:SER:OG	2.47	0.47
5:A:116:LYS:NZ	5:A:120:ASP:OD1	2.47	0.47
2:Z:493:VAL:HG11	11:G:111:HIS:HB3	1.96	0.47
3:W:122:LEU:HD23	3:W:125:LYS:HZ2	1.78	0.47
3:W:92:GLN:OE1	3:W:92:GLN:N	2.45	0.47
3:W:245:MET:SD	3:W:262:ALA:HB2	2.55	0.47
3:W:460:THR:O	3:W:506:ARG:NH2	2.48	0.47
5:A:272:ASN:OD1	18:P:8:G:N2	2.48	0.47
5:A:590:GLN:O	5:A:593:SER:OG	2.28	0.47
20:U:17:LEU:O	20:U:55:LYS:NZ	2.46	0.47
20:U:58:LEU:HD11	20:U:93:VAL:HG21	1.96	0.47
5:A:196:LEU:HD13	5:A:325:LEU:HD11	1.97	0.47
6:B:18:THR:OG1	6:B:20:ASP:OD1	2.16	0.47
6:B:746:THR:HG21	19:T:33:DA:OP2	2.14	0.47
4:V:227:LEU:HD23	4:V:228:ARG:HH11	1.78	0.47
5:A:853:LYS:O	5:A:857:THR:N	2.47	0.47
5:A:545:VAL:HB	5:A:676:ILE:HD13	1.97	0.47
4:V:63:GLN:NE2	4:V:67:ASP:OD2	2.47	0.47
6:B:1122:CYS:O	6:B:1122:CYS:SG	2.72	0.47
11:G:22:LEU:O	11:G:26:VAL:HG23	2.15	0.47
15:K:105:PHE:CE2	15:K:109:ILE:HD11	2.49	0.47
2:Z:450:ILE:HG21	2:Z:468:LEU:HD11	1.96	0.46
5:A:290:LEU:HD11	5:A:303:ILE:HG23	1.97	0.46
5:A:1138:SER:N	5:A:1360:ASN:OD1	2.48	0.46
5:A:1201:ASP:OD1	5:A:1201:ASP:N	2.48	0.46
5:A:1419:VAL:HG11	5:A:1432:PHE:CE1	2.50	0.46
3:W:261:ILE:O	3:W:265:VAL:HG23	2.14	0.46
20:U:19:ALA:O	20:U:55:LYS:NZ	2.42	0.46
21:Y:75:GLN:O	21:Y:111:ARG:NH1	2.49	0.46
3:W:439:ARG:HH21	3:W:483:GLN:HG3	1.73	0.46
6:B:601:VAL:HG22	6:B:616:THR:HG23	1.97	0.46
6:B:975:ARG:HB3	6:B:977:THR:HG23	1.96	0.46
6:B:794:VAL:HG22	6:B:967:ILE:HG22	1.98	0.46
3:W:367:VAL:HG22	20:U:148:ALA:HB2	1.98	0.46
18:P:10:A:O2'	18:P:11:U:OP1	2.12	0.46
15:K:63:VAL:HG12	15:K:71:ILE:HG22	1.97	0.46
5:A:65:ILE:HD11	5:A:258:LEU:HG	1.96	0.46
5:A:1095:LEU:HD13	5:A:1401:LEU:HD22	1.97	0.46
5:A:1141:VAL:HA	5:A:1357:THR:HG23	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:1435:THR:O	5:A:1439:LEU:HD23	2.16	0.46
2:Z:474:MET:SD	2:Z:474:MET:N	2.89	0.46
5:A:1163:HIS:NE2	5:A:1297:THR:OG1	2.41	0.46
6:B:794:VAL:HG13	6:B:965:ILE:HG23	1.97	0.46
11:G:18:PHE:HA	11:G:22:LEU:HD12	1.98	0.46
6:B:210:LYS:HD2	6:B:218:THR:HG21	1.96	0.46
5:A:107:LEU:HD11	5:A:221:VAL:HG13	1.98	0.45
5:A:274:ASP:OD2	5:A:342:ARG:NH2	2.49	0.45
5:A:479:TRP:CD1	6:B:931:ILE:HD12	2.51	0.45
7:C:105:VAL:HG11	7:C:115:VAL:HG22	1.97	0.45
5:A:1151:ALA:HB2	5:A:1334:TRP:CZ2	2.50	0.45
6:B:378:GLY:HA3	13:I:102:ALA:HB3	1.97	0.45
3:W:558:GLU:N	3:W:558:GLU:OE1	2.49	0.45
7:C:129:PRO:O	7:C:132:SER:OG	2.29	0.45
5:A:1196:TYR:CD2	5:A:1246:ILE:HG23	2.52	0.45
6:B:777:ASN:O	14:J:47:ARG:NH1	2.50	0.45
3:W:419:ARG:NH1	3:W:461:CYS:SG	2.90	0.45
4:V:245:LEU:HD13	4:V:253:ILE:HG21	1.98	0.45
7:C:7:PRO:O	15:K:104:ARG:NH1	2.50	0.45
3:W:235:GLU:HB3	20:U:58:LEU:HD23	1.99	0.45
6:B:998:ASP:OD1	6:B:1000:THR:HG23	2.16	0.44
20:U:96:ILE:HG12	20:U:110:LEU:HD11	1.99	0.44
5:A:395:THR:HG22	5:A:397:PHE:H	1.82	0.44
6:B:40:VAL:HG11	6:B:482:LEU:HD13	1.99	0.44
4:V:269:CYS:SG	4:V:279:ARG:NE	2.87	0.44
6:B:924:ARG:NE	7:C:62:GLU:OE1	2.50	0.44
7:C:37:VAL:HG13	7:C:41:GLU:HB2	1.99	0.44
3:W:231:VAL:HG13	3:W:241:ALA:HB3	2.00	0.44
14:J:44:CYS:SG	14:J:45:CYS:N	2.91	0.44
20:U:83:SER:OG	20:U:94:ALA:HB1	2.18	0.44
2:Z:561:LEU:HD21	2:Z:636:PHE:HA	1.99	0.44
3:W:100:TRP:O	3:W:104:THR:HG23	2.18	0.44
5:A:228:ILE:O	5:A:244:ARG:NH2	2.46	0.44
6:B:643:LEU:HD11	6:B:656:LEU:HD11	1.99	0.44
6:B:845:TYR:CD2	6:B:865:VAL:HG11	2.53	0.44
6:B:352:GLY:O	6:B:361:LYS:NZ	2.40	0.44
2:Z:440:ILE:HG23	2:Z:450:ILE:HD11	1.99	0.43
5:A:350:VAL:CG1	5:A:1435:THR:HG21	2.38	0.43
7:C:172:GLU:OE2	16:L:58:ARG:NH2	2.49	0.43
8:D:132:ASP:O	8:D:136:THR:HG23	2.18	0.43
9:E:71:GLN:HB2	9:E:99:ILE:HD12	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:W:94:VAL:CG2	4:V:65:VAL:HG23	2.45	0.43
5:A:904:GLN:NE2	5:A:981:CYS:O	2.51	0.43
8:D:125:GLU:OE1	8:D:125:GLU:N	2.47	0.43
3:W:112:GLN:HG2	4:V:41:LEU:HD21	2.00	0.43
5:A:344:LYS:HZ3	19:T:24:DG:P	2.40	0.43
6:B:83:ARG:HD3	6:B:133:ILE:HD12	2.00	0.43
9:E:73:PHE:O	9:E:103:LEU:N	2.49	0.43
3:W:360:LEU:HD21	3:W:422:VAL:HG21	1.99	0.43
8:D:64:THR:O	8:D:68:THR:HG22	2.19	0.43
4:V:403:TYR:OH	4:V:443:ARG:NH1	2.51	0.43
5:A:458:PHE:CE2	5:A:484:LEU:HD21	2.54	0.43
5:A:1218:ARG:NH2	5:A:1252:ALA:O	2.52	0.43
4:V:223:ARG:NH2	4:V:300:ASP:OD1	2.51	0.43
5:A:862:ARG:HA	5:A:865:ILE:HG22	1.99	0.43
9:E:104:ILE:HD11	9:E:127:LEU:HD23	2.01	0.43
12:H:112:LEU:HB2	12:H:132:LEU:HD12	2.00	0.43
17:N:44:DT:O2	19:T:10:DG:N2	2.52	0.43
3:W:78:ASN:OD1	3:W:79:VAL:N	2.52	0.43
3:W:120:LYS:CG	3:W:158:LEU:HD13	2.49	0.43
5:A:1484:MET:SD	5:A:1484:MET:N	2.92	0.43
6:B:114:ARG:NE	6:B:191:GLU:OE2	2.39	0.43
5:A:410:ASN:OD1	5:A:449:HIS:NE2	2.48	0.43
5:A:1374:VAL:HG11	5:A:1411:LEU:HD21	2.00	0.43
6:B:761:THR:HG23	6:B:1000:THR:HA	2.01	0.43
6:B:1138:ARG:O	6:B:1141:ARG:NH1	2.47	0.43
4:V:262:PHE:CZ	4:V:283:LEU:HD22	2.53	0.42
20:U:19:ALA:HB3	20:U:22:GLU:HG2	2.01	0.42
5:A:467:MET:SD	5:A:467:MET:N	2.92	0.42
6:B:59:VAL:HG21	6:B:91:ILE:HD11	2.02	0.42
2:Z:493:VAL:HG11	11:G:111:HIS:CB	2.49	0.42
2:Z:540:VAL:O	2:Z:548:GLY:N	2.46	0.42
8:D:31:THR:O	8:D:84:ARG:NH2	2.51	0.42
9:E:103:LEU:HD11	9:E:130:PHE:CD2	2.54	0.42
3:W:150:ILE:O	3:W:156:ARG:NE	2.46	0.42
5:A:115:SER:OG	5:A:115:SER:O	2.36	0.42
6:B:157:ARG:NH2	6:B:177:CYS:O	2.53	0.42
9:E:152:THR:O	9:E:156:VAL:HG23	2.19	0.42
3:W:310:ILE:HG23	3:W:359:ILE:HD12	2.02	0.42
4:V:101:PHE:O	4:V:104:VAL:HG12	2.19	0.42
3:W:322:PRO:O	3:W:375:ARG:NH1	2.52	0.42
4:V:326:VAL:HG12	4:V:378:MET:CG	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:290:LEU:HD13	5:A:306:ASP:HB3	2.02	0.42
3:W:473:LEU:O	3:W:477:PHE:N	2.50	0.42
4:V:132:MET:SD	4:V:156:LEU:HD22	2.60	0.42
5:A:42:LYS:O	5:A:288:ASN:ND2	2.48	0.42
3:W:260:ARG:NH1	20:U:136:MET:SD	2.93	0.42
5:A:967:ARG:NH1	5:A:1326:GLY:O	2.53	0.42
6:B:68:GLN:O	6:B:420:GLN:NE2	2.43	0.42
7:C:122:SER:OG	7:C:124:SER:O	2.35	0.42
17:N:14:DC:N4	19:T:38:DG:O6	2.53	0.42
3:W:181:ASP:OD1	3:W:203:ARG:NH2	2.52	0.42
5:A:360:ASP:OD1	6:B:1062:ARG:NE	2.48	0.42
6:B:867:ILE:HB	6:B:894:THR:HG22	2.02	0.42
11:G:94:LYS:O	11:G:128:TYR:OH	2.38	0.42
4:V:265:CYS:O	4:V:268:ALA:N	2.53	0.42
4:V:369:LEU:HD13	4:V:421:ALA:HB2	2.01	0.42
5:A:552:ASP:O	12:H:24:ARG:NH1	2.53	0.42
5:A:1217:ASP:OD2	5:A:1220:HIS:ND1	2.52	0.41
3:W:52:SER:O	3:W:86:ASN:ND2	2.52	0.41
3:W:120:LYS:NZ	3:W:154:THR:O	2.48	0.41
4:V:302:SER:O	4:V:306:CYS:N	2.54	0.41
6:B:193:VAL:CG2	6:B:482:LEU:HD23	2.50	0.41
6:B:817:GLN:HA	6:B:918:PHE:HB2	2.03	0.41
5:A:365:THR:OG1	5:A:366:VAL:N	2.52	0.41
6:B:92:TYR:O	6:B:124:LEU:HD12	2.20	0.41
2:Z:604:ASP:OD1	2:Z:605:GLY:N	2.53	0.41
4:V:498:GLU:OE1	4:V:533:SER:OG	2.39	0.41
5:A:857:THR:H	5:A:857:THR:HG1	1.54	0.41
6:B:857:GLY:N	6:B:904:VAL:O	2.50	0.41
9:E:79:GLU:OE1	9:E:79:GLU:N	2.54	0.41
4:V:253:ILE:HA	4:V:256:VAL:HG22	2.02	0.41
4:V:297:VAL:O	4:V:301:LEU:N	2.42	0.41
4:V:282:GLU:CD	9:E:69:THR:HG21	2.40	0.41
5:A:1115:LYS:NZ	5:A:1136:THR:OG1	2.51	0.41
5:A:1247:PHE:HB3	5:A:1257:LEU:HD13	2.02	0.41
6:B:752:TYR:HE1	6:B:809:VAL:HG23	1.86	0.41
20:U:41:ILE:HD13	20:U:56:LEU:HD21	2.02	0.41
20:U:41:ILE:O	20:U:45:PHE:N	2.54	0.41
1:X:18:LYS:NZ	4:V:378:MET:SD	2.71	0.41
5:A:26:LEU:HG	6:B:1168:ALA:HB2	2.02	0.41
5:A:107:LEU:HB3	5:A:191:ILE:HD13	2.01	0.41
5:A:366:VAL:HG22	6:B:1055:VAL:HG23	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:787:VAL:HG22	5:A:824:GLU:O	2.21	0.41
6:B:91:ILE:HG22	20:U:254:VAL:HG13	2.03	0.41
5:A:195:GLY:C	5:A:196:LEU:HD12	2.42	0.41
7:C:212:ASP:N	7:C:212:ASP:OD1	2.54	0.41
2:Z:189:GLU:N	2:Z:189:GLU:OE1	2.54	0.40
5:A:425:ASP:N	5:A:425:ASP:OD1	2.54	0.40
5:A:196:LEU:HD21	5:A:315:ALA:CB	2.51	0.40
6:B:731:GLN:NE2	18:P:16:G:OP1	2.52	0.40
19:T:19:DT:H2'	19:T:20:DT:H71	2.03	0.40
5:A:322:LEU:HB3	5:A:325:LEU:HD12	2.03	0.40
5:A:871:VAL:HG11	5:A:1400:LEU:HD11	2.03	0.40
6:B:91:ILE:HD13	6:B:126:VAL:HG23	2.03	0.40
8:D:17:ALA:HB1	8:D:95:PHE:CZ	2.56	0.40
11:G:10:GLU:HB3	11:G:67:LEU:HD11	2.03	0.40
5:A:408:ARG:NH2	5:A:413:TYR:O	2.55	0.40
9:E:59:THR:HG22	9:E:75:PHE:HA	2.03	0.40
9:E:76:PHE:CE2	9:E:105:VAL:HG21	2.57	0.40
16:L:24:THR:O	16:L:26:ASN:ND2	2.55	0.40
2:Z:726:ASP:O	2:Z:733:ARG:N	2.52	0.40

