



Full wwPDB EM Validation Report ⓘ

Jul 23, 2024 – 08:06 pm BST

PDB ID : 8A3Y
EMDB ID : EMD-15127
Title : Structure of mammalian Pol II-DSIF-SPT6-PAF1-TFIIS-hexasome elongation complex
Authors : Farnung, L.; Ochmann, M.; Garg, G.; Vos, S.M.; Cramer, P.
Deposited on : 2022-06-09
Resolution : 3.30 Å(reported)

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

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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.dev92
Mogul : 1.8.4, CSD as541be (2020)
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) : 2.37.1

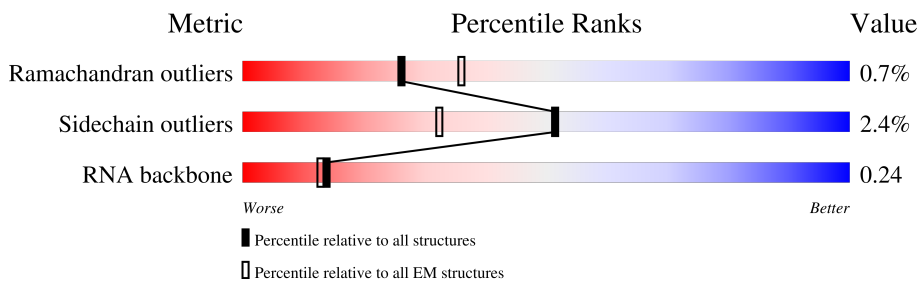
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 Å.

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







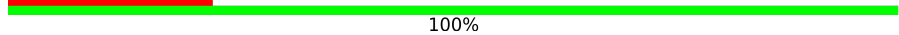

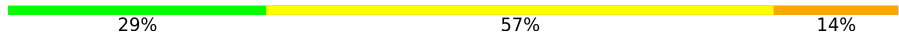

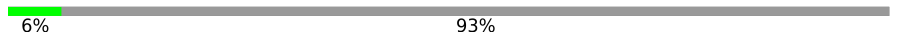



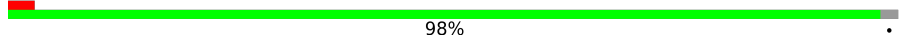

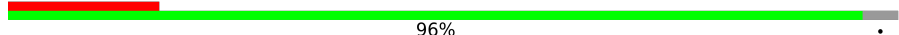







Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	A	1984	
2	B	1251	
3	C	270	
4	D	142	
5	E	210	
6	F	127	
7	G	172	
8	H	150	

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Mol	Chain	Length	Quality of chain
9	I	125	 88% 5% 7%
10	J	67	 79% 19%
11	K	117	 90% 9%
12	L	58	 69% 10% 19%
13	M	1002	 23% 100%
14	N	127	 9% 71% 24% 5%
15	P	28	 29% 57% 14%
16	Q	1845	 16% 48% 52%
16	U	1845	 6% 93%
17	R	248	 72% 96%
18	T	138	 8% 60% 36%
19	V	311	 24% 76% 22%
20	W	305	 98%
21	X	531	 8% 92%
22	Y	121	 17% 96%
23	Z	1087	 12% 46% 53%
24	a	136	 15% 63% 8% 29%
24	e	136	 67% 29%
25	b	103	 5% 73% 8% 19%
25	f	103	 73% 24%
26	c	103	 90% 9%
27	d	95	 86% 13%

2 Entry composition [i](#)

There are 29 unique types of molecules in this entry. The entry contains 125225 atoms, of which 59820 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	22642	7074	11387	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	18007	5684	9027	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	4097	1300	2025	356	410	6		0	0

- Molecule 4 is a protein called RNA polymerase II subunit D.

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	3458	1089	1738	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 DNA-directed RNA polymerases I, II, and III subunit RPABC3.

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 DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
9	I	116	1822	582	880	168	181	11	0	0

- Molecule 10 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
10	J	66	1068	339	544	88	91	6	0	0

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB11-a.

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	786	240	396	77	67	6	0	0

- Molecule 13 is a protein called SPT6.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
13	M	1002	7015	2583	2278	1071	1076	7	0	0

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

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
14	N	127	4051	1239	1420	507	758	127	0	0

- Molecule 15 is a RNA chain called RNA, Template DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
15	P	28	911	271	307	120	185	28	0	0

- Molecule 16 is a protein called RNA polymerase-associated protein CTR9 homolog, RNA polymerase-associated protein LEO1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
16	Q	890	14396	4579	7170	1264	1352	31	0	0
16	U	125	1524	534	672	151	166	1	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	1174	GLU	-	linker	UNP Q6PD62
Q	1175	ASN	-	linker	UNP Q6PD62
Q	1176	LEU	-	linker	UNP Q6PD62
Q	1177	TYR	-	linker	UNP Q6PD62
Q	1178	PHE	-	linker	UNP Q6PD62
Q	1179	GLN	-	linker	UNP Q6PD62
U	-5	GLU	-	linker	UNP Q6PD62
U	-4	ASN	-	linker	UNP Q6PD62
U	-3	LEU	-	linker	UNP Q6PD62
U	-2	TYR	-	linker	UNP Q6PD62
U	-1	PHE	-	linker	UNP Q6PD62
U	0	GLN	-	linker	UNP Q6PD62

- Molecule 17 is a protein called RNA polymerase-associated protein RTF1 homolog.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
17	R	244	3523	1148	1691	340	337	7	0	0

- Molecule 18 is a DNA chain called RNA, Template DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
18	T	138	4353	1331	1550	502	833	137	0	0

- Molecule 19 is a protein called RNA polymerase II-associated factor 1 homolog.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
19	V	244	3136	1061	1433	305	333	4	0	0

- Molecule 20 is a protein called WD repeat-containing protein 61.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
20	W	300	4581	1483	2248	392	454	4	0	0

- Molecule 21 is a protein called Parafibromin.

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

- Molecule 22 is a protein called Transcription elongation factor SPT4.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
22	Y	116	1819	570	908	159	173	9	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Y	-3	GLY	-	expression tag	UNP Q4R941
Y	-2	PRO	-	expression tag	UNP Q4R941
Y	-1	GLY	-	expression tag	UNP Q4R941
Y	0	SER	-	expression tag	UNP Q4R941

- Molecule 23 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms							AltConf	Trace
			Total	C	H	N	O	P	S		
23	Z	510	8063	2550	4040	709	745	1	18	0	0

- Molecule 24 is a protein called Histone H3.2.

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

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 25 is a protein called Histone H4.

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

- Molecule 26 is a protein called Histone H2A.

Mol	Chain	Residues	Atoms					AltConf	Trace	
26	c	103	Total	C	H	N	O		0	0
			1644	501	849	155	139			

- Molecule 27 is a protein called Histone H2B.

Mol	Chain	Residues	Atoms					AltConf	Trace	
27	d	95	Total	C	H	N	O	S	0	0
			1521	469	776	134	140	2		

- Molecule 28 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
28	A	2	Total	Zn	0
			2	2	
28	B	1	Total	Zn	0
			1	1	
28	C	1	Total	Zn	0
			1	1	
28	I	2	Total	Zn	0
			2	2	

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Mol	Chain	Residues	Atoms		AltConf
28	J	1	Total 1	Zn 1	0
28	L	1	Total 1	Zn 1	0
28	Y	1	Total 1	Zn 1	0

- Molecule 29 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
29	P	1	Total 1	Mg 1	0

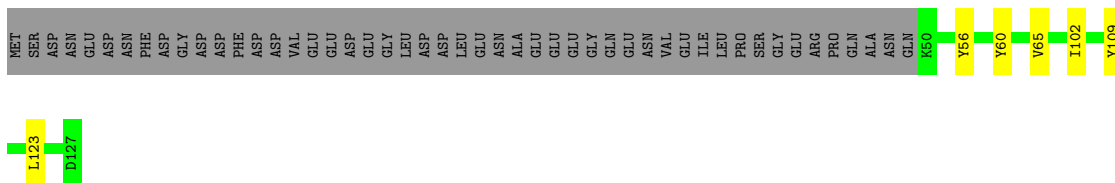
- Molecule 5: DNA-directed RNA polymerase II subunit E

Chain E:  94% 5%



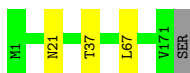
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F:  57% 5% 39%




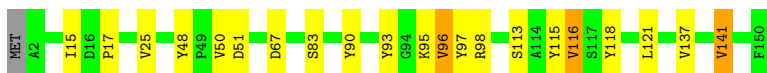
- Molecule 7: DNA-directed RNA polymerase II subunit RPB7

Chain G:  98% ..




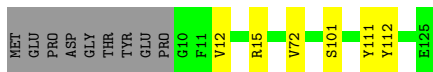
- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain H:  85% 12% ..




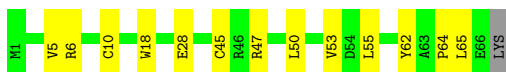
- Molecule 9: DNA-directed RNA polymerase II subunit RPB9

Chain I:  88% 5% 7%




- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain J:  79% 19% .



- Molecule 11: DNA-directed RNA polymerase II subunit RPB11-a

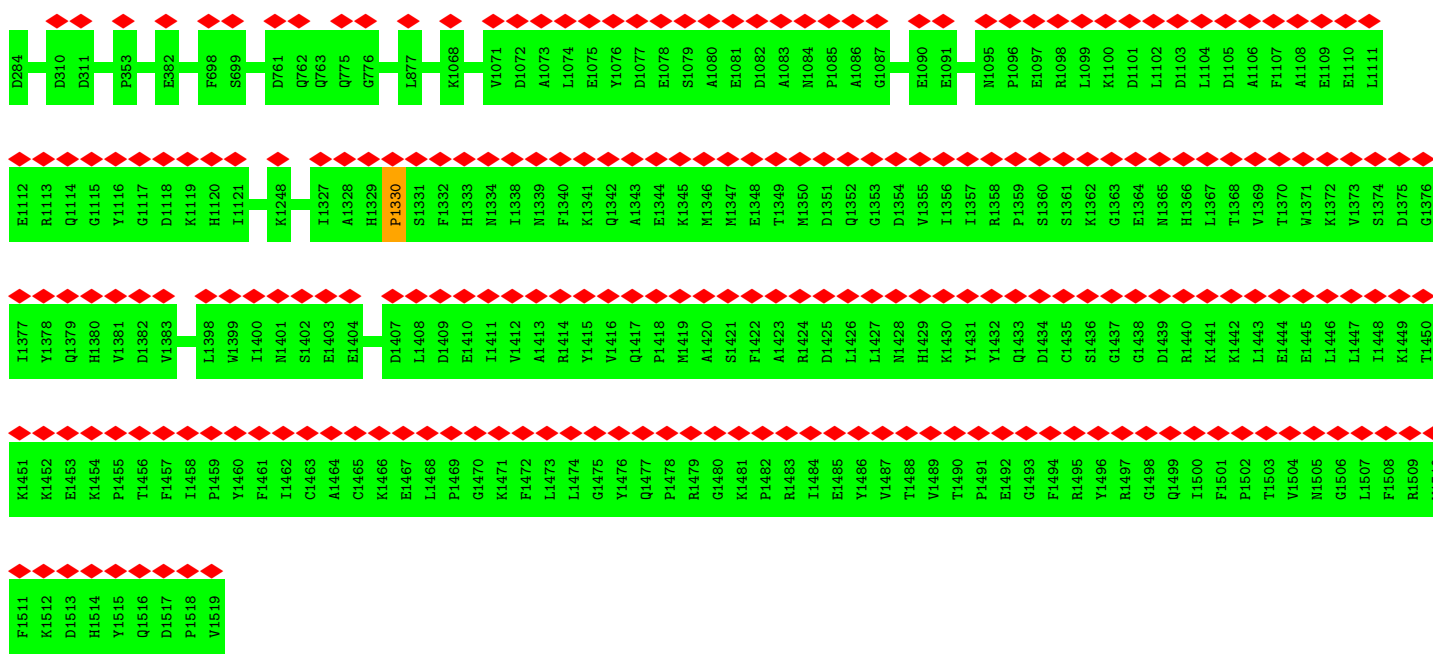
Chain K:  90% 9% .



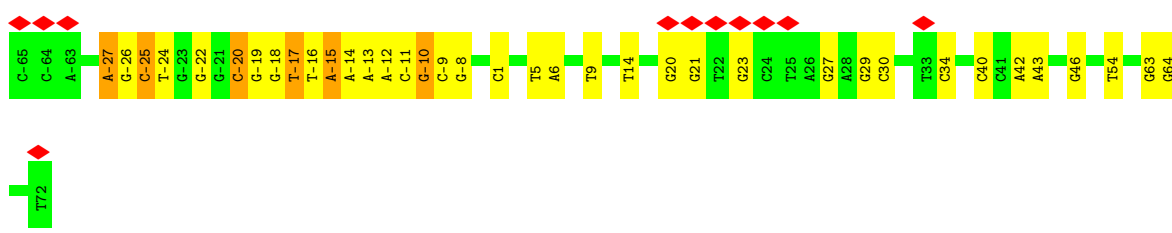
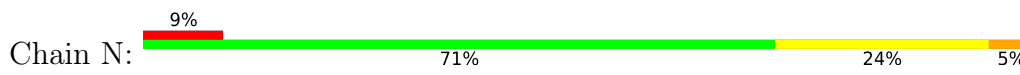
• Molecule 12: RNA polymerase II subunit K