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	
1	X	10/380 (3%)	4 (40%)	6 (60%)	0	100	100
2	Z	455/1087 (42%)	435 (96%)	20 (4%)	0	100	100
3	W	518/590 (88%)	504 (97%)	14 (3%)	0	100	100
4	V	548/580 (94%)	537 (98%)	11 (2%)	0	100	100
5	A	1406/1970 (71%)	1361 (97%)	45 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	B	1130/1174 (96%)	1069 (95%)	61 (5%)	0	100	100
7	C	250/271 (92%)	243 (97%)	7 (3%)	0	100	100
8	D	122/142 (86%)	118 (97%)	4 (3%)	0	100	100
9	E	203/210 (97%)	197 (97%)	6 (3%)	0	100	100
10	F	75/127 (59%)	72 (96%)	3 (4%)	0	100	100
11	G	169/172 (98%)	161 (95%)	8 (5%)	0	100	100
12	H	146/150 (97%)	141 (97%)	5 (3%)	0	100	100
13	I	112/125 (90%)	103 (92%)	9 (8%)	0	100	100
14	J	63/67 (94%)	61 (97%)	2 (3%)	0	100	100
15	K	113/117 (97%)	110 (97%)	3 (3%)	0	100	100
16	L	42/58 (72%)	38 (90%)	4 (10%)	0	100	100
20	U	195/528 (37%)	186 (95%)	9 (5%)	0	100	100
21	Y	114/117 (97%)	111 (97%)	3 (3%)	0	100	100
All	All	5671/7865 (72%)	5451 (96%)	220 (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	X	11/331 (3%)	7 (64%)	4 (36%)	0	0
2	Z	418/940 (44%)	415 (99%)	3 (1%)	84	95
3	W	471/513 (92%)	467 (99%)	4 (1%)	81	94
4	V	493/515 (96%)	487 (99%)	6 (1%)	71	92
5	A	1247/1749 (71%)	1236 (99%)	11 (1%)	78	94
6	B	994/1027 (97%)	989 (100%)	5 (0%)	88	96
7	C	231/248 (93%)	230 (100%)	1 (0%)	91	97
8	D	114/126 (90%)	113 (99%)	1 (1%)	78	94

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	E	190/192 (99%)	185 (97%)	5 (3%)	46	79
10	F	67/111 (60%)	67 (100%)	0	100	100
11	G	152/153 (99%)	150 (99%)	2 (1%)	69	91
12	H	129/131 (98%)	128 (99%)	1 (1%)	81	94
13	I	103/112 (92%)	102 (99%)	1 (1%)	76	93
14	J	54/56 (96%)	54 (100%)	0	100	100
15	K	104/106 (98%)	104 (100%)	0	100	100
16	L	41/55 (74%)	40 (98%)	1 (2%)	49	81
20	U	170/451 (38%)	170 (100%)	0	100	100
21	Y	102/103 (99%)	102 (100%)	0	100	100
All	All	5091/6919 (74%)	5046 (99%)	45 (1%)	79	94

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	X	13	GLU
1	X	21	LYS
1	X	23	LYS
1	X	24	LYS
2	Z	259	GLU
2	Z	359	LEU
2	Z	489	THR
3	W	245	MET
3	W	337	PHE
3	W	425	MET
3	W	471	GLN
4	V	28	LYS
4	V	197	GLN
4	V	265	CYS
4	V	321	HIS
4	V	365	MET
4	V	532	GLN
5	A	67	ARG
5	A	114	CYS
5	A	230	ASP
5	A	673	GLN
5	A	766	PHE
5	A	857	THR

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Mol	Chain	Res	Type
5	A	931	ARG
5	A	1159	CYS
5	A	1199	MET
5	A	1219	LYS
5	A	1424	THR
6	B	405	ARG
6	B	841	ARG
6	B	1080	ARG
6	B	1138	ARG
6	B	1140	CYS
7	C	63	PHE
8	D	129	GLN
9	E	7	THR
9	E	44	PHE
9	E	86	THR
9	E	108	GLN
9	E	162	ARG
11	G	52	ASP
11	G	106	CYS
12	H	124	ARG
13	I	122	ARG
16	L	39	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
4	V	532	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
18	P	14/22 (63%)	7 (50%)	2 (14%)

All (7) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
18	P	5	U
18	P	6	U
18	P	7	G
18	P	8	G

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Mol	Chain	Res	Type
18	P	10	A
18	P	11	U
18	P	12	A

All (2) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
18	P	6	U
18	P	10	A

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 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.

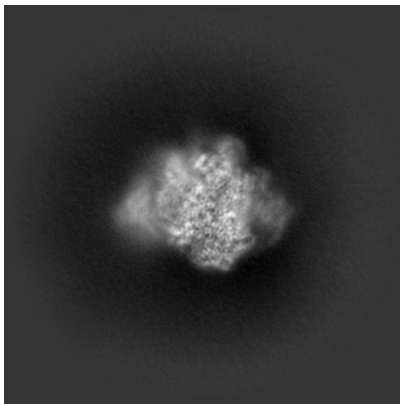
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-42270. These allow visual inspection of the internal detail of the map and identification of artifacts.

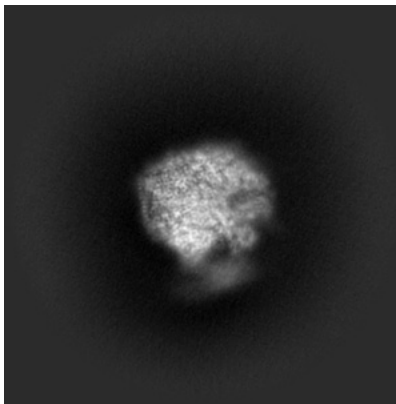
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

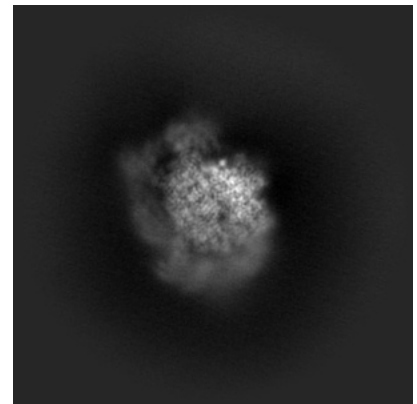
6.1.1 Primary map



X

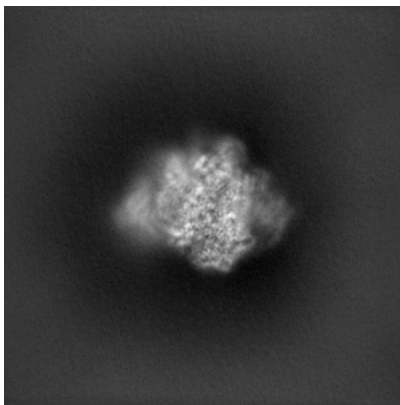


Y

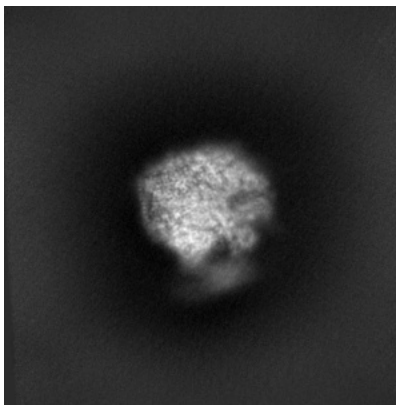


Z

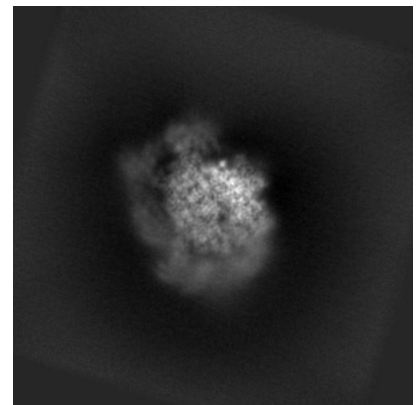
6.1.2 Raw map



X



Y

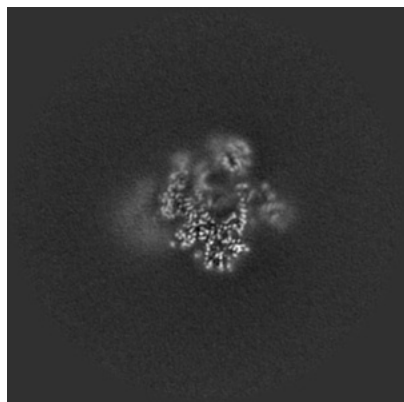


Z

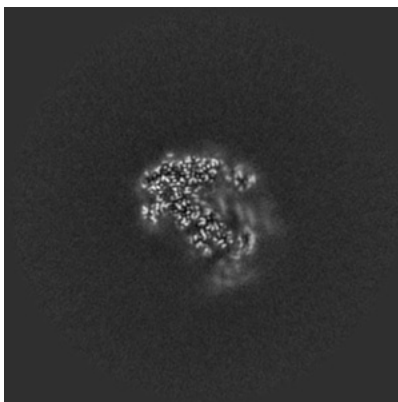
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