• Molecule 13: SPT6



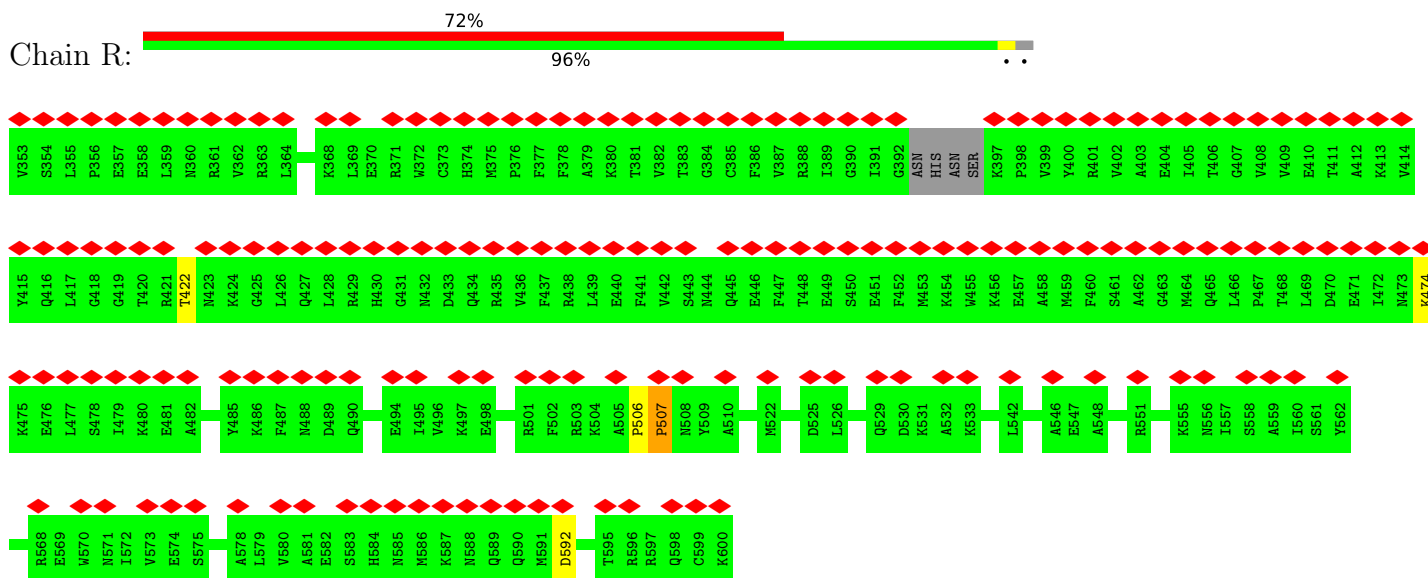
• Molecule 14: Non-template DNA

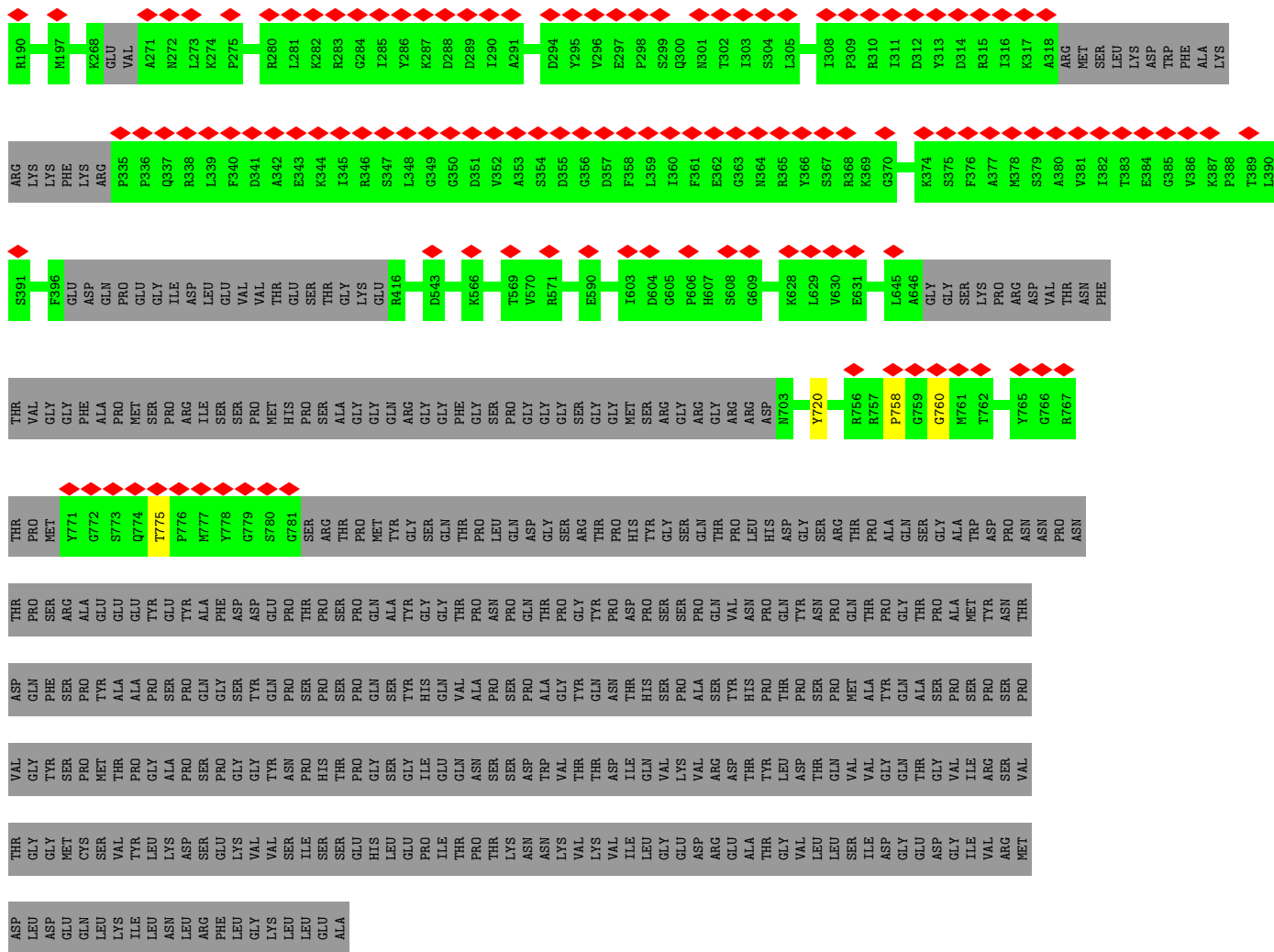


• Molecule 15: RNA, Template DNA

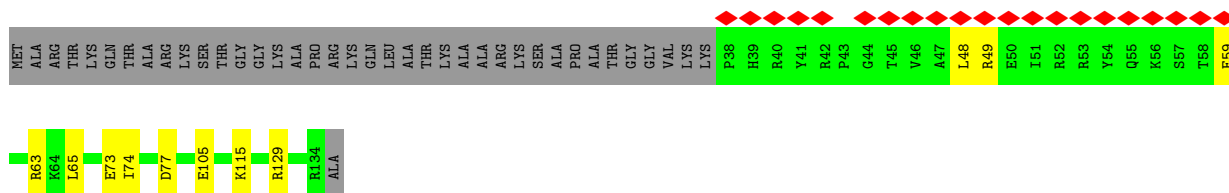


- Molecule 17: RNA polymerase-associated protein RTF1 homolog

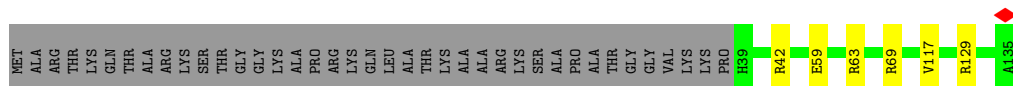




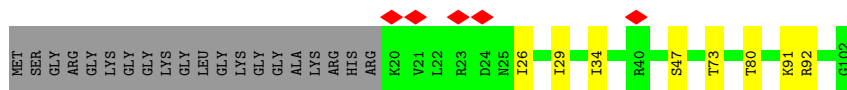
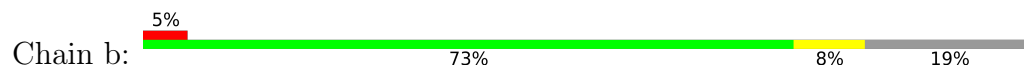
• Molecule 24: Histone H3.2



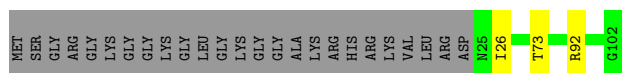
• Molecule 24: Histone H3.2



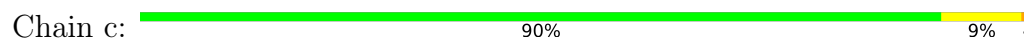
• Molecule 25: Histone H4



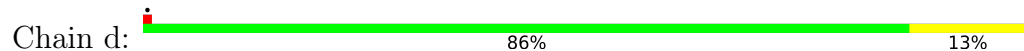
• Molecule 25: Histone H4



• Molecule 26: Histone H2A



• Molecule 27: Histone H2B



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	30000	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.082	Depositor
Minimum map value	-0.036	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.004	Depositor
Map size (Å)	377.99997, 377.99997, 377.99997	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.05, 1.05, 1.05	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, SEP, TPO, ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	1.40	96/11437 (0.8%)	0.89	18/15433 (0.1%)
2	B	1.63	127/9158 (1.4%)	0.97	28/12360 (0.2%)
3	C	1.77	44/2115 (2.1%)	0.96	6/2873 (0.2%)
4	D	0.42	0/1017	0.51	0/1368
5	E	1.29	10/1751 (0.6%)	0.81	1/2366 (0.0%)
6	F	1.69	10/636 (1.6%)	0.89	0/859
7	G	0.76	0/1364	0.63	0/1853
8	H	1.78	31/1219 (2.5%)	0.92	1/1644 (0.1%)
9	I	1.25	4/964 (0.4%)	0.79	0/1305
10	J	1.82	9/533 (1.7%)	1.03	3/719 (0.4%)
11	K	1.67	8/939 (0.9%)	0.92	2/1271 (0.2%)
12	L	1.57	5/395 (1.3%)	1.00	2/525 (0.4%)
13	M	0.26	0/4763	0.48	1/6084 (0.0%)
14	N	1.02	0/2957	1.57	63/4566 (1.4%)
15	P	1.14	3/678 (0.4%)	1.62	22/1055 (2.1%)
16	Q	0.36	0/7365	0.51	0/9927
16	U	0.34	0/864	0.58	2/1173 (0.2%)
17	R	0.39	0/1860	0.56	2/2509 (0.1%)
18	T	1.30	13/3137 (0.4%)	1.55	73/4835 (1.5%)
19	V	0.32	0/1728	0.52	2/2357 (0.1%)
20	W	0.37	0/2392	0.53	0/3257
21	X	0.34	0/356	0.52	0/478
22	Y	0.27	0/927	0.48	0/1250
23	Z	0.45	0/4081	0.55	1/5493 (0.0%)
24	a	0.66	0/814	0.73	0/1092
24	e	0.55	0/812	0.78	3/1088 (0.3%)
25	b	0.67	0/669	0.83	0/894
25	f	0.57	0/626	0.75	0/837
26	c	0.43	0/805	0.61	0/1088
27	d	0.49	0/756	0.64	0/1015
All	All	1.12	360/67118 (0.5%)	0.89	230/91574 (0.3%)

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	2
2	B	0	3
14	N	0	9
17	R	0	1
18	T	0	6
All	All	0	21