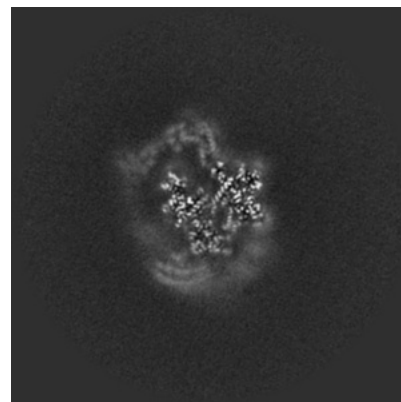
6.2.1 Primary map



X Index: 256

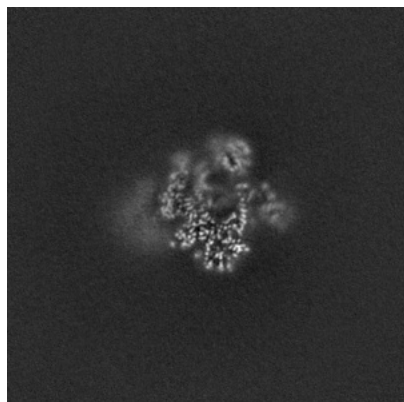


Y Index: 256

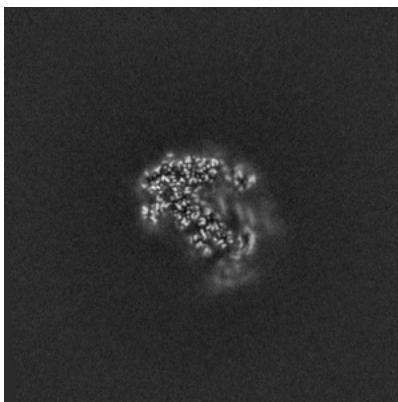


Z Index: 256

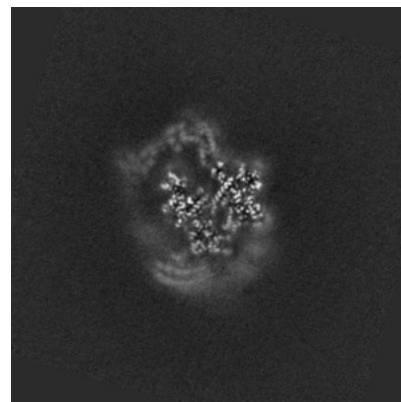
6.2.2 Raw map



X Index: 256



Y Index: 256

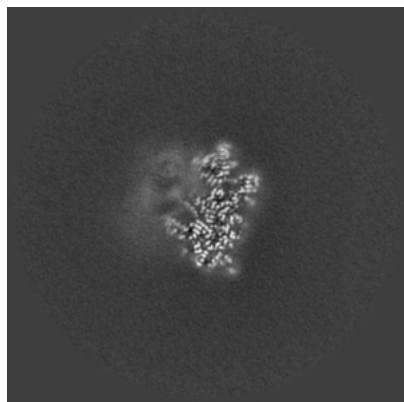


Z Index: 256

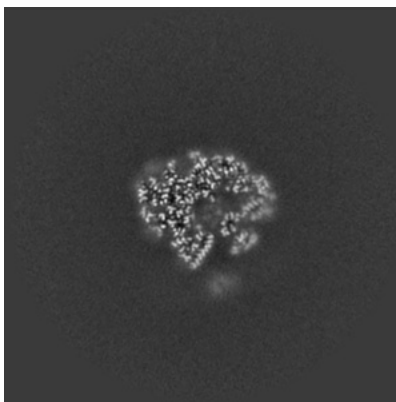
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

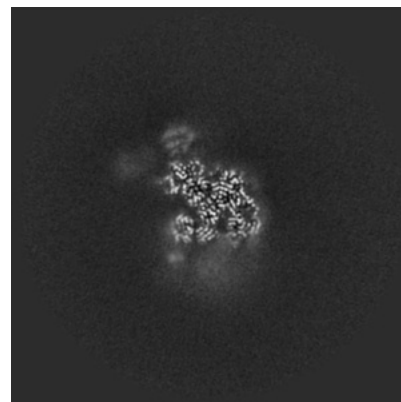
6.3.1 Primary map



X Index: 289

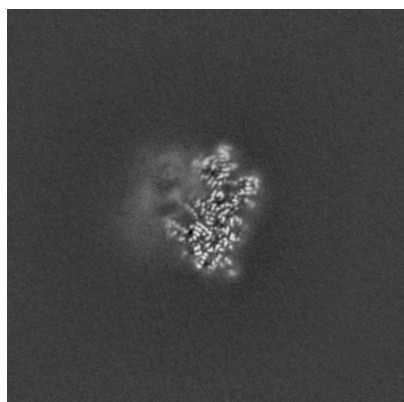


Y Index: 281

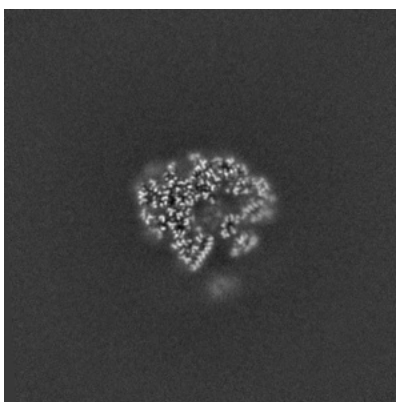


Z Index: 221

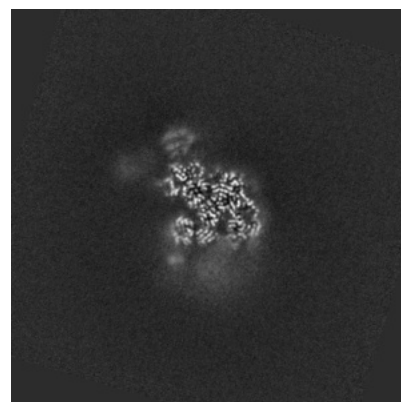
6.3.2 Raw map



X Index: 289



Y Index: 281

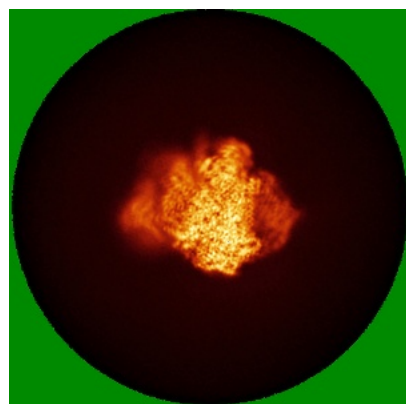


Z Index: 221

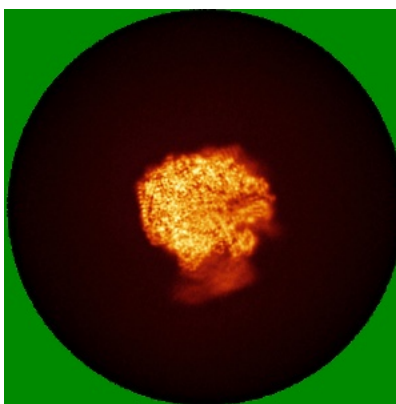
The images above show the largest variance slices of the map in three orthogonal directions.