All (360) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	791	GLU	CA-CB	-15.45	1.20	1.53
2	B	94	SER	C-N	-11.43	1.07	1.34
8	H	116	VAL	CB-CG1	-9.53	1.32	1.52
18	T	-72	DA	O5'-C5'	9.24	1.65	1.42
2	B	690	CYS	CB-SG	-8.86	1.67	1.82
2	B	1047	TYR	CD1-CE1	-8.55	1.26	1.39
2	B	753	TYR	CD2-CE2	-8.35	1.26	1.39
2	B	548	TRP	CB-CG	-8.30	1.35	1.50
1	A	999	ARG	C-N	-8.24	1.15	1.34
8	H	118	TYR	CD1-CE1	-8.16	1.27	1.39
1	A	1050	CYS	CB-SG	-8.11	1.68	1.82
1	A	886	VAL	CB-CG1	-8.08	1.35	1.52
8	H	118	TYR	CD2-CE2	-8.08	1.27	1.39
2	B	29	VAL	CB-CG2	-8.05	1.35	1.52
1	A	827	TYR	CD2-CE2	-7.88	1.27	1.39
3	C	19	VAL	CB-CG2	-7.77	1.36	1.52
2	B	664	TYR	CD2-CE2	-7.73	1.27	1.39
1	A	1374	VAL	CB-CG2	-7.69	1.36	1.52
1	A	492	TYR	CE2-CZ	-7.61	1.28	1.38
10	J	10	CYS	CB-SG	-7.56	1.69	1.82
1	A	492	TYR	CD2-CE2	-7.50	1.28	1.39
18	T	42	DA	C3'-O3'	-7.42	1.34	1.44
2	B	664	TYR	CD1-CE1	-7.39	1.28	1.39
1	A	514	GLU	CB-CG	-7.35	1.38	1.52
10	J	62	TYR	CD1-CE1	-7.33	1.28	1.39
2	B	1047	TYR	CD2-CE2	-7.24	1.28	1.39
8	H	118	TYR	CE1-CZ	-7.23	1.29	1.38
1	A	1396	ARG	CB-CG	-7.19	1.33	1.52
8	H	48	TYR	CD1-CE1	-7.15	1.28	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	I	72	VAL	CB-CG1	-7.12	1.38	1.52
2	B	108	MET	C-N	-7.11	1.17	1.34
1	A	380	VAL	CB-CG2	-7.09	1.38	1.52
2	B	1047	TYR	CE1-CZ	-7.09	1.29	1.38
2	B	615	TYR	CD1-CE1	-7.03	1.28	1.39
2	B	809	VAL	CB-CG1	-7.02	1.38	1.52
1	A	488	VAL	CB-CG1	-7.00	1.38	1.52
1	A	1379	GLU	CB-CG	-6.98	1.38	1.52
2	B	184	TYR	CD1-CE1	-6.96	1.28	1.39
18	T	45	DG	C3'-O3'	-6.95	1.34	1.44
2	B	753	TYR	CE2-CZ	-6.90	1.29	1.38
1	A	492	TYR	CD1-CE1	-6.90	1.29	1.39
2	B	755	GLN	C-N	-6.90	1.18	1.34
3	C	176	TRP	CE3-CZ3	-6.89	1.26	1.38
10	J	45	CYS	CB-SG	-6.89	1.70	1.82
2	B	662	VAL	CB-CG2	-6.87	1.38	1.52
5	E	191	VAL	CB-CG1	-6.87	1.38	1.52
1	A	560	VAL	CB-CG2	-6.86	1.38	1.52
2	B	1029	TYR	CD2-CE2	-6.84	1.29	1.39
2	B	615	TYR	CD2-CE2	-6.80	1.29	1.39
2	B	693	TYR	CE1-CZ	-6.80	1.29	1.38
3	C	184	PHE	CD1-CE1	-6.78	1.25	1.39
2	B	1047	TYR	CE2-CZ	-6.77	1.29	1.38
2	B	1029	TYR	CE1-CZ	-6.76	1.29	1.38
2	B	120	TYR	CD2-CE2	-6.76	1.29	1.39
2	B	509	VAL	CB-CG1	-6.74	1.38	1.52
2	B	753	TYR	CD1-CE1	-6.74	1.29	1.39
2	B	753	TYR	CE1-CZ	-6.73	1.29	1.38
2	B	1105	GLU	CB-CG	-6.70	1.39	1.52
3	C	186	TYR	CD1-CE1	-6.70	1.29	1.39
2	B	177	CYS	CB-SG	-6.69	1.70	1.82
2	B	504	THR	CB-CG2	-6.68	1.30	1.52
18	T	50	DC	N1-C2	-6.62	1.33	1.40
2	B	1029	TYR	CD1-CE1	-6.61	1.29	1.39
8	H	115	TYR	CD2-CE2	-6.61	1.29	1.39
6	F	60	TYR	CD1-CE1	-6.61	1.29	1.39
3	C	184	PHE	CD2-CE2	-6.60	1.26	1.39
1	A	815	TYR	CD1-CE1	-6.58	1.29	1.39
6	F	109	TYR	CD1-CE1	-6.58	1.29	1.39
8	H	97	TYR	CE2-CZ	-6.58	1.29	1.38
1	A	815	TYR	CD2-CE2	-6.56	1.29	1.39
2	B	750	VAL	CB-CG2	-6.56	1.39	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	801	VAL	CB-CG1	-6.56	1.39	1.52
2	B	806	PHE	CD1-CE1	-6.55	1.26	1.39
12	L	55	PHE	CB-CG	-6.53	1.40	1.51
3	C	229	PHE	CD1-CE1	-6.52	1.26	1.39
2	B	811	TYR	CE1-CZ	-6.49	1.30	1.38
8	H	115	TYR	CE2-CZ	-6.49	1.30	1.38
3	C	172	GLU	CB-CG	-6.49	1.39	1.52
3	C	169	PHE	CD2-CE2	-6.47	1.26	1.39
18	T	44	DT	C3'-O3'	-6.47	1.35	1.44
1	A	787	VAL	CB-CG2	-6.46	1.39	1.52
2	B	26	CYS	CB-SG	-6.46	1.71	1.82
3	C	186	TYR	CD2-CE2	-6.46	1.29	1.39
2	B	693	TYR	CD1-CE1	-6.46	1.29	1.39
8	H	90	TYR	CD1-CE1	-6.45	1.29	1.39
2	B	193	VAL	CB-CG2	-6.42	1.39	1.52
18	T	50	DC	N1-C6	-6.39	1.33	1.37
1	A	835	GLU	CB-CG	-6.36	1.40	1.52
2	B	622	CYS	CB-SG	-6.36	1.71	1.82
1	A	871	VAL	CB-CG1	-6.35	1.39	1.52
1	A	1140	THR	CA-CB	-6.35	1.36	1.53
3	C	169	PHE	CD1-CE1	-6.33	1.26	1.39
1	A	827	TYR	CD1-CE1	-6.32	1.29	1.39
2	B	922	ARG	CB-CG	-6.31	1.35	1.52
1	A	521	VAL	CB-CG2	-6.31	1.39	1.52
1	A	891	TYR	CD1-CE1	-6.28	1.29	1.39
10	J	62	TYR	CE1-CZ	-6.28	1.30	1.38
2	B	919	CYS	CB-SG	-6.28	1.71	1.82
10	J	5	VAL	CB-CG2	-6.28	1.39	1.52
5	E	191	VAL	CB-CG2	-6.26	1.39	1.52
6	F	109	TYR	CD2-CE2	-6.25	1.29	1.39
3	C	231	TYR	CD2-CE2	-6.24	1.29	1.39
2	B	33	TYR	CE1-CZ	-6.23	1.30	1.38
2	B	984	CYS	CB-SG	-6.23	1.71	1.82
2	B	752	TYR	CE2-CZ	-6.22	1.30	1.38
1	A	630	VAL	CB-CG1	-6.22	1.39	1.52
2	B	805	PHE	CD2-CE2	-6.22	1.26	1.39
6	F	60	TYR	CE1-CZ	-6.22	1.30	1.38
2	B	809	VAL	CB-CG2	-6.21	1.39	1.52
11	K	56	VAL	CB-CG1	-6.21	1.39	1.52
1	A	590	GLN	CG-CD	-6.20	1.36	1.51
1	A	669	TYR	CD2-CE2	-6.19	1.30	1.39
2	B	949	TYR	CD1-CE1	-6.18	1.30	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	H	90	TYR	CD2-CE2	-6.18	1.30	1.39
12	L	45	TYR	CE1-CZ	-6.17	1.30	1.38
18	T	43	DG	C3'-O3'	-6.17	1.35	1.44
2	B	1029	TYR	CE2-CZ	-6.16	1.30	1.38
8	H	98	ARG	CB-CG	-6.13	1.35	1.52
8	H	115	TYR	CE1-CZ	-6.10	1.30	1.38
2	B	236	TRP	CB-CG	-6.10	1.39	1.50
2	B	198	GLU	CB-CG	-6.09	1.40	1.52
2	B	193	VAL	CB-CG1	-6.09	1.40	1.52
1	A	474	VAL	CB-CG1	-6.08	1.40	1.52
1	A	873	VAL	CB-CG2	-6.06	1.40	1.52
11	K	75	VAL	CB-CG2	-6.06	1.40	1.52
2	B	923	VAL	CB-CG1	-6.05	1.40	1.52
1	A	590	GLN	CB-CG	-6.05	1.36	1.52
2	B	924	ARG	CB-CG	-6.04	1.36	1.52
18	T	50	DC	C1'-N1	-6.04	1.38	1.47
8	H	141	VAL	CB-CG2	-6.04	1.40	1.52
12	L	45	TYR	CD1-CE1	-6.03	1.30	1.39
2	B	707	CYS	CB-SG	-6.02	1.72	1.82
3	C	104	ASP	CA-CB	-6.01	1.40	1.53
2	B	367	TYR	CD1-CE1	-5.97	1.30	1.39
18	T	41	DG	C3'-O3'	-5.97	1.36	1.44
2	B	184	TYR	CE1-CZ	-5.96	1.30	1.38
8	H	115	TYR	CD1-CE1	-5.96	1.30	1.39
1	A	827	TYR	CE2-CZ	-5.95	1.30	1.38
3	C	186	TYR	CE1-CZ	-5.94	1.30	1.38
18	T	50	DC	N3-C4	-5.93	1.29	1.33
3	C	197	TYR	CE2-CZ	-5.93	1.30	1.38
3	C	186	TYR	CE2-CZ	-5.92	1.30	1.38
3	C	151	VAL	CB-CG1	-5.91	1.40	1.52
1	A	366	VAL	CB-CG1	-5.90	1.40	1.52
2	B	92	TYR	CD1-CE1	-5.90	1.30	1.39
3	C	231	TYR	CD1-CE1	-5.89	1.30	1.39
3	C	197	TYR	CE1-CZ	-5.89	1.30	1.38
2	B	806	PHE	CD2-CE2	-5.88	1.27	1.39
10	J	6	ARG	CB-CG	-5.87	1.36	1.52
1	A	377	GLN	CB-CG	-5.85	1.36	1.52
1	A	458	PHE	CD1-CE1	-5.85	1.27	1.39
2	B	184	TYR	CD2-CE2	-5.84	1.30	1.39
8	H	96	VAL	CB-CG1	-5.83	1.40	1.52
1	A	657	TYR	CD1-CE1	-5.83	1.30	1.39
15	P	29	A	N9-C4	-5.81	1.34	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	697	GLU	CG-CD	-5.80	1.43	1.51
8	H	90	TYR	CE2-CZ	-5.80	1.31	1.38
1	A	669	TYR	CD1-CE1	-5.80	1.30	1.39
1	A	669	TYR	CE2-CZ	-5.79	1.31	1.38
2	B	1020	TYR	CD1-CE1	-5.79	1.30	1.39
2	B	907	VAL	CB-CG1	-5.77	1.40	1.52
1	A	771	VAL	CB-CG2	-5.74	1.40	1.52
2	B	794	VAL	CB-CG2	-5.74	1.40	1.52
2	B	1047	TYR	CG-CD1	-5.74	1.31	1.39
2	B	184	TYR	CE2-CZ	-5.74	1.31	1.38
2	B	1149	VAL	CB-CG2	-5.74	1.40	1.52
2	B	811	TYR	CD1-CE1	-5.74	1.30	1.39
12	L	45	TYR	CD2-CE2	-5.73	1.30	1.39
2	B	788	TYR	CE1-CZ	-5.71	1.31	1.38
3	C	197	TYR	CD1-CE1	-5.71	1.30	1.39
1	A	482	PHE	CD2-CE2	-5.71	1.27	1.39
2	B	1093	CYS	CB-SG	-5.71	1.72	1.81
1	A	784	VAL	CB-CG1	-5.70	1.40	1.52
2	B	788	TYR	CD2-CE2	-5.69	1.30	1.39
15	P	25	A	N9-C4	-5.67	1.34	1.37
2	B	120	TYR	CD1-CE1	-5.67	1.30	1.39
2	B	697	GLU	CB-CG	-5.67	1.41	1.52
1	A	447	GLU	CB-CG	-5.67	1.41	1.52
1	A	556	GLU	CB-CG	-5.67	1.41	1.52
1	A	1375	ARG	CG-CD	-5.67	1.37	1.51
11	K	97	GLU	CB-CG	-5.66	1.41	1.52
1	A	556	GLU	CG-CD	-5.66	1.43	1.51
8	H	48	TYR	CE1-CZ	-5.66	1.31	1.38
2	B	814	TYR	CD1-CE1	-5.65	1.30	1.39
5	E	209	VAL	CB-CG2	-5.64	1.41	1.52
2	B	788	TYR	CD1-CE1	-5.64	1.30	1.39
3	C	169	PHE	CB-CG	-5.64	1.41	1.51
1	A	406	VAL	CB-CG1	-5.64	1.41	1.52
1	A	901	VAL	CB-CG2	-5.64	1.41	1.52
1	A	815	TYR	CE2-CZ	-5.63	1.31	1.38
1	A	810	PHE	CD2-CE2	-5.62	1.28	1.39
2	B	176	GLU	CB-CG	-5.62	1.41	1.52
2	B	191	GLU	CG-CD	-5.62	1.43	1.51
2	B	568	PHE	CD1-CE1	-5.62	1.28	1.39
2	B	510	CYS	CB-SG	-5.61	1.72	1.81
11	K	63	VAL	CB-CG1	-5.61	1.41	1.52
3	C	19	VAL	CB-CG1	-5.61	1.41	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	785	TYR	CD2-CE2	-5.60	1.30	1.39
2	B	1027	VAL	CB-CG2	-5.60	1.41	1.52
2	B	814	TYR	CE2-CZ	-5.58	1.31	1.38
2	B	1153	TYR	CE2-CZ	-5.58	1.31	1.38
5	E	26	TYR	CD1-CE1	-5.58	1.30	1.39
5	E	203	TYR	CD2-CE2	-5.58	1.30	1.39
2	B	949	TYR	CD2-CE2	-5.57	1.30	1.39
1	A	500	GLU	CB-CG	-5.57	1.41	1.52
15	P	30	C	N1-C6	-5.57	1.33	1.37
3	C	185	GLU	CB-CG	-5.56	1.41	1.52
8	H	50	VAL	CB-CG2	-5.56	1.41	1.52
1	A	618	TYR	CD2-CE2	-5.56	1.31	1.39
3	C	229	PHE	CD2-CE2	-5.55	1.28	1.39
6	F	102	ILE	C-N	-5.55	1.23	1.34
3	C	230	TYR	CD1-CE1	-5.55	1.31	1.39
2	B	367	TYR	CD2-CE2	-5.54	1.31	1.39
3	C	45	ILE	CB-CG2	-5.54	1.35	1.52
8	H	115	TYR	CG-CD1	-5.54	1.31	1.39
1	A	554	PHE	CD1-CE1	-5.53	1.28	1.39
2	B	671	GLU	CB-CG	-5.53	1.41	1.52
1	A	378	VAL	CB-CG1	-5.52	1.41	1.52
11	K	61	TYR	CD1-CE1	-5.52	1.31	1.39
1	A	446	VAL	CB-CG2	-5.52	1.41	1.52
8	H	93	TYR	CD1-CE1	-5.51	1.31	1.39
1	A	810	PHE	CD1-CE1	-5.50	1.28	1.39
1	A	479	TRP	CB-CG	-5.50	1.40	1.50
1	A	1471	PHE	CD1-CE1	-5.49	1.28	1.39
2	B	466	VAL	CB-CG2	-5.49	1.41	1.52
9	I	111	TYR	CD2-CE2	-5.49	1.31	1.39
3	C	37	VAL	CB-CG1	-5.48	1.41	1.52
1	A	548	PHE	CD2-CE2	-5.48	1.28	1.39
3	C	224	GLY	C-N	-5.48	1.21	1.34
2	B	791	GLU	CB-CG	-5.47	1.41	1.52
1	A	64	VAL	CB-CG1	-5.46	1.41	1.52
2	B	1048	TYR	CB-CG	-5.45	1.43	1.51
2	B	1018	TYR	CD1-CE1	-5.45	1.31	1.39
6	F	60	TYR	CD2-CE2	-5.45	1.31	1.39
2	B	752	TYR	CD2-CE2	-5.45	1.31	1.39
1	A	970	PHE	CB-CG	-5.43	1.42	1.51
11	K	61	TYR	CD2-CE2	-5.43	1.31	1.39
1	A	891	TYR	CD2-CE2	-5.43	1.31	1.39
1	A	657	TYR	CD2-CE2	-5.42	1.31	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	H	118	TYR	CE2-CZ	-5.42	1.31	1.38
3	C	231	TYR	CE2-CZ	-5.41	1.31	1.38
6	F	60	TYR	CE2-CZ	-5.41	1.31	1.38
3	C	231	TYR	CE1-CZ	-5.41	1.31	1.38
1	A	1085	GLU	CB-CG	-5.41	1.41	1.52
2	B	1088	GLU	CB-CG	-5.41	1.41	1.52
1	A	891	TYR	CE1-CZ	-5.39	1.31	1.38
1	A	566	PHE	CD1-CE1	-5.39	1.28	1.39
2	B	766	TYR	CD2-CE2	-5.39	1.31	1.39
8	H	25	VAL	CB-CG1	-5.37	1.41	1.52
11	K	102	GLU	CB-CG	-5.37	1.42	1.52
2	B	661	VAL	CB-CG1	-5.37	1.41	1.52
1	A	1087	VAL	CB-CG1	-5.37	1.41	1.52
1	A	553	VAL	CB-CG2	-5.36	1.41	1.52
3	C	158	GLU	CB-CG	-5.36	1.42	1.52
2	B	766	TYR	CD1-CE1	-5.35	1.31	1.39
5	E	206	TYR	CD1-CE1	-5.35	1.31	1.39
1	A	634	GLU	CB-CG	-5.34	1.42	1.52
1	A	886	VAL	CB-CG2	-5.34	1.41	1.52
1	A	978	VAL	CB-CG1	-5.33	1.41	1.52
2	B	664	TYR	CB-CG	-5.32	1.43	1.51
8	H	137	VAL	CB-CG2	-5.31	1.41	1.52
2	B	860	VAL	CB-CG2	-5.31	1.41	1.52
1	A	382	ARG	CB-CG	-5.30	1.38	1.52
1	A	26	LEU	C-N	-5.30	1.21	1.34
2	B	615	TYR	CE1-CZ	-5.30	1.31	1.38
8	H	90	TYR	CE1-CZ	-5.30	1.31	1.38
11	K	68	GLU	CB-CG	-5.29	1.42	1.52
2	B	752	TYR	CB-CG	-5.29	1.43	1.51
1	A	514	GLU	CG-CD	-5.29	1.44	1.51
18	T	49	DT	N1-C2	-5.28	1.33	1.38
1	A	21	VAL	CB-CG2	-5.28	1.41	1.52
18	T	44	DT	N1-C6	-5.28	1.34	1.38
1	A	679	TRP	CE3-CZ3	-5.28	1.29	1.38
3	C	101	PHE	CD2-CE2	-5.28	1.28	1.39
6	F	56	TYR	CD1-CE1	-5.28	1.31	1.39
9	I	111	TYR	CD1-CE1	-5.27	1.31	1.39
2	B	568	PHE	CD2-CE2	-5.27	1.28	1.39
10	J	62	TYR	CD2-CE2	-5.27	1.31	1.39
1	A	787	VAL	CB-CG1	-5.26	1.41	1.52
2	B	176	GLU	CG-CD	-5.26	1.44	1.51
3	C	197	TYR	CG-CD1	-5.26	1.32	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	970	PHE	CD1-CE1	-5.26	1.28	1.39
2	B	736	TYR	CD2-CE2	-5.25	1.31	1.39
1	A	458	PHE	CD2-CE2	-5.24	1.28	1.39
2	B	735	VAL	CB-CG2	-5.24	1.41	1.52
2	B	904	VAL	CB-CG2	-5.24	1.41	1.52
5	E	194	ILE	C-N	-5.24	1.22	1.34
8	H	115	TYR	CG-CD2	-5.24	1.32	1.39
3	C	184	PHE	CB-CG	-5.24	1.42	1.51
2	B	1153	TYR	CD2-CE2	-5.23	1.31	1.39
5	E	206	TYR	CD2-CE2	-5.23	1.31	1.39
2	B	1006	VAL	CB-CG2	-5.22	1.41	1.52
3	C	197	TYR	CD2-CE2	-5.22	1.31	1.39
12	L	54	VAL	CB-CG2	-5.21	1.42	1.52
3	C	9	VAL	CB-CG2	-5.21	1.42	1.52
1	A	770	VAL	CB-CG1	-5.21	1.42	1.52
5	E	11	TRP	CB-CG	-5.20	1.40	1.50
9	I	112	TYR	CD1-CE1	-5.20	1.31	1.39
3	C	234	GLU	CB-CG	-5.20	1.42	1.52
1	A	713	VAL	CB-CG2	-5.20	1.42	1.52
6	F	65	VAL	CB-CG1	-5.19	1.42	1.52
2	B	369	VAL	CB-CG2	-5.19	1.42	1.52
2	B	523	VAL	CB-CG1	-5.19	1.42	1.52
3	C	50	VAL	CB-CG2	-5.18	1.42	1.52
2	B	743	ARG	CG-CD	-5.18	1.39	1.51
2	B	753	TYR	CG-CD2	-5.18	1.32	1.39
3	C	176	TRP	CB-CG	-5.17	1.41	1.50
2	B	1048	TYR	CD1-CE1	-5.17	1.31	1.39
1	A	492	TYR	CG-CD2	-5.15	1.32	1.39
1	A	669	TYR	CG-CD1	-5.15	1.32	1.39
2	B	923	VAL	CB-CG2	-5.15	1.42	1.52
2	B	750	VAL	CB-CG1	-5.15	1.42	1.52
1	A	827	TYR	CG-CD2	-5.14	1.32	1.39
5	E	203	TYR	CD1-CE1	-5.13	1.31	1.39
1	A	978	VAL	CB-CG2	-5.12	1.42	1.52
8	H	97	TYR	CD2-CE2	-5.12	1.31	1.39
2	B	120	TYR	CE2-CZ	-5.12	1.31	1.38
2	B	33	TYR	CD1-CE1	-5.12	1.31	1.39
2	B	918	PHE	CD2-CE2	-5.11	1.29	1.39
3	C	21	PHE	CD2-CE2	-5.11	1.29	1.39
1	A	570	TRP	CE3-CZ3	-5.11	1.29	1.38
3	C	101	PHE	CD1-CE1	-5.10	1.29	1.39
3	C	164	TYR	CD1-CE1	-5.10	1.31	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1402	CYS	CB-SG	-5.10	1.73	1.81
10	J	18	TRP	CB-CG	-5.09	1.41	1.50
1	A	554	PHE	CD2-CE2	-5.09	1.29	1.39
1	A	392	GLU	CB-CG	-5.08	1.42	1.52
2	B	666	ASP	CB-CG	-5.08	1.41	1.51
2	B	782	ILE	CB-CG2	-5.08	1.37	1.52
3	C	203	TRP	CB-CG	-5.08	1.41	1.50
2	B	811	TYR	CG-CD1	-5.08	1.32	1.39
3	C	230	TYR	CD2-CE2	-5.08	1.31	1.39
1	A	548	PHE	CE1-CZ	-5.08	1.27	1.37
10	J	53	VAL	CB-CG2	-5.08	1.42	1.52
2	B	945	CYS	CB-SG	-5.07	1.73	1.81
8	H	48	TYR	CD2-CE2	-5.07	1.31	1.39
8	H	115	TYR	CB-CG	-5.07	1.44	1.51
2	B	1018	TYR	CD2-CE2	-5.06	1.31	1.39
1	A	618	TYR	CD1-CE1	-5.06	1.31	1.39
2	B	785	TYR	CD1-CE1	-5.06	1.31	1.39
2	B	466	VAL	CB-CG1	-5.05	1.42	1.52
1	A	521	VAL	CB-CG1	-5.05	1.42	1.52
1	A	1392	TYR	CD2-CE2	-5.05	1.31	1.39
2	B	801	VAL	CB-CG2	-5.04	1.42	1.52
3	C	49	TRP	CB-CG	-5.04	1.41	1.50
2	B	926	VAL	CB-CG1	-5.04	1.42	1.52
1	A	675	VAL	CB-CG1	-5.04	1.42	1.52
8	H	98	ARG	CG-CD	-5.04	1.39	1.51
8	H	116	VAL	CB-CG2	-5.04	1.42	1.52
1	A	586	TRP	CD2-CE2	-5.03	1.35	1.41
18	T	44	DT	C2-N3	-5.03	1.33	1.37
1	A	570	TRP	CB-CG	-5.03	1.41	1.50
2	B	788	TYR	CE2-CZ	-5.03	1.32	1.38
1	A	458	PHE	CB-CG	-5.02	1.42	1.51
8	H	97	TYR	CE1-CZ	-5.02	1.32	1.38
1	A	479	TRP	CE3-CZ3	-5.01	1.29	1.38
2	B	736	TYR	CD1-CE1	-5.01	1.31	1.39
6	F	56	TYR	CD2-CE2	-5.01	1.31	1.39
1	A	81	CYS	CB-SG	-5.00	1.73	1.81
2	B	829	PHE	CD1-CE1	-5.00	1.29	1.39