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

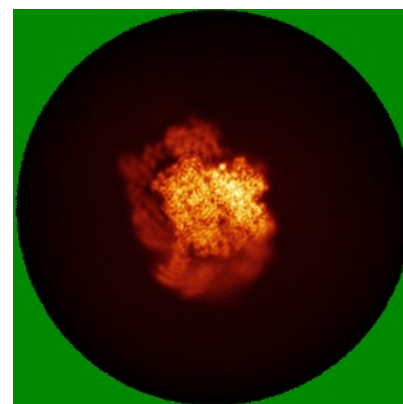
6.4.1 Primary map



X

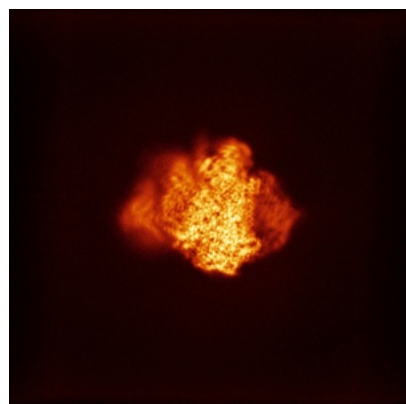


Y

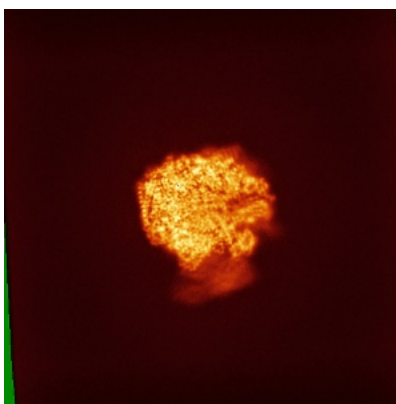


Z

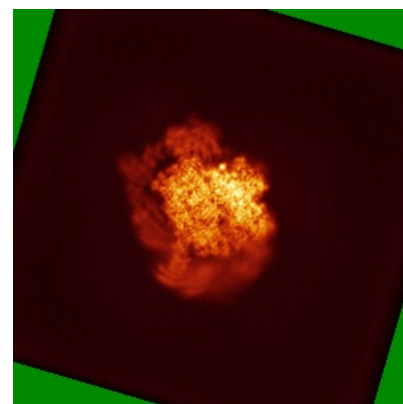
6.4.2 Raw map



X



Y

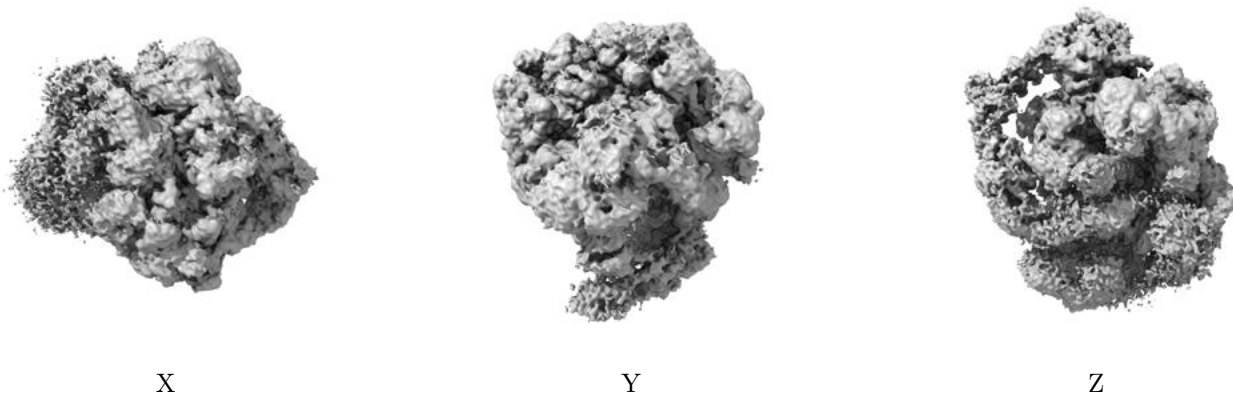


Z

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.

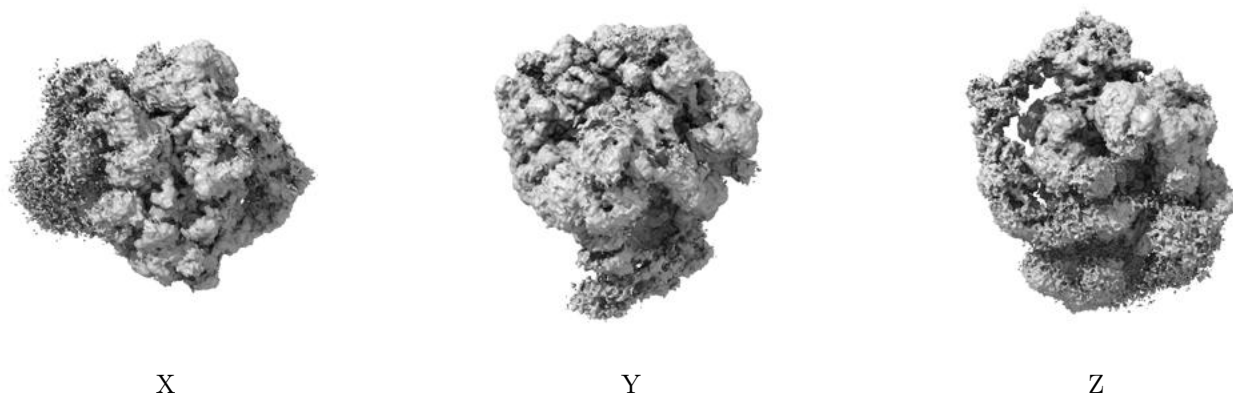
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.35. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

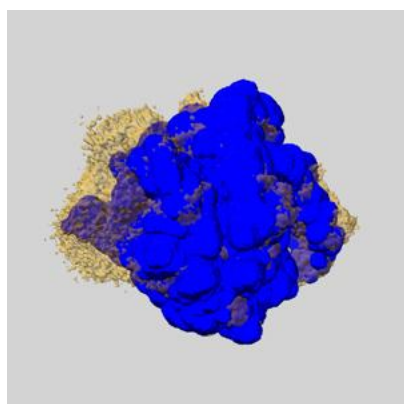
6.6 Mask visualisation [i](#)

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

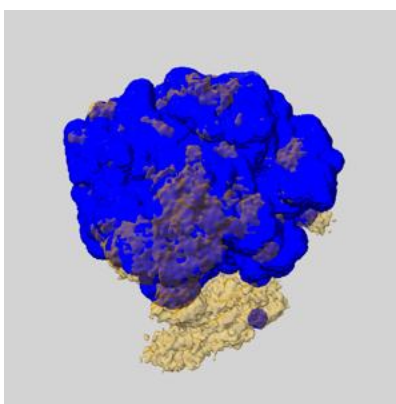
A mask typically either:

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

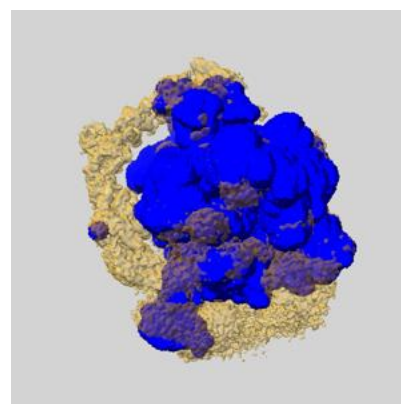
6.6.1 emd_42270_msk_1.map [i](#)