All (230) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	P	25	A	C8-N9-C4	-13.83	100.27	105.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	P	25	A	N7-C8-N9	12.65	120.13	113.80
14	N	20	DG	O3'-P-O5'	-11.99	81.22	104.00
15	P	26	C	C6-N1-C2	-11.05	115.88	120.30
14	N	-15	DA	N1-C6-N6	-10.51	112.29	118.60
3	C	224	GLY	C-N-CA	10.23	147.27	121.70
14	N	20	DG	OP2-P-O3'	-10.02	83.17	105.20
18	T	16	DA	N1-C6-N6	-9.83	112.70	118.60
15	P	24	A	C8-N9-C4	-9.38	102.05	105.80
15	P	25	A	C5-N7-C8	-9.30	99.25	103.90
14	N	-13	DA	N1-C6-N6	-9.12	113.13	118.60
18	T	51	DT	O5'-P-OP1	-9.07	97.53	105.70
1	A	457	ILE	CG1-CB-CG2	-8.93	91.75	111.40
18	T	17	DA	N1-C6-N6	-8.78	113.33	118.60
14	N	14	DT	O4'-C1'-N1	8.73	114.11	108.00
15	P	24	A	N1-C2-N3	8.49	133.54	129.30
14	N	21	DG	O4'-C1'-N9	8.42	113.89	108.00
14	N	-27	DA	N1-C6-N6	-8.26	113.64	118.60
18	T	50	DC	OP1-P-O3'	8.24	123.33	105.20
14	N	-12	DA	N1-C6-N6	-8.18	113.69	118.60
2	B	473	LEU	CB-CG-CD2	-8.06	97.30	111.00
18	T	26	DC	N3-C2-O2	-8.01	116.29	121.90
14	N	34	DC	P-O3'-C3'	8.00	129.30	119.70
2	B	411	LEU	CB-CG-CD2	-7.97	97.46	111.00
14	N	-14	DA	N1-C6-N6	-7.88	113.87	118.60
14	N	64	DG	P-O3'-C3'	7.88	129.16	119.70
18	T	24	DA	N1-C6-N6	-7.83	113.90	118.60
14	N	5	DT	O4'-C1'-N1	7.77	113.44	108.00
18	T	-47	DT	O4'-C1'-N1	7.64	113.35	108.00
15	P	25	A	N9-C4-C5	7.62	108.85	105.80
18	T	-53	DG	P-O3'-C3'	7.54	128.75	119.70
2	B	583	LEU	CB-CG-CD1	-7.48	98.28	111.00
14	N	-27	DA	C5-C6-N1	7.42	121.41	117.70
15	P	24	A	N9-C4-C5	7.39	108.75	105.80
2	B	567	ILE	CG1-CB-CG2	-7.33	95.27	111.40
1	A	484	LEU	CB-CG-CD2	-7.25	98.67	111.00
2	B	545	LEU	CB-CG-CD2	-7.24	98.69	111.00
18	T	17	DA	C4-C5-C6	-7.23	113.39	117.00
18	T	-21	DC	O4'-C1'-N1	7.22	113.06	108.00
14	N	-12	DA	C5-C6-N1	7.20	121.30	117.70
14	N	-9	DC	N3-C2-O2	-7.17	116.88	121.90
18	T	10	DC	N3-C2-O2	-7.14	116.90	121.90
14	N	-15	DA	C4-C5-C6	-7.12	113.44	117.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
18	T	-31	DA	O4'-C1'-N9	7.12	112.98	108.00
1	A	524	MET	CG-SD-CE	-7.09	88.85	100.20
14	N	63	DG	P-O3'-C3'	7.08	128.20	119.70
18	T	7	DC	N3-C2-O2	-7.07	116.95	121.90
15	P	27	C	C6-N1-C2	-7.05	117.48	120.30
14	N	-25	DC	N3-C2-O2	-7.01	116.99	121.90
18	T	16	DA	C4-C5-C6	-6.97	113.52	117.00
3	C	68	LEU	CB-CG-CD1	-6.96	99.17	111.00
2	B	668	LEU	CB-CG-CD2	-6.94	99.20	111.00
14	N	-8	DG	O4'-C1'-N9	6.93	112.85	108.00
18	T	28	DC	N3-C2-O2	-6.92	117.06	121.90
14	N	54	DT	P-O3'-C3'	6.92	128.00	119.70
18	T	11	DG	O4'-C1'-N9	6.91	112.83	108.00
18	T	17	DA	C5-C6-N1	6.90	121.15	117.70
14	N	-13	DA	C4-C5-C6	-6.89	113.56	117.00
15	P	26	C	N3-C2-O2	-6.88	117.09	121.90
18	T	26	DC	N1-C2-O2	6.87	123.02	118.90
17	R	507	PRO	N-CA-CB	6.86	111.53	103.30
18	T	18	DC	N3-C2-O2	-6.82	117.12	121.90
14	N	-15	DA	C5-C6-N1	6.81	121.11	117.70
18	T	-51	DC	P-O3'-C3'	6.80	127.86	119.70
14	N	23	DG	O4'-C1'-N9	6.79	112.75	108.00
14	N	21	DG	P-O3'-C3'	6.78	127.84	119.70
1	A	542	LEU	CB-CG-CD2	-6.75	99.53	111.00
14	N	-14	DA	C5-C6-N1	6.69	121.05	117.70
18	T	16	DA	C5-C6-N1	6.67	121.03	117.70
15	P	24	A	C6-N1-C2	-6.64	114.61	118.60
18	T	-12	DC	P-O3'-C3'	6.62	127.65	119.70
18	T	23	DC	N3-C2-O2	-6.58	117.30	121.90
14	N	-13	DA	C5-C6-N1	6.57	120.98	117.70
18	T	24	DA	C4-C5-C6	-6.57	113.72	117.00
14	N	-17	DT	P-O3'-C3'	6.56	127.57	119.70
3	C	67	ARG	NE-CZ-NH2	-6.55	117.03	120.30
1	A	1396	ARG	CG-CD-NE	-6.54	98.06	111.80
18	T	-63	DC	P-O3'-C3'	6.54	127.55	119.70
18	T	-13	DA	P-O3'-C3'	6.53	127.53	119.70
15	P	22	G	O4'-C1'-N9	6.51	113.41	108.20
18	T	46	DG	O4'-C4'-C3'	-6.50	101.90	104.50
14	N	42	DA	P-O3'-C3'	6.47	127.47	119.70
14	N	30	DC	O4'-C1'-N1	6.44	112.51	108.00
15	P	25	A	N3-C4-N9	-6.44	122.25	127.40
1	A	1090	LEU	CB-CG-CD2	-6.43	100.06	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
18	T	22	DC	N3-C2-O2	-6.43	117.40	121.90
14	N	-27	DA	C4-C5-C6	-6.43	113.78	117.00
18	T	29	DC	N3-C2-O2	-6.43	117.40	121.90
18	T	21	DC	N3-C2-O2	-6.41	117.41	121.90
14	N	-11	DC	N3-C2-O2	-6.40	117.42	121.90
2	B	848	LEU	CB-CG-CD1	-6.39	100.14	111.00
24	e	63	ARG	NE-CZ-NH2	6.38	123.49	120.30
14	N	-20	DC	N3-C2-O2	-6.34	117.46	121.90
18	T	43	DG	O4'-C4'-C3'	-6.33	101.97	104.50
18	T	29	DC	O4'-C1'-N1	6.32	112.43	108.00
14	N	21	DG	O5'-P-OP2	6.32	118.28	110.70
2	B	505	LEU	CA-CB-CG	6.32	129.82	115.30
19	V	258	PRO	N-CA-CB	6.31	110.87	103.30
14	N	20	DG	P-O3'-C3'	6.30	127.26	119.70
14	N	-14	DA	C4-C5-C6	-6.25	113.87	117.00
2	B	501	LEU	CB-CG-CD2	-6.25	100.37	111.00
18	T	24	DA	C5-C6-N1	6.25	120.82	117.70
1	A	486	LEU	CB-CG-CD2	-6.24	100.40	111.00
17	R	506	PRO	N-CA-CB	6.16	110.70	103.30
18	T	44	DT	O4'-C4'-C3'	-6.16	102.04	104.50
14	N	20	DG	C3'-C2'-C1'	-6.11	95.17	102.50
18	T	19	DC	N3-C2-O2	-6.09	117.64	121.90
2	B	163	LEU	CB-CG-CD2	-6.09	100.65	111.00
1	A	1095	LEU	CB-CG-CD2	-6.08	100.67	111.00
1	A	1463	LEU	CB-CG-CD1	-6.08	100.67	111.00
11	K	100	LEU	CB-CG-CD2	-6.07	100.68	111.00
2	B	411	LEU	CA-CB-CG	6.06	129.24	115.30
14	N	9	DT	N3-C2-O2	-6.06	118.67	122.30
18	T	-15	DA	O4'-C1'-N9	6.00	112.20	108.00
18	T	-30	DG	P-O3'-C3'	5.99	126.89	119.70
18	T	15	DT	C6-C5-C7	-5.98	119.31	122.90
14	N	20	DG	OP1-P-O3'	-5.97	92.06	105.20
18	T	10	DC	N1-C2-O2	5.97	122.48	118.90
5	E	165	LEU	CB-CG-CD2	-5.97	100.86	111.00
13	M	1330	PRO	N-CA-CB	5.96	110.45	103.30
18	T	-29	DC	P-O3'-C3'	5.96	126.85	119.70
15	P	26	C	O4'-C1'-N1	5.95	112.96	108.20
1	A	26	LEU	C-N-CA	-5.93	106.88	121.70
2	B	395	LEU	CB-CG-CD2	-5.91	100.96	111.00
15	P	23	G	C6-C5-N7	-5.91	126.86	130.40
18	T	27	DT	C6-C5-C7	-5.89	119.37	122.90
15	P	23	G	N7-C8-N9	5.88	116.04	113.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	N	-12	DA	C4-C5-C6	-5.88	114.06	117.00
19	V	238	PRO	N-CA-CB	5.88	110.35	103.30
10	J	55	LEU	CB-CG-CD2	-5.87	101.01	111.00
1	A	1400	LEU	CB-CG-CD2	-5.87	101.03	111.00
24	e	69	ARG	NE-CZ-NH2	5.84	123.22	120.30
16	U	463	PRO	N-CA-CB	5.79	110.24	103.30
18	T	-70	DC	O4'-C1'-N1	5.77	112.04	108.00
15	P	23	G	C4-N9-C1'	5.77	134.00	126.50
14	N	-8	DG	N1-C6-O6	-5.75	116.45	119.90
2	B	556	ILE	C-N-CA	-5.73	107.38	121.70
18	T	-43	DT	P-O3'-C3'	5.72	126.56	119.70
18	T	49	DT	O4'-C1'-N1	5.71	112.00	108.00
14	N	-16	DT	C6-C5-C7	-5.70	119.48	122.90
18	T	14	DT	N3-C2-O2	-5.69	118.88	122.30
14	N	-17	DT	N3-C2-O2	-5.68	118.89	122.30
1	A	979	LEU	CB-CG-CD1	-5.66	101.39	111.00
11	K	93	ASP	CB-CG-OD1	-5.65	113.22	118.30
18	T	-60	DG	O4'-C1'-N9	5.64	111.95	108.00
18	T	-38	DC	P-O3'-C3'	5.64	126.47	119.70
2	B	1014	LEU	CB-CG-CD2	-5.63	101.42	111.00
14	N	-11	DC	O4'-C1'-N1	5.63	111.94	108.00
18	T	8	DC	N3-C2-O2	-5.59	117.99	121.90
2	B	866	ILE	CG1-CB-CG2	-5.57	99.14	111.40
15	P	26	C	C6-N1-C1'	5.56	127.47	120.80
1	A	1398	LEU	CB-CG-CD2	-5.55	101.56	111.00
18	T	12	DT	N3-C2-O2	-5.54	118.98	122.30
14	N	-9	DC	N1-C2-O2	5.54	122.22	118.90
16	U	493	PRO	N-CA-CB	5.52	109.92	103.30
14	N	-17	DT	C6-C5-C7	-5.51	119.59	122.90
18	T	-34	DG	C3'-C2'-C1'	-5.50	95.89	102.50
18	T	11	DG	N1-C6-O6	-5.50	116.60	119.90
18	T	27	DT	O4'-C1'-N1	5.49	111.84	108.00
18	T	25	DG	N1-C6-O6	-5.49	116.61	119.90
18	T	-4	DC	P-O3'-C3'	5.48	126.28	119.70
2	B	1015	LEU	CB-CG-CD2	-5.48	101.69	111.00
14	N	-20	DC	N1-C2-O2	5.46	122.17	118.90
18	T	18	DC	N1-C2-O2	5.45	122.17	118.90
24	e	42	ARG	NE-CZ-NH2	5.45	123.03	120.30
3	C	228	ARG	NE-CZ-NH2	-5.45	117.58	120.30
14	N	21	DG	C1'-O4'-C4'	-5.45	104.66	110.10
18	T	-2	DC	O4'-C1'-N1	5.44	111.81	108.00
2	B	115	LEU	CB-CG-CD2	-5.43	101.78	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	P	26	C	C5-C6-N1	5.42	123.71	121.00
18	T	1	DT	O4'-C1'-N1	5.42	111.79	108.00
14	N	-24	DT	C6-C5-C7	-5.41	119.65	122.90
14	N	46	DG	O4'-C1'-N9	-5.41	104.21	108.00
23	Z	758	PRO	N-CA-CB	5.41	109.80	103.30
2	B	542	LEU	CB-CG-CD2	-5.41	101.80	111.00
18	T	12	DT	C6-C5-C7	-5.41	119.66	122.90
14	N	40	DC	P-O3'-C3'	5.39	126.17	119.70
15	P	21	G	P-O3'-C3'	5.38	126.16	119.70
2	B	21	LEU	CA-CB-CG	5.38	127.67	115.30
2	B	576	ILE	CG1-CB-CG2	-5.37	99.58	111.40
14	N	43	DA	P-O3'-C3'	5.33	126.10	119.70
1	A	938	LEU	CB-CG-CD2	-5.33	101.95	111.00
2	B	403	LEU	CB-CG-CD1	-5.31	101.97	111.00
18	T	14	DT	C6-C5-C7	-5.31	119.71	122.90
8	H	121	LEU	CB-CG-CD2	-5.31	101.98	111.00
2	B	371	ARG	NE-CZ-NH2	-5.28	117.66	120.30
14	N	-10	DG	N1-C6-O6	-5.28	116.73	119.90
18	T	21	DC	N3-C4-C5	5.27	124.01	121.90
10	J	50	LEU	CB-CG-CD2	-5.26	102.06	111.00
18	T	21	DC	N1-C2-O2	5.25	122.05	118.90
3	C	67	ARG	NE-CZ-NH1	5.25	122.92	120.30
2	B	751	LEU	CB-CG-CD2	-5.23	102.11	111.00
14	N	27	DG	C1'-O4'-C4'	-5.23	104.87	110.10
14	N	29	DG	O4'-C1'-N9	5.22	111.65	108.00
1	A	80	GLU	C-N-CA	-5.22	108.66	121.70
18	T	7	DC	N1-C2-O2	5.21	122.02	118.90
15	P	24	A	N7-C8-N9	5.21	116.40	113.80
14	N	-16	DT	N3-C2-O2	-5.20	119.18	122.30
18	T	-40	DG	O4'-C1'-N9	5.20	111.64	108.00
12	L	44	MET	CG-SD-CE	-5.20	91.88	100.20
18	T	-2	DC	C1'-O4'-C4'	-5.19	104.91	110.10
2	B	959	GLU	C-N-CA	-5.19	111.41	122.30
18	T	13	DT	N3-C2-O2	-5.17	119.20	122.30
18	T	-47	DT	C1'-O4'-C4'	-5.17	104.93	110.10
18	T	13	DT	C6-C5-C7	-5.17	119.80	122.90
2	B	395	LEU	CA-CB-CG	-5.16	103.44	115.30
14	N	-24	DT	N3-C2-O2	-5.15	119.21	122.30
18	T	28	DC	N1-C2-O2	5.14	121.98	118.90
14	N	21	DG	OP1-P-OP2	5.13	127.29	119.60
10	J	65	LEU	CA-CB-CG	5.11	127.06	115.30
1	A	565	MET	CG-SD-CE	-5.11	92.02	100.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	146	LYS	CA-CB-CG	5.11	124.64	113.40
18	T	26	DC	N3-C4-N4	-5.10	114.43	118.00
14	N	-22	DG	N1-C6-O6	-5.10	116.84	119.90
14	N	-16	DT	C5-C6-N1	-5.09	120.65	123.70
18	T	20	DG	C5-C6-N1	5.08	114.04	111.50
2	B	377	LEU	CB-CG-CD1	-5.08	102.37	111.00
1	A	567	LEU	CB-CG-CD1	-5.07	102.39	111.00
14	N	-8	DG	C1'-O4'-C4'	-5.07	105.03	110.10
14	N	6	DA	C3'-C2'-C1'	-5.07	96.42	102.50
2	B	665	ILE	CG1-CB-CG2	-5.04	100.31	111.40
14	N	-14	DA	P-O3'-C3'	5.04	125.75	119.70
1	A	484	LEU	CA-CB-CG	5.03	126.87	115.30
3	C	44	ILE	CG1-CB-CG2	-5.03	100.34	111.40
15	P	23	G	C8-N9-C4	-5.03	104.39	106.40
14	N	1	DC	O4'-C1'-N1	5.02	111.51	108.00
18	T	-32	DC	O4'-C1'-N1	5.02	111.51	108.00
18	T	-1	DG	P-O3'-C3'	5.02	125.72	119.70
12	L	20	GLY	N-CA-C	-5.02	100.56	113.10
18	T	-49	DG	O4'-C1'-N9	5.01	111.51	108.00

There are no chirality outliers.

All (21) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1434	GLU	Peptide
1	A	910	LYS	Peptide
2	B	20	ASP	Peptide
2	B	547	GLU	Peptide
2	B	686	GLU	Peptide
14	N	-10	DG	Sidechain
14	N	-15	DA	Sidechain
14	N	-17	DT	Sidechain
14	N	-18	DG	Sidechain
14	N	-19	DG	Sidechain
14	N	-20	DC	Sidechain
14	N	-25	DC	Sidechain
14	N	-26	DG	Sidechain
14	N	-27	DA	Sidechain
17	R	592	ASP	Peptide
18	T	11	DG	Sidechain
18	T	14	DT	Sidechain
18	T	15	DT	Sidechain

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Mol	Chain	Res	Type	Group
18	T	23	DC	Sidechain
18	T	24	DA	Sidechain
18	T	8	DC	Sidechain

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1408/1984 (71%)	1281 (91%)	117 (8%)	10 (1%)	22	54
2	B	1112/1251 (89%)	998 (90%)	105 (9%)	9 (1%)	19	51
3	C	254/270 (94%)	232 (91%)	19 (8%)	3 (1%)	13	42
4	D	124/142 (87%)	118 (95%)	6 (5%)	0	100	100
5	E	207/210 (99%)	199 (96%)	7 (3%)	1 (0%)	29	61
6	F	76/127 (60%)	70 (92%)	6 (8%)	0	100	100
7	G	169/172 (98%)	156 (92%)	13 (8%)	0	100	100
8	H	147/150 (98%)	130 (88%)	16 (11%)	1 (1%)	22	54
9	I	114/125 (91%)	104 (91%)	10 (9%)	0	100	100
10	J	64/67 (96%)	60 (94%)	2 (3%)	2 (3%)	4	23
11	K	113/117 (97%)	107 (95%)	6 (5%)	0	100	100
12	L	45/58 (78%)	39 (87%)	6 (13%)	0	100	100
13	M	976/1002 (97%)	903 (92%)	72 (7%)	1 (0%)	51	81
16	Q	888/1845 (48%)	836 (94%)	52 (6%)	0	100	100
16	U	117/1845 (6%)	88 (75%)	21 (18%)	8 (7%)	1	8
17	R	240/248 (97%)	225 (94%)	14 (6%)	1 (0%)	34	66

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
19	V	234/311 (75%)	197 (84%)	33 (14%)	4 (2%)	9	35
20	W	298/305 (98%)	269 (90%)	29 (10%)	0	100	100
21	X	41/531 (8%)	41 (100%)	0	0	100	100
22	Y	114/121 (94%)	109 (96%)	5 (4%)	0	100	100
23	Z	497/1087 (46%)	460 (93%)	36 (7%)	1 (0%)	47	77
24	a	95/136 (70%)	83 (87%)	9 (10%)	3 (3%)	4	22
24	e	95/136 (70%)	87 (92%)	8 (8%)	0	100	100
25	b	81/103 (79%)	70 (86%)	8 (10%)	3 (4%)	3	20
25	f	76/103 (74%)	67 (88%)	9 (12%)	0	100	100
26	c	101/103 (98%)	88 (87%)	9 (9%)	4 (4%)	3	18
27	d	93/95 (98%)	82 (88%)	9 (10%)	2 (2%)	6	30
All	All	7779/12644 (62%)	7099 (91%)	627 (8%)	53 (1%)	26	54

All (53) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	540	ASP
1	A	1185	VAL
1	A	1468	THR
2	B	19	PRO
3	C	93	PHE
13	M	1330	PRO
17	R	507	PRO
16	U	506	ALA
16	U	508	HIS
19	V	238	PRO
23	Z	760	GLY
24	a	73	GLU
25	b	29	ILE
27	d	101	GLY
1	A	1435	THR
16	U	481	GLY
16	U	521	LYS
24	a	77	ASP
27	d	109	SER
2	B	20	ASP
2	B	142	THR
2	B	1004	ASP

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Mol	Chain	Res	Type
10	J	28	GLU
16	U	463	PRO
16	U	513	LEU
16	U	516	ALA
16	U	523	GLN
19	V	228	GLU
19	V	249	ASP
19	V	291	ASN
25	b	34	ILE
1	A	300	ALA
1	A	696	SER
2	B	950	ARG
26	c	64	GLU
26	c	113	SER
1	A	495	ASP
1	A	1130	ILE
2	B	679	PRO
2	B	834	ARG
3	C	60	HIS
3	C	92	GLU
24	a	74	ILE
25	b	26	ILE
2	B	650	ASN
2	B	1001	PRO
1	A	478	PRO
5	E	45	GLY
8	H	17	PRO
10	J	64	PRO
1	A	980	PRO
26	c	114	VAL
26	c	26	PRO

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.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1245/1761 (71%)	1226 (98%)	19 (2%)	65	81
2	B	986/1084 (91%)	947 (96%)	39 (4%)	31	61
3	C	235/247 (95%)	228 (97%)	7 (3%)	41	68
4	D	109/126 (86%)	108 (99%)	1 (1%)	78	87
5	E	191/192 (100%)	189 (99%)	2 (1%)	76	86
6	F	68/111 (61%)	67 (98%)	1 (2%)	65	81
7	G	146/153 (95%)	143 (98%)	3 (2%)	53	75
8	H	130/131 (99%)	121 (93%)	9 (7%)	15	44
9	I	104/112 (93%)	101 (97%)	3 (3%)	42	69
10	J	55/56 (98%)	54 (98%)	1 (2%)	59	78
11	K	104/106 (98%)	103 (99%)	1 (1%)	76	86
12	L	43/55 (78%)	40 (93%)	3 (7%)	15	43
13	M	154/894 (17%)	154 (100%)	0	100	100
16	Q	761/1601 (48%)	755 (99%)	6 (1%)	81	89
16	U	63/1601 (4%)	63 (100%)	0	100	100
17	R	168/222 (76%)	166 (99%)	2 (1%)	71	83
19	V	144/285 (50%)	141 (98%)	3 (2%)	53	75
20	W	255/260 (98%)	254 (100%)	1 (0%)	91	95
21	X	40/467 (9%)	40 (100%)	0	100	100
22	Y	102/105 (97%)	102 (100%)	0	100	100
23	Z	434/939 (46%)	432 (100%)	2 (0%)	88	93
24	a	85/111 (77%)	77 (91%)	8 (9%)	8	30
24	e	84/111 (76%)	81 (96%)	3 (4%)	35	63
25	b	68/79 (86%)	63 (93%)	5 (7%)	13	40
25	f	63/79 (80%)	60 (95%)	3 (5%)	25	56
26	c	82/82 (100%)	75 (92%)	7 (8%)	10	35
27	d	81/81 (100%)	69 (85%)	12 (15%)	3	13
All	All	6000/11051 (54%)	5859 (98%)	141 (2%)	51	73

All (141) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	ARG
1	A	147	LEU
1	A	251	THR
1	A	301	HIS
1	A	382	ARG
1	A	476	ILE
1	A	539	GLN
1	A	571	ASP
1	A	605	THR
1	A	757	GLN
1	A	761	SER
1	A	819	SER
1	A	884	ASN
1	A	931	ARG
1	A	937	ASP
1	A	1030	SER
1	A	1074	SER
1	A	1210	TRP
1	A	1286	ARG
2	B	20	ASP
2	B	83	ARG
2	B	90	GLN
2	B	92	TYR
2	B	115	LEU
2	B	147	THR
2	B	170	ASP
2	B	180	ASP
2	B	218	THR
2	B	236	TRP
2	B	267	VAL
2	B	291	ASP
2	B	331	THR
2	B	332	LYS
2	B	348	LEU
2	B	351	VAL
2	B	354	SER
2	B	359	THR
2	B	386	ASP
2	B	388	TYR
2	B	411	LEU
2	B	429	PHE
2	B	453	TRP
2	B	592	ARG