X



Y

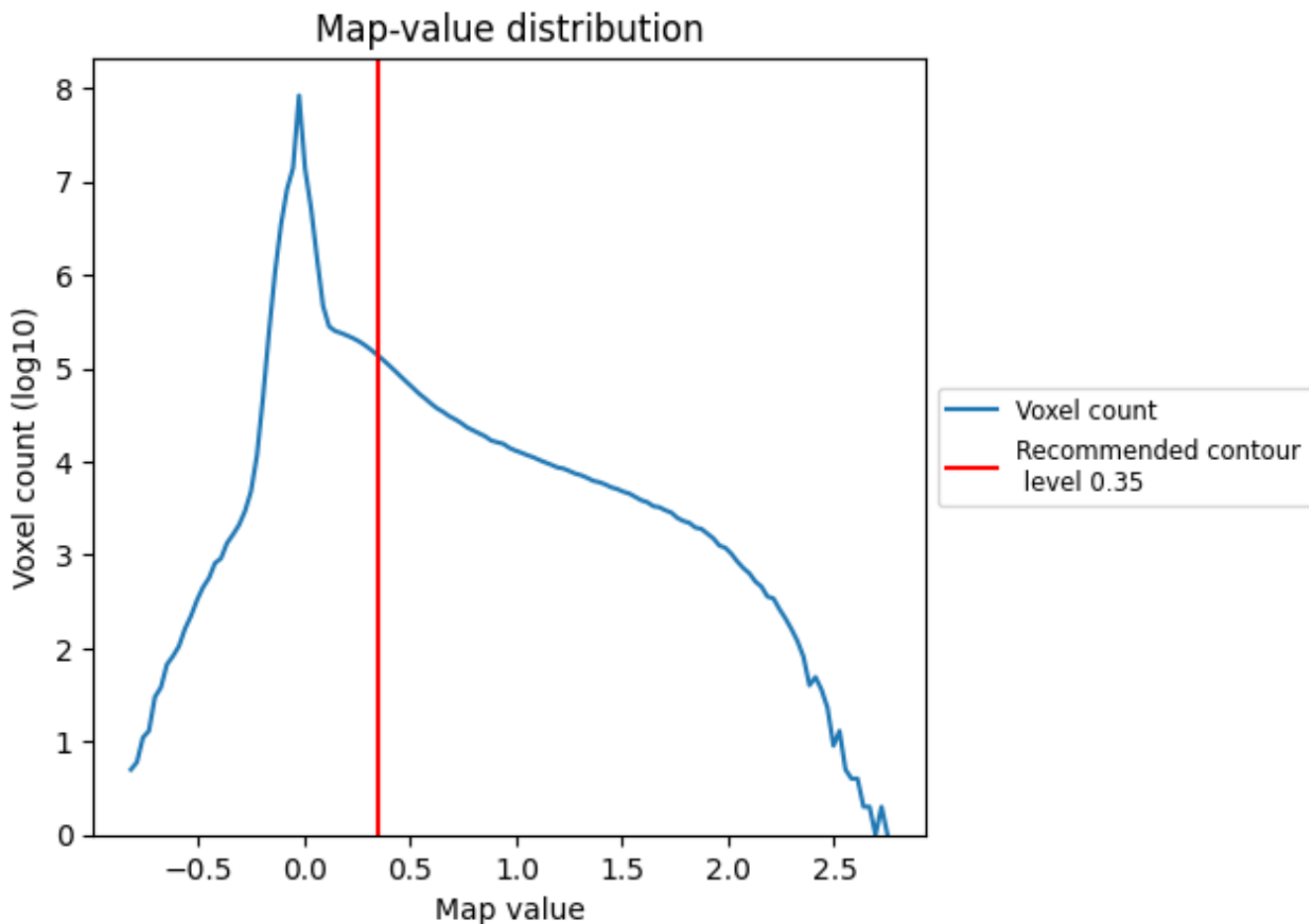


Z

7 Map analysis [i](#)

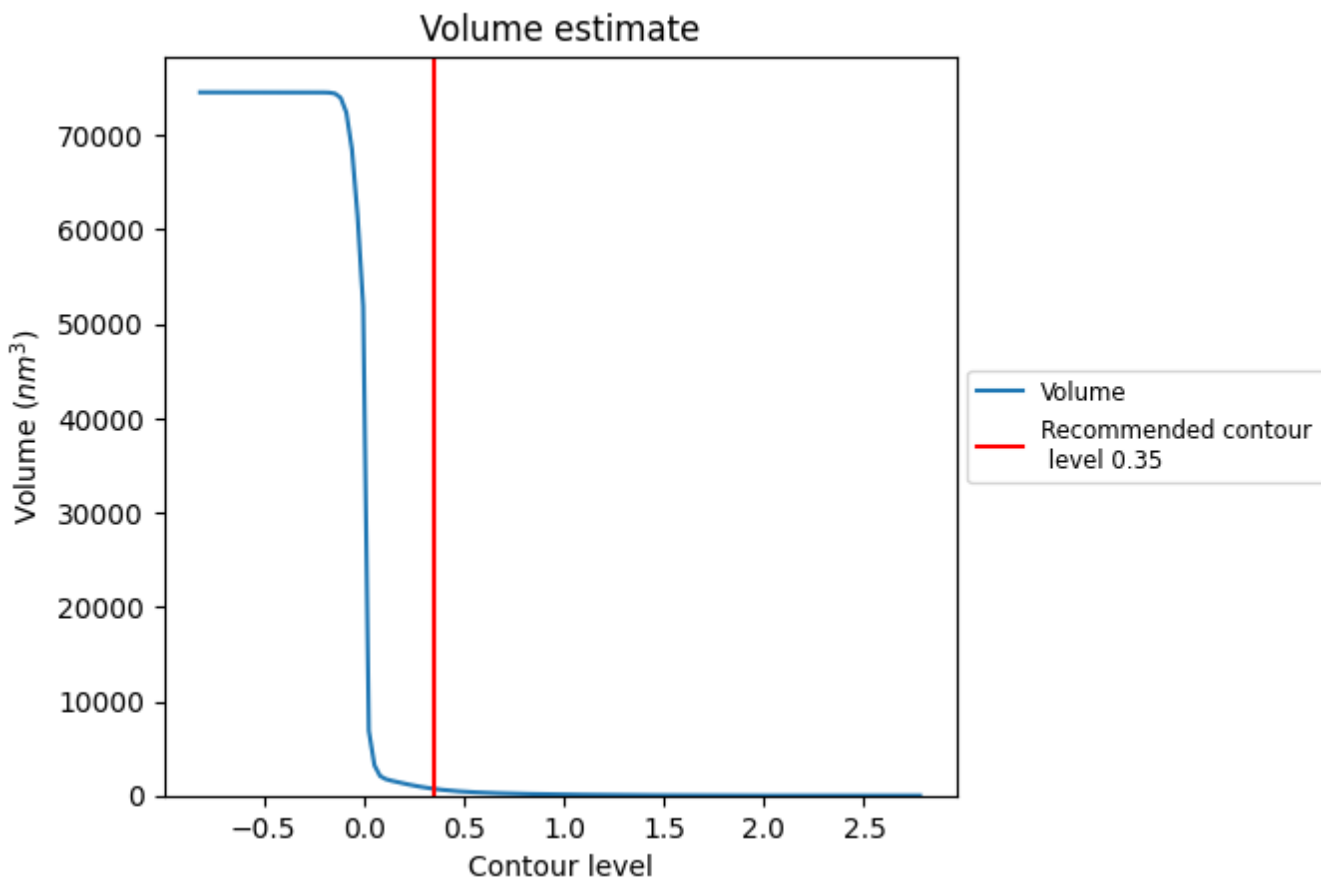
This section contains the results of statistical analysis of the map.

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.