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Mol	Chain	Res	Type
2	B	597	ILE
2	B	610	ARG
2	B	626	LEU
2	B	649	ASN
2	B	650	ASN
2	B	659	SER
2	B	715	ASP
2	B	731	GLN
2	B	738	THR
2	B	743	ARG
2	B	784	SER
2	B	931	ILE
2	B	1118	VAL
2	B	1148	LEU
2	B	1174	VAL
3	C	33	SER
3	C	63	PHE
3	C	74	THR
3	C	75	SER
3	C	76	ASP
3	C	147	ASP
3	C	151	VAL
4	D	94	LYS
5	E	82	VAL
5	E	117	SER
6	F	123	LEU
7	G	21	ASN
7	G	37	THR
7	G	67	LEU
8	H	15	ILE
8	H	51	ASP
8	H	67	ASP
8	H	83	SER
8	H	95	LYS
8	H	96	VAL
8	H	113	SER
8	H	116	VAL
8	H	141	VAL
9	I	12	VAL
9	I	15	ARG
9	I	101	SER
10	J	47	ARG

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Mol	Chain	Res	Type
11	K	99	SER
12	L	34	ILE
12	L	39	CYS
12	L	44	MET
16	Q	180	ARG
16	Q	191	ARG
16	Q	697	TYR
16	Q	707	CYS
16	Q	820	LEU
16	Q	858	LYS
17	R	422	THR
17	R	474	LYS
19	V	45	ASP
19	V	132	ARG
19	V	181	LYS
20	W	169	ASP
23	Z	176	ASP
23	Z	720	TYR
24	a	48	LEU
24	a	49	ARG
24	a	59	GLU
24	a	63	ARG
24	a	65	LEU
24	a	105	GLU
24	a	115	LYS
24	a	129	ARG
25	b	47	SER
25	b	73	THR
25	b	80	THR
25	b	91	LYS
25	b	92	ARG
26	c	29	ARG
26	c	59	THR
26	c	81	ARG
26	c	91	GLU
26	c	101	THR
26	c	114	VAL
26	c	118	LYS
27	d	31	LYS
27	d	39	TYR
27	d	48	ASP
27	d	49	THR

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Mol	Chain	Res	Type
27	d	77	LEU
27	d	84	SER
27	d	85	THR
27	d	93	THR
27	d	98	LEU
27	d	109	SER
27	d	116	THR
27	d	119	THR
24	e	59	GLU
24	e	117	VAL
24	e	129	ARG
25	f	26	ILE
25	f	73	THR
25	f	92	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (107) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	62	GLN
1	A	96	HIS
1	A	122	ASN
1	A	123	ASN
1	A	152	ASN
1	A	288	ASN
1	A	301	HIS
1	A	313	HIS
1	A	449	HIS
1	A	704	ASN
1	A	742	ASN
1	A	780	ASN
1	A	809	HIS
1	A	935	GLN
1	A	982	ASN
1	A	1005	HIS
1	A	1182	GLN
1	A	1230	GLN
1	A	1236	ASN
2	B	52	GLN
2	B	175	ASN
2	B	319	ASN
2	B	471	ASN
2	B	631	GLN

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Mol	Chain	Res	Type
2	B	649	ASN
2	B	1003	ASN
2	B	1040	GLN
2	B	1120	ASN
2	B	1142	ASN
3	C	60	HIS
3	C	262	GLN
4	D	34	ASN
4	D	48	ASN
4	D	66	ASN
4	D	76	ASN
4	D	129	GLN
5	E	107	GLN
5	E	168	ASN
7	G	93	ASN
7	G	139	GLN
8	H	131	ASN
9	I	84	HIS
9	I	91	HIS
11	K	49	GLN
13	M	1352	GLN
16	Q	38	HIS
16	Q	40	GLN
16	Q	82	GLN
16	Q	105	ASN
16	Q	128	GLN
16	Q	161	ASN
16	Q	244	ASN
16	Q	268	ASN
16	Q	289	GLN
16	Q	294	HIS
16	Q	298	ASN
16	Q	305	GLN
16	Q	349	GLN
16	Q	359	ASN
16	Q	373	ASN
16	Q	407	GLN
16	Q	466	ASN
16	Q	502	ASN
16	Q	527	HIS
16	Q	561	ASN
16	Q	573	ASN

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Mol	Chain	Res	Type
16	Q	585	GLN
16	Q	616	HIS
16	Q	706	ASN
16	Q	714	HIS
16	Q	877	GLN
16	Q	880	GLN
16	Q	887	ASN
17	R	416	GLN
17	R	432	ASN
17	R	484	ASN
17	R	585	ASN
17	R	588	ASN
19	V	37	ASN
19	V	69	GLN
19	V	72	HIS
19	V	97	ASN
19	V	122	GLN
19	V	193	HIS
20	W	11	GLN
20	W	15	HIS
20	W	27	ASN
20	W	98	GLN
20	W	131	ASN
20	W	173	ASN
20	W	223	ASN
20	W	268	HIS
20	W	273	HIS
23	Z	232	GLN
23	Z	251	ASN
23	Z	466	GLN
23	Z	519	GLN
23	Z	595	HIS
24	a	39	HIS
24	a	108	ASN
25	b	75	HIS
26	c	73	ASN
26	c	112	GLN
27	d	64	ASN
24	e	68	GLN
24	e	76	GLN
25	f	64	ASN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
15	P	27/28 (96%)	14 (51%)	5 (18%)

All (14) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
15	P	13	A
15	P	14	C
15	P	15	C
15	P	16	G
15	P	21	G
15	P	22	G
15	P	24	A
15	P	32	C
15	P	33	A
15	P	34	A
15	P	35	A
15	P	36	A
15	P	37	A
15	P	38	A

All (5) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
15	P	13	A
15	P	21	G
15	P	23	G
15	P	34	A
15	P	36	A

5.4 Non-standard residues in protein, DNA, RNA chains

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
23	TPO	Z	775	23	8,10,11	1.54	1 (12%)	10,14,16	1.99	1 (10%)
1	SEP	A	1547	1	8,9,10	1.49	1 (12%)	8,12,14	1.39	2 (25%)
1	TPO	A	1525	1	8,10,11	1.60	1 (12%)	10,14,16	1.83	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
23	TPO	Z	775	23	-	1/9/11/13	-
1	SEP	A	1547	1	-	0/5/8/10	-
1	TPO	A	1525	1	-	4/9/11/13	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1525	TPO	P-O1P	3.42	1.61	1.50
23	Z	775	TPO	P-O1P	3.35	1.61	1.50
1	A	1547	SEP	P-O1P	3.25	1.61	1.50

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
23	Z	775	TPO	P-OG1-CB	-5.85	105.53	123.21
1	A	1525	TPO	P-OG1-CB	-4.97	108.20	123.21
1	A	1547	SEP	P-OG-CB	-2.68	110.93	118.30
1	A	1547	SEP	OG-CB-CA	2.03	110.12	108.14

There are no chirality outliers.

All (5) 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
23	Z	775	TPO	C-CA-CB-CG2
1	A	1525	TPO	O-C-CA-CB

There are no ring outliers.

No monomer is involved in short contacts.

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
13	M	12
2	B	3
14	N	1
16	U	1
19	V	1
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	M	1287:MET	C	1327:ILE	N	37.43
1	N	-52:DC	O3'	-40:DG	P	31.66
1	M	477:LYS	C	538:LYS	N	28.32
1	U	497:ASP	C	505:SER	N	25.85

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	M	430:ALA	C	440:ILE	N	16.17
1	M	763:GLN	C	775:GLN	N	13.29
1	V	299:GLU	C	310:ASN	N	12.74
1	M	1384:ARG	C	1396:ALA	N	11.29
1	M	815:THR	C	824:GLU	N	6.79
1	M	1334:ASN	C	1338:ILE	N	5.28
1	M	332:LEU	C	349:SER	N	4.97
1	M	572:ASP	C	580:THR	N	4.78
1	M	1039:THR	C	1051:GLU	N	4.71
1	M	932:SER	C	935:GLU	N	4.39
1	M	675:GLY	C	684:THR	N	3.73
1	B	755:GLN	C	756:LYS	N	1.18
1	B	108:MET	C	109:MET	N	1.17
1	A	999:ARG	C	1000:LEU	N	1.15
1	B	94:SER	C	95:LYS	N	1.07

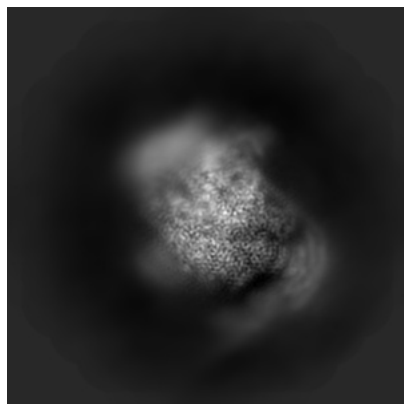
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15127. These allow visual inspection of the internal detail of the map and identification of artifacts.

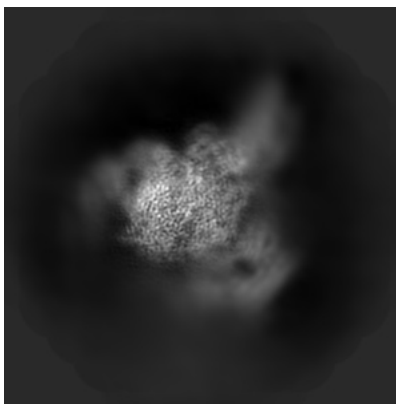
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

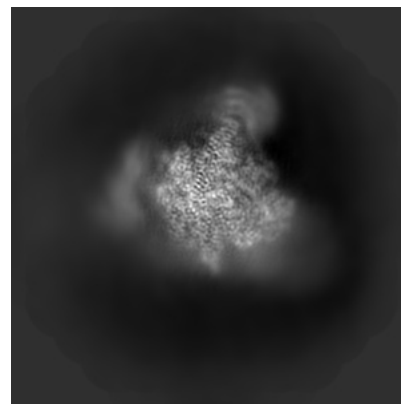
6.1.1 Primary map



X

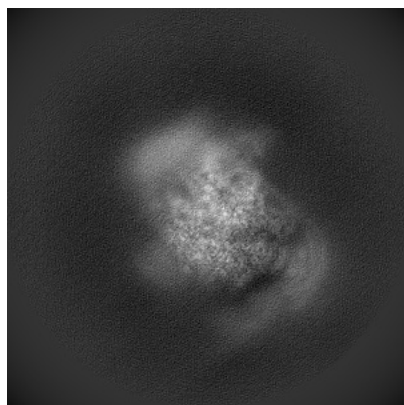


Y

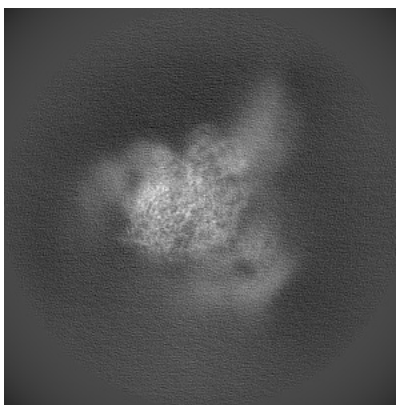


Z

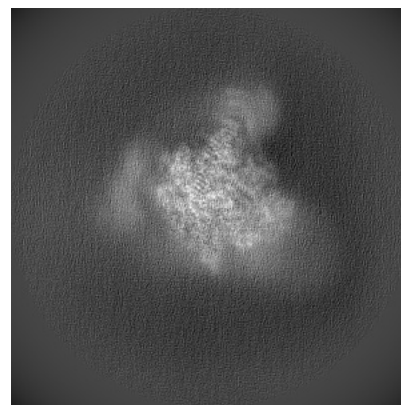
6.1.2 Raw map



X



Y

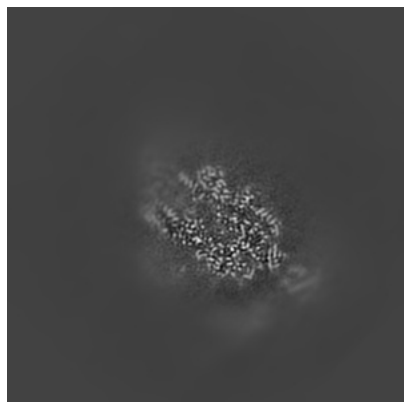


Z

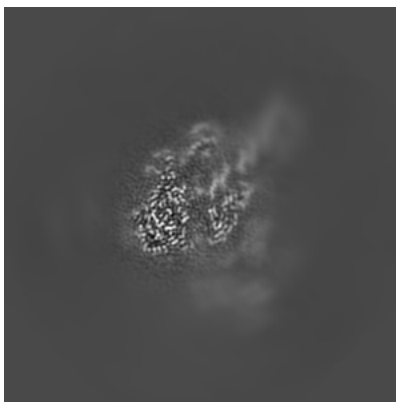
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

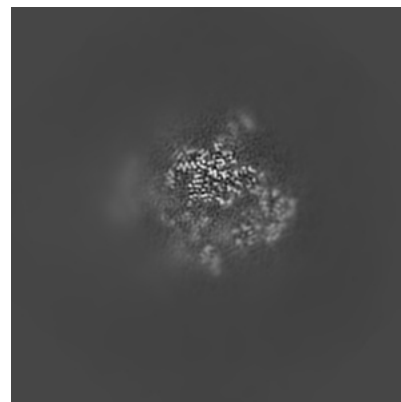
6.2.1 Primary map



X Index: 180

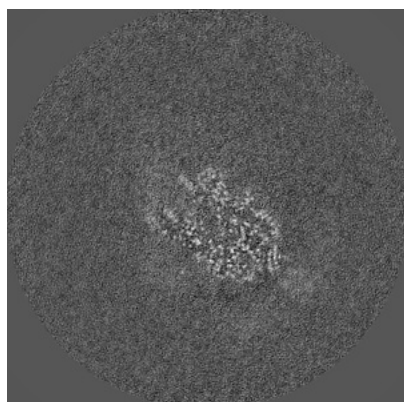


Y Index: 180

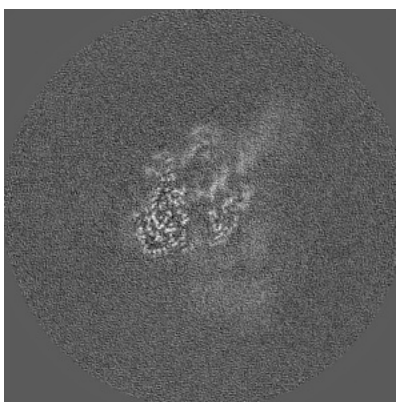


Z Index: 180

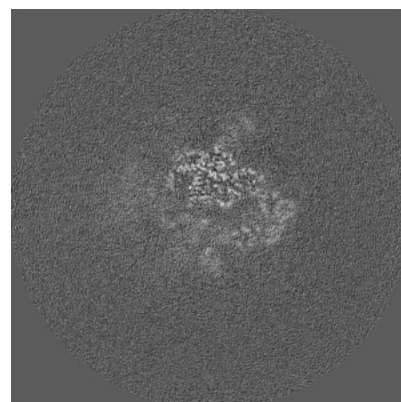
6.2.2 Raw map



X Index: 180



Y Index: 180

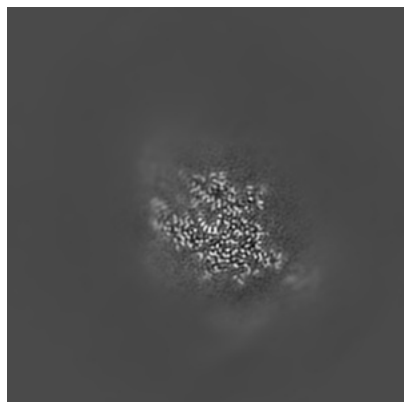


Z Index: 180

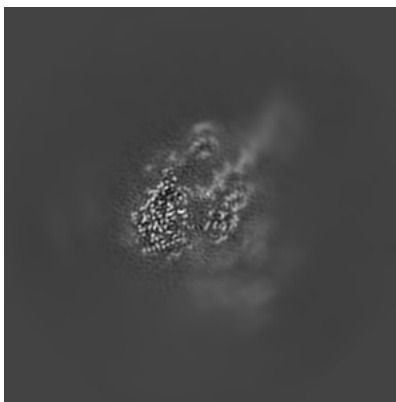
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

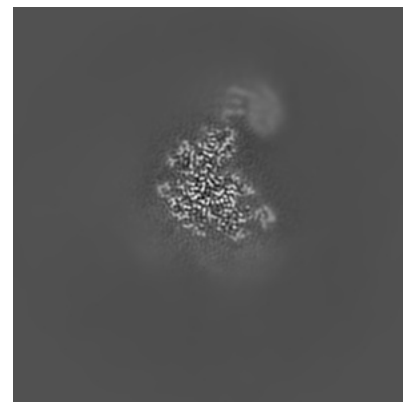
6.3.1 Primary map



X Index: 175

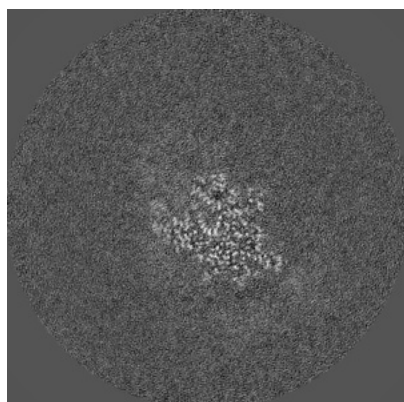


Y Index: 182

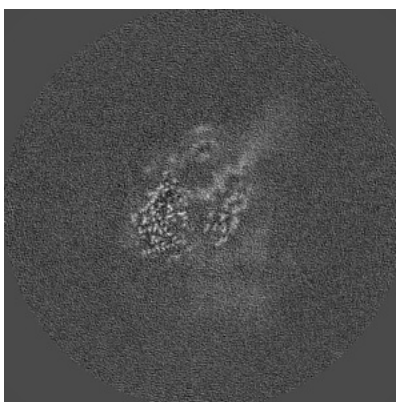


Z Index: 138

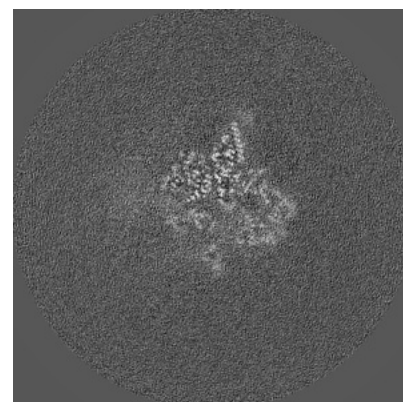
6.3.2 Raw map



X Index: 175



Y Index: 182

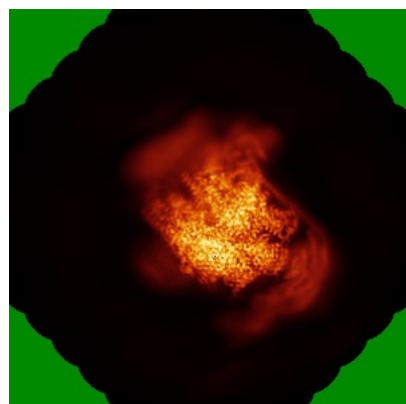


Z Index: 175

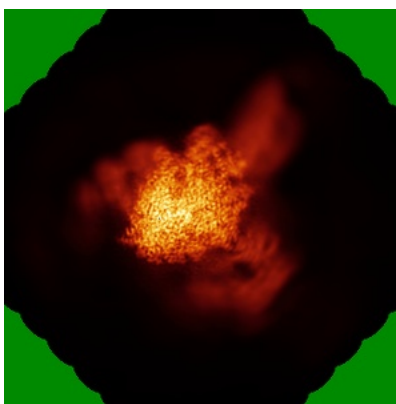
The images above show the largest variance slices of the map in three orthogonal directions.

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

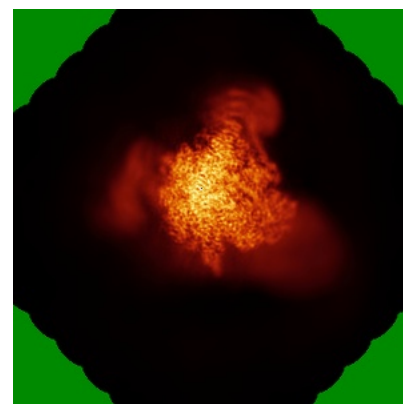
6.4.1 Primary map



X

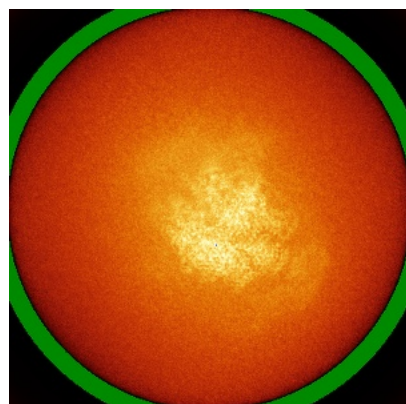


Y

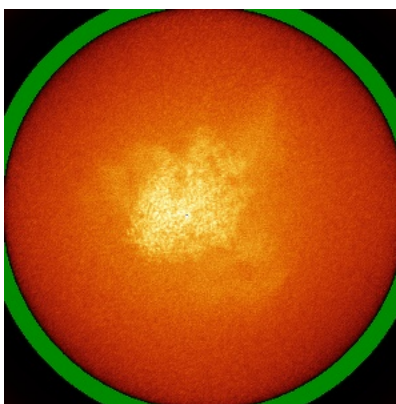


Z

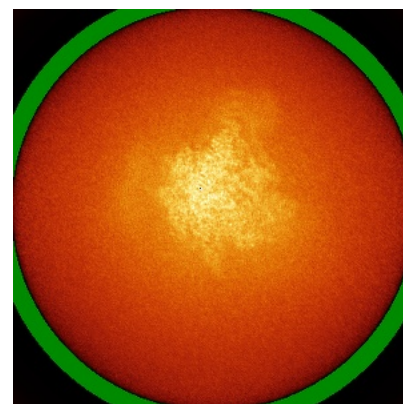
6.4.2 Raw map



X



Y

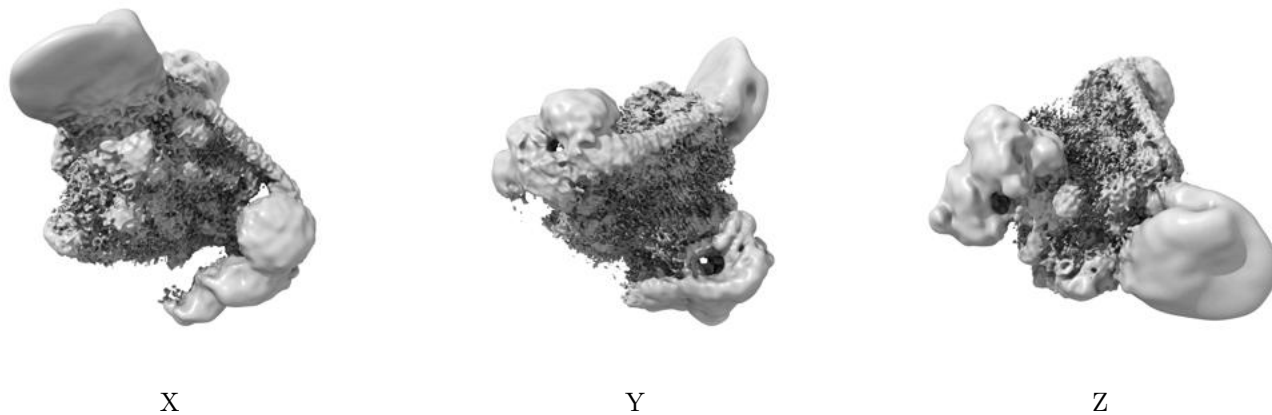


Z

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.

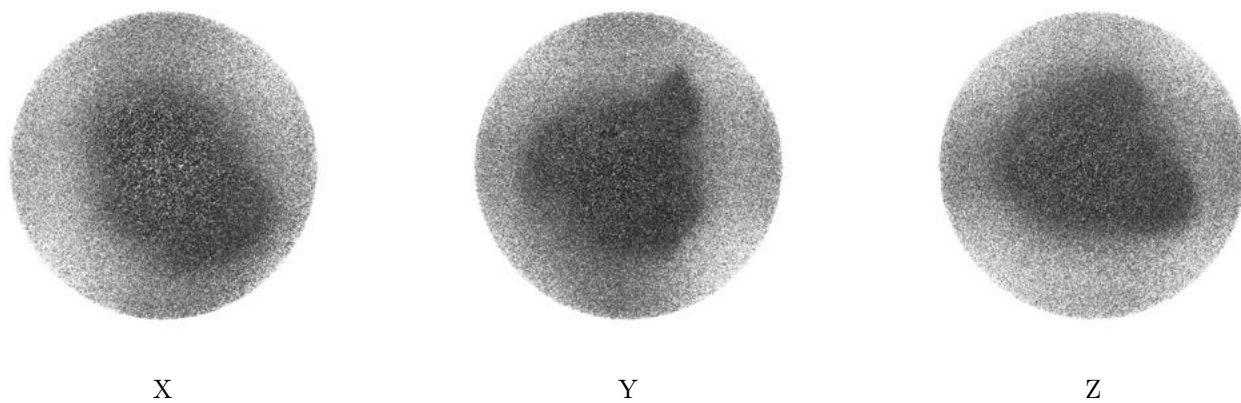
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.004. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

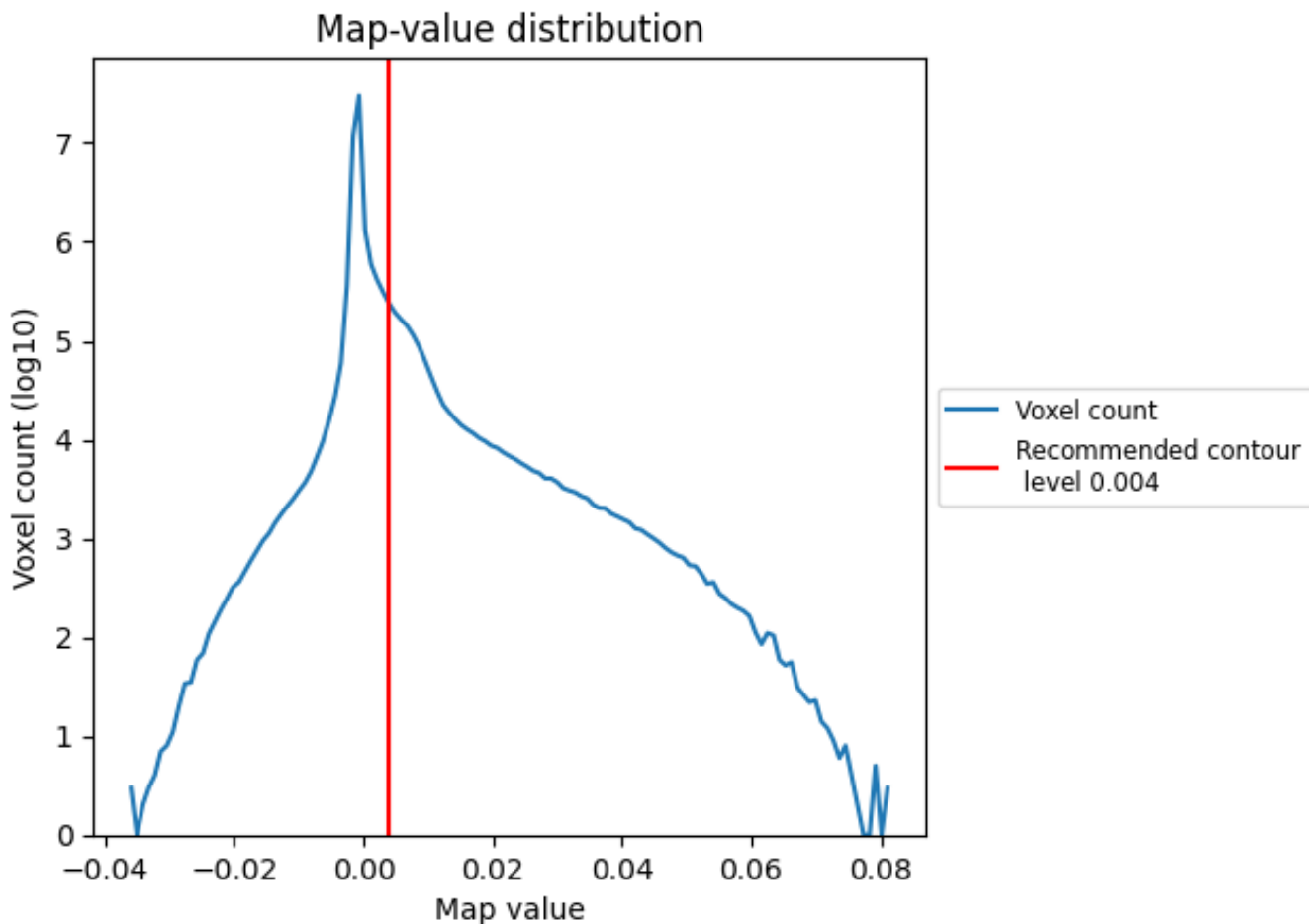
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