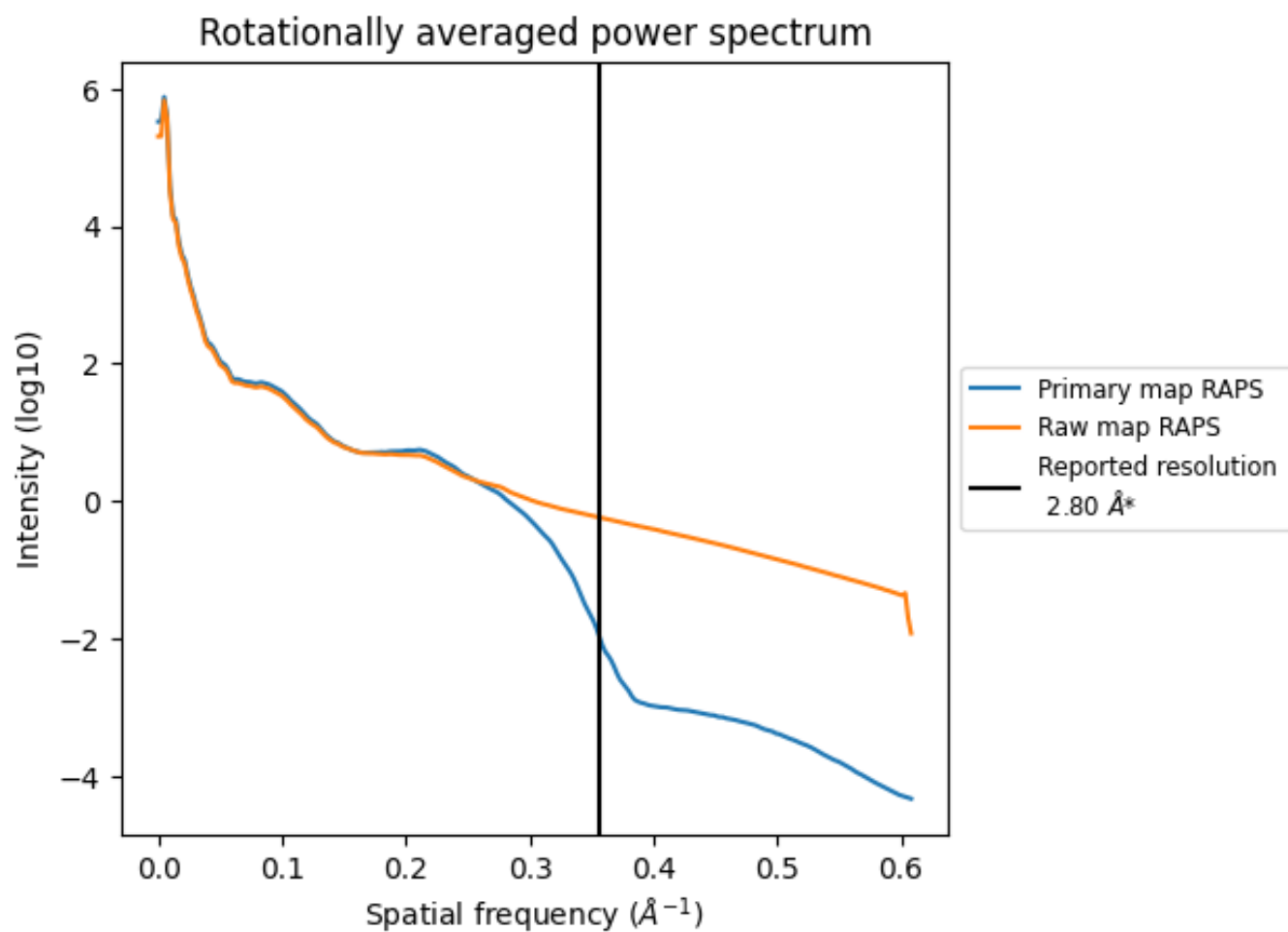
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 717 nm³; this corresponds to an approximate mass of 647 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

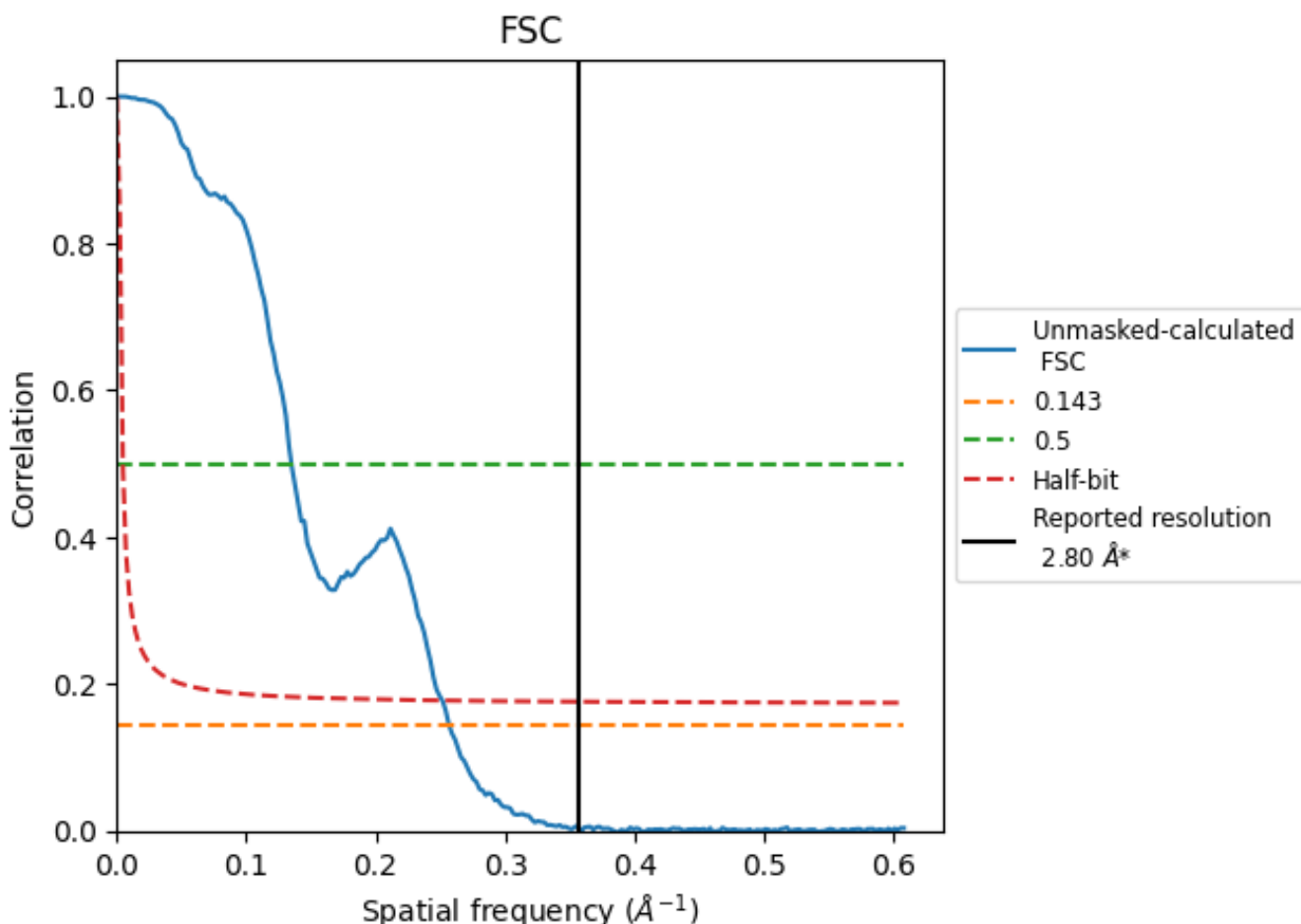


*Reported resolution corresponds to spatial frequency of 0.357 \AA^{-1}

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 0.357\AA^{-1}

8.2 Resolution estimates [i](#)

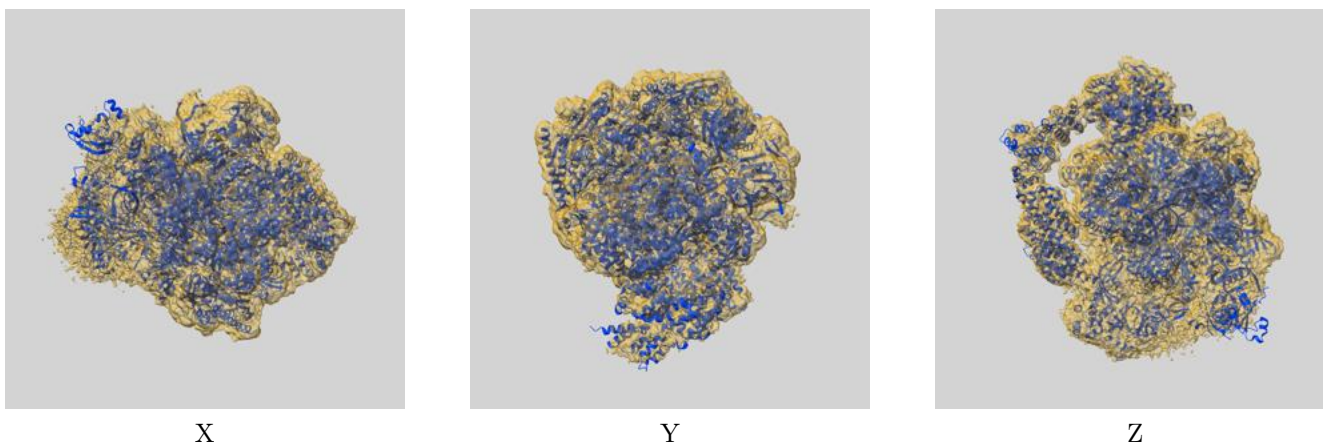
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.89	7.41	3.98

*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 3.89 differs from the reported value 2.8 by more than 10 %

9 Map-model fit [i](#)

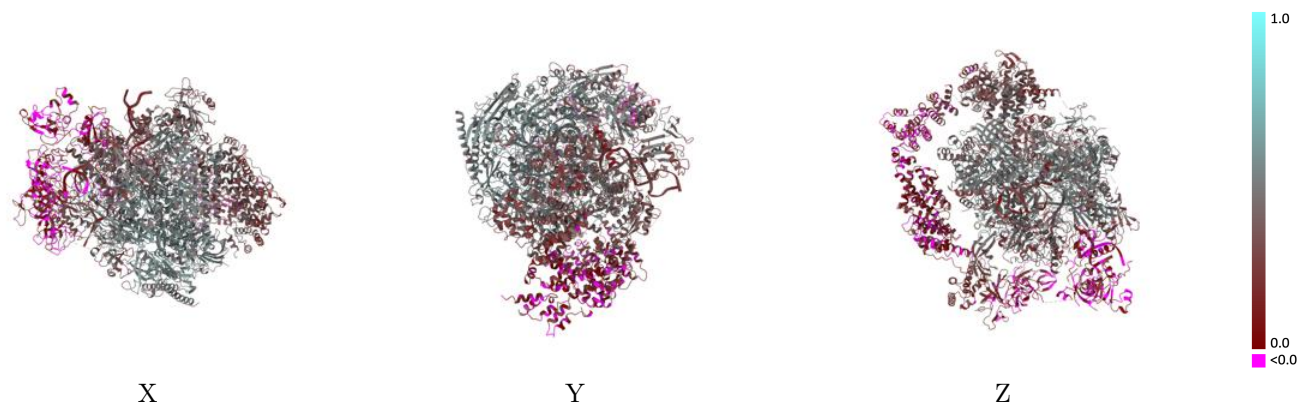
This section contains information regarding the fit between EMDB map EMD-42270 and PDB model 8UHD. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



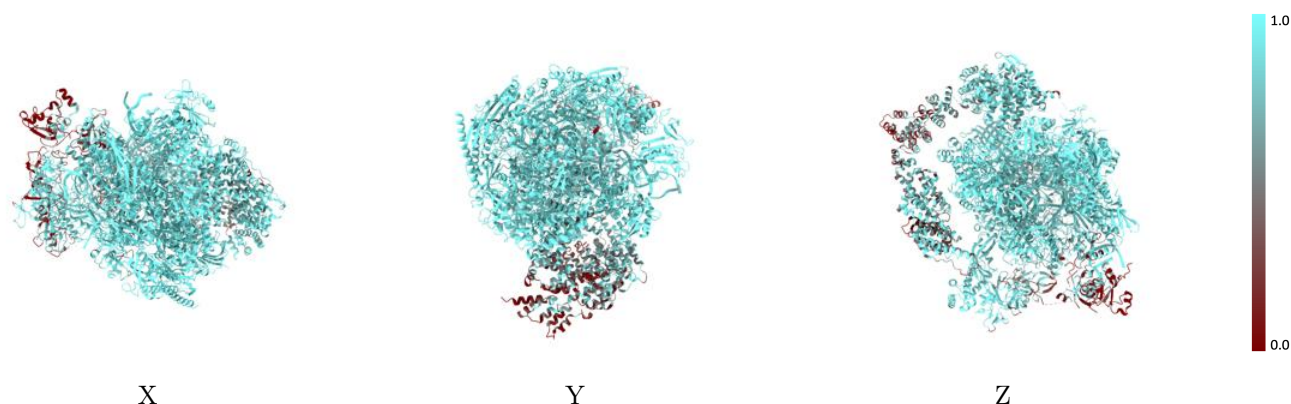
The images above show the 3D surface view of the map at the recommended contour level 0.35 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



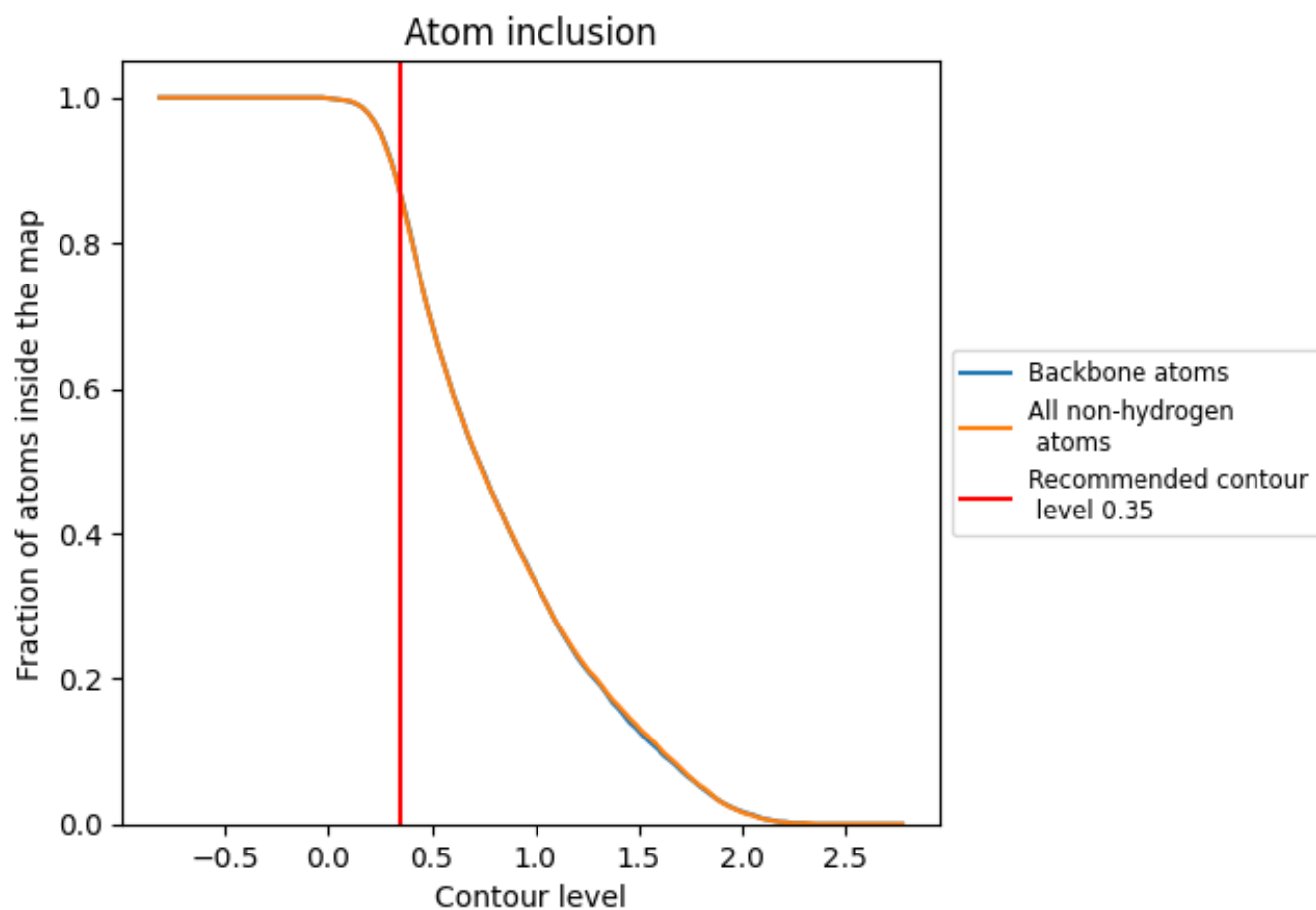
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.35).













































9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 86% 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 (0.35) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8620	 0.3530
A	 0.9550	 0.4520
B	 0.9700	 0.4790
C	 0.9880	 0.5100
D	 0.9700	 0.2000
E	 0.9610	 0.4270
F	 0.9850	 0.4980
G	 0.9690	 0.2560
H	 0.9750	 0.4880
I	 0.9800	 0.4230
J	 0.9860	 0.5220
K	 0.9810	 0.5090
L	 0.9970	 0.4690
N	 0.9190	 0.1830
P	 0.9750	 0.3530
T	 0.9480	 0.2730
U	 0.8630	 0.2750
V	 0.5530	 0.1130
W	 0.7530	 0.2710
X	 0.8930	 0.1880
Y	 0.2660	 0.0640
Z	 0.6110	 0.0770