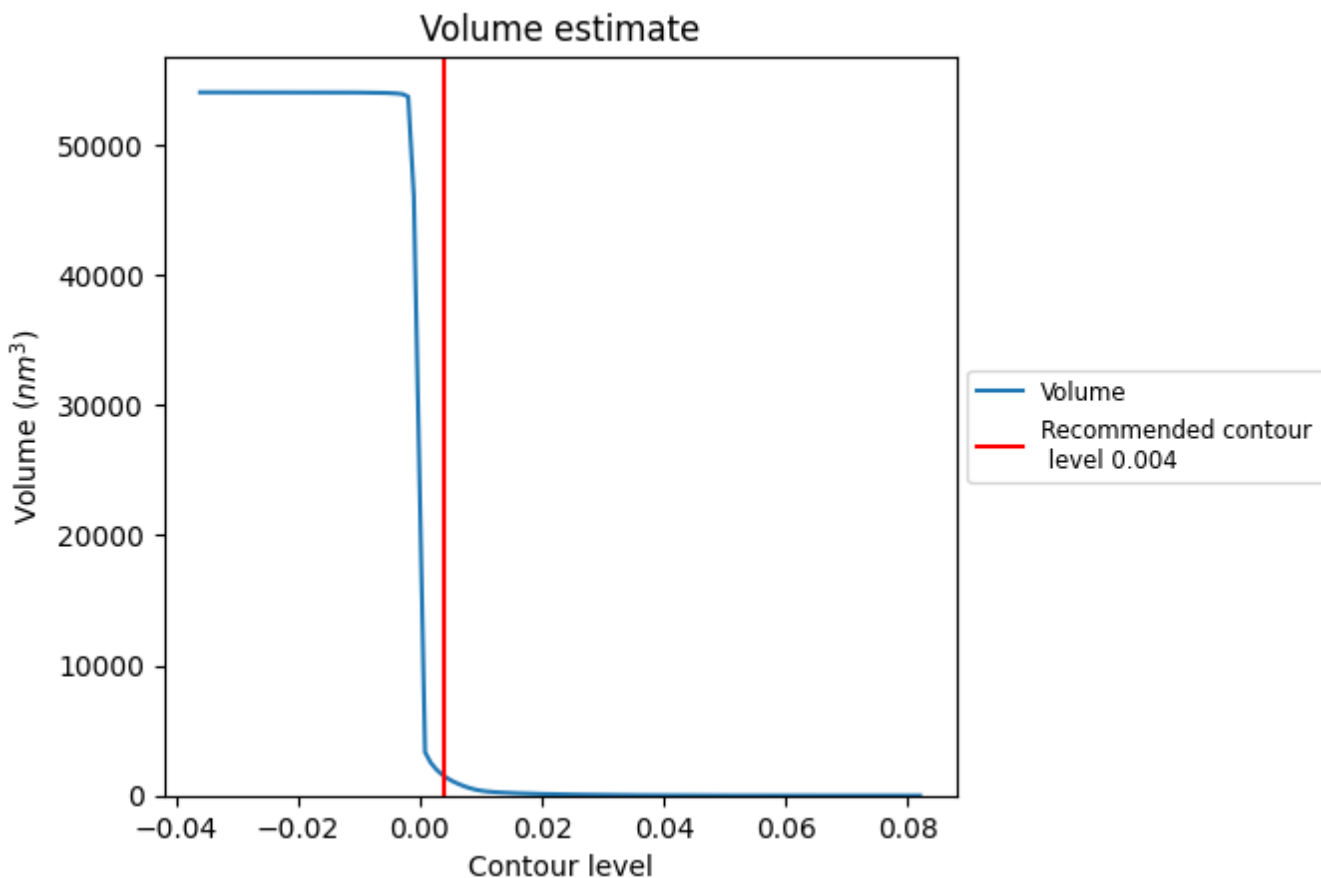
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

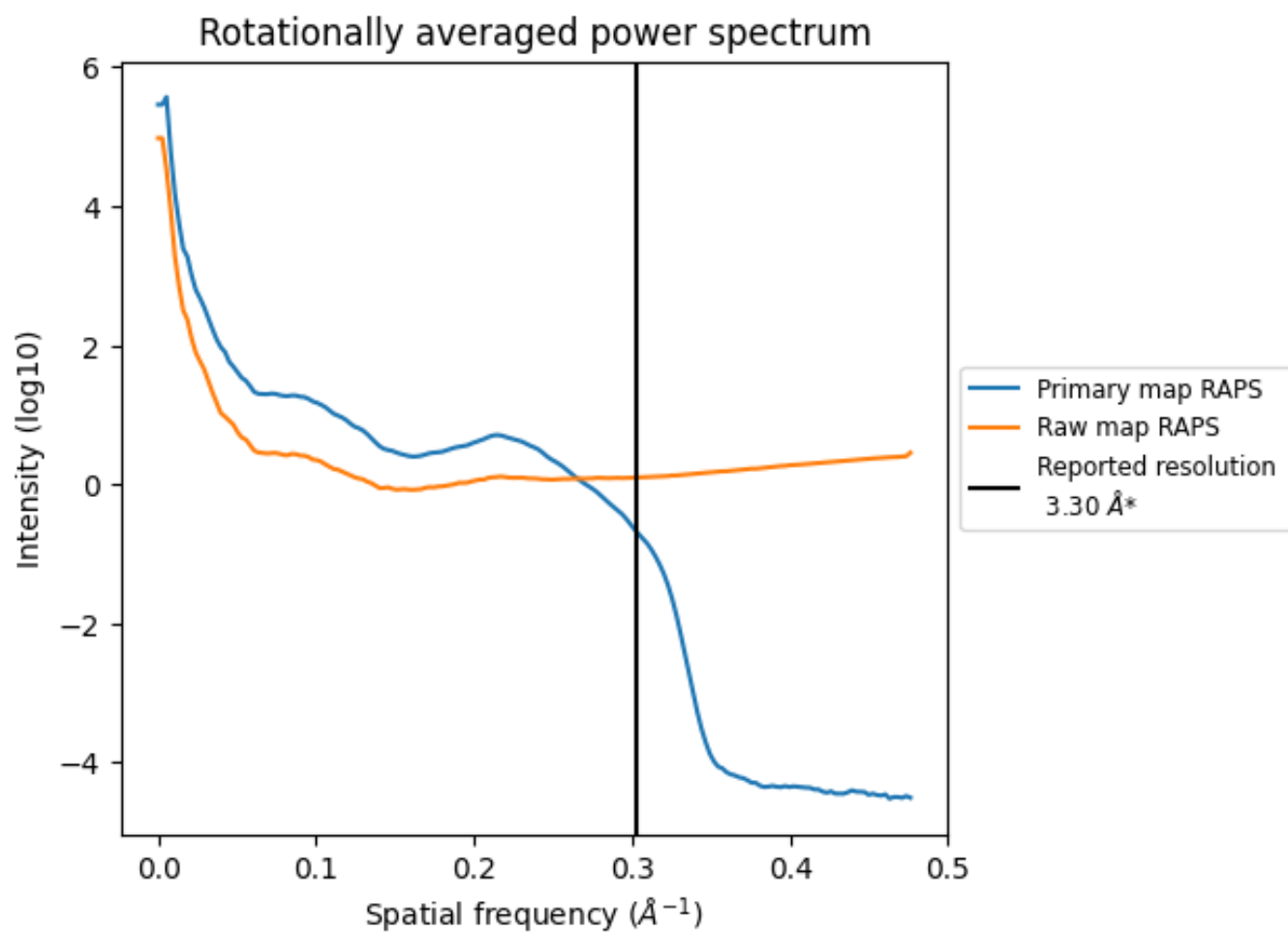
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1502 nm³; this corresponds to an approximate mass of 1357 kDa.

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

7.3 Rotationally averaged power spectrum i

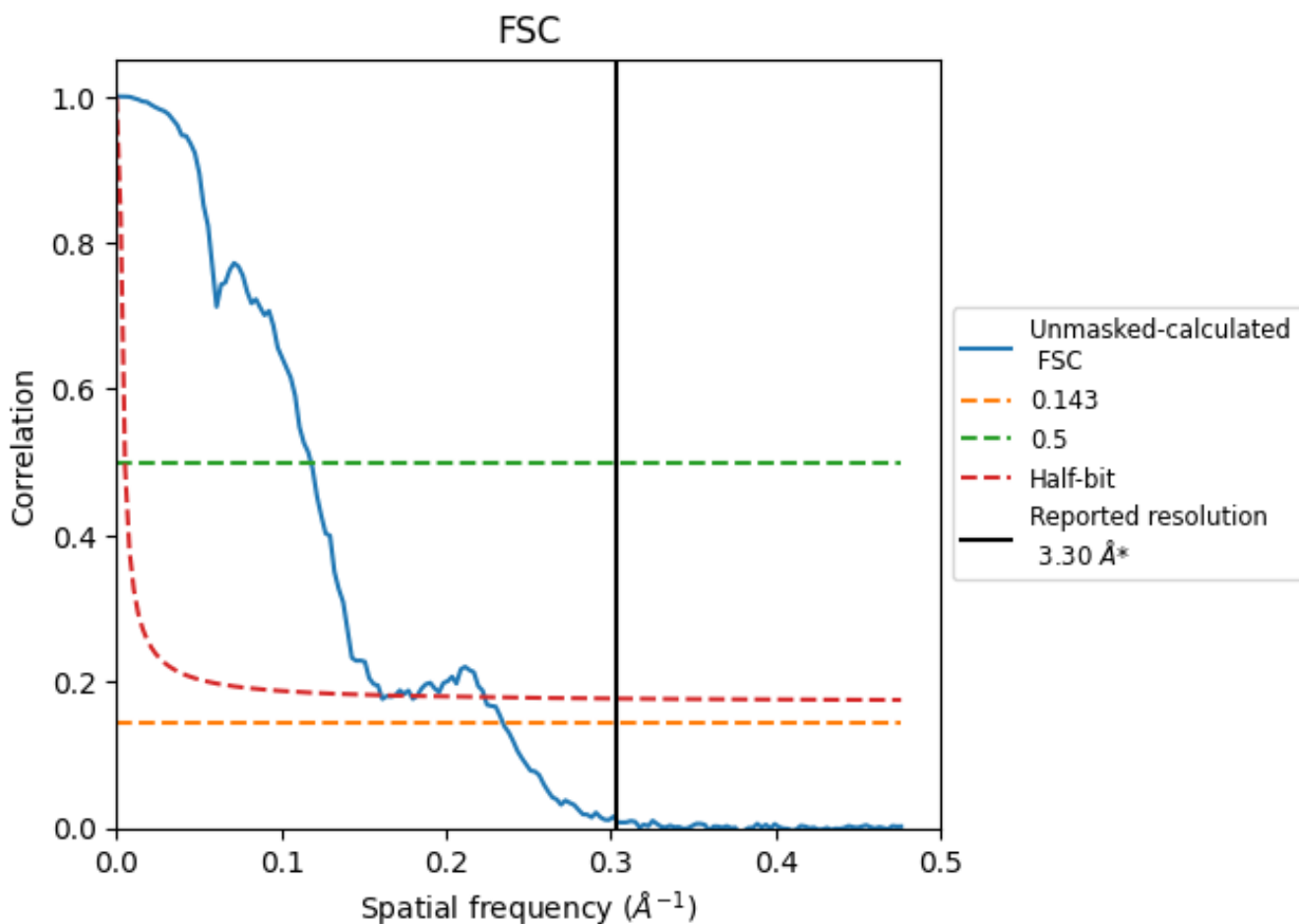


*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8 Fourier-Shell correlation [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 0.303 Å⁻¹

8.2 Resolution estimates [i](#)

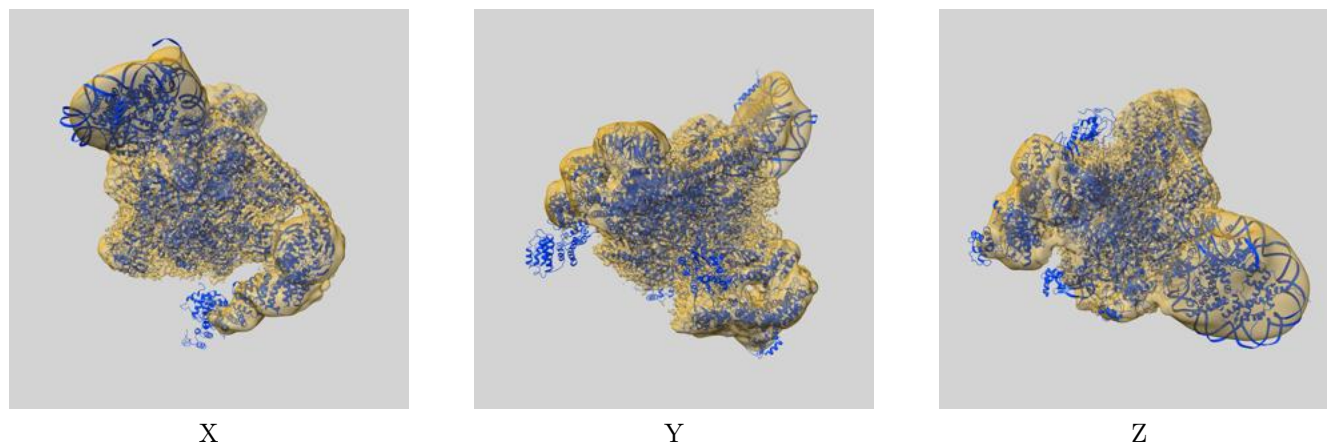
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.26	8.47	6.23

*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 4.26 differs from the reported value 3.3 by more than 10 %

9 Map-model fit [i](#)

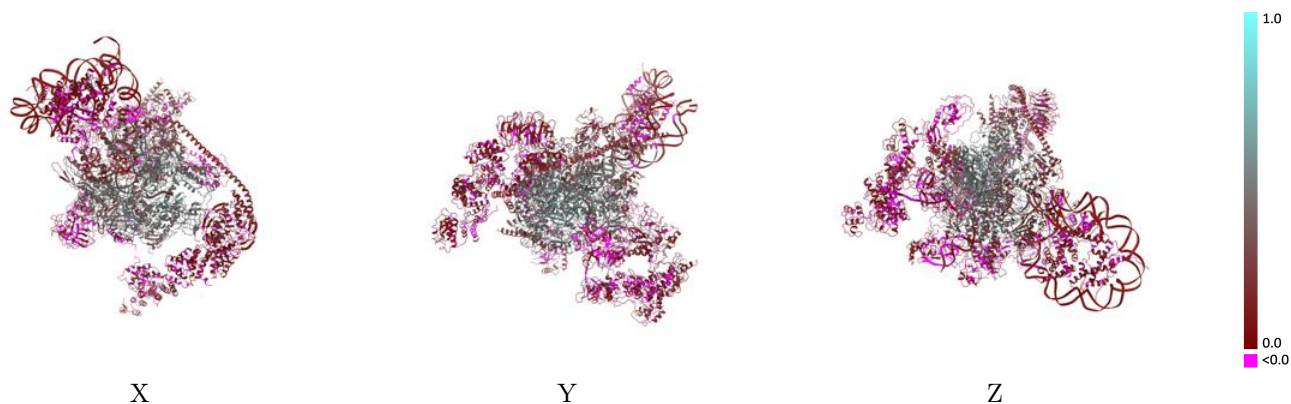
This section contains information regarding the fit between EMDB map EMD-15127 and PDB model 8A3Y. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay [i](#)



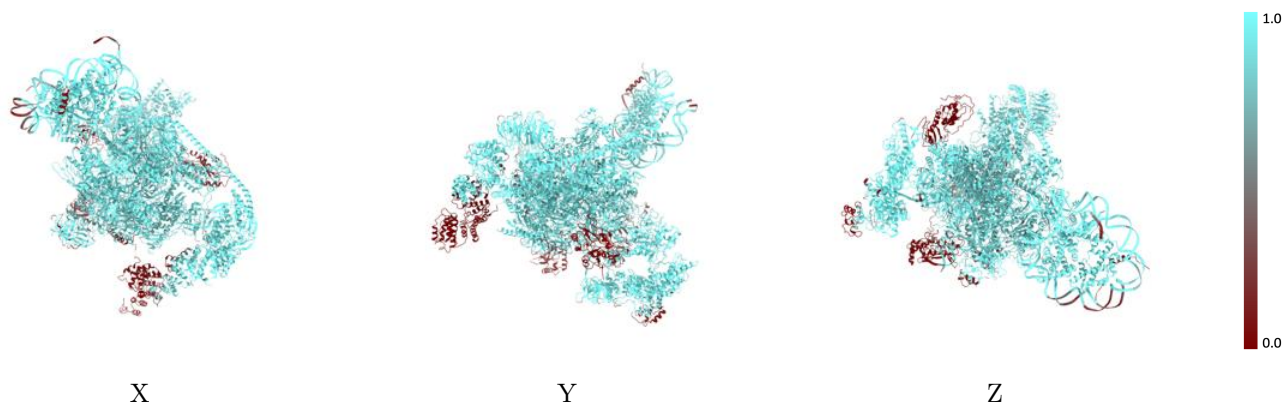
The images above show the 3D surface view of the map at the recommended contour level 0.004 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



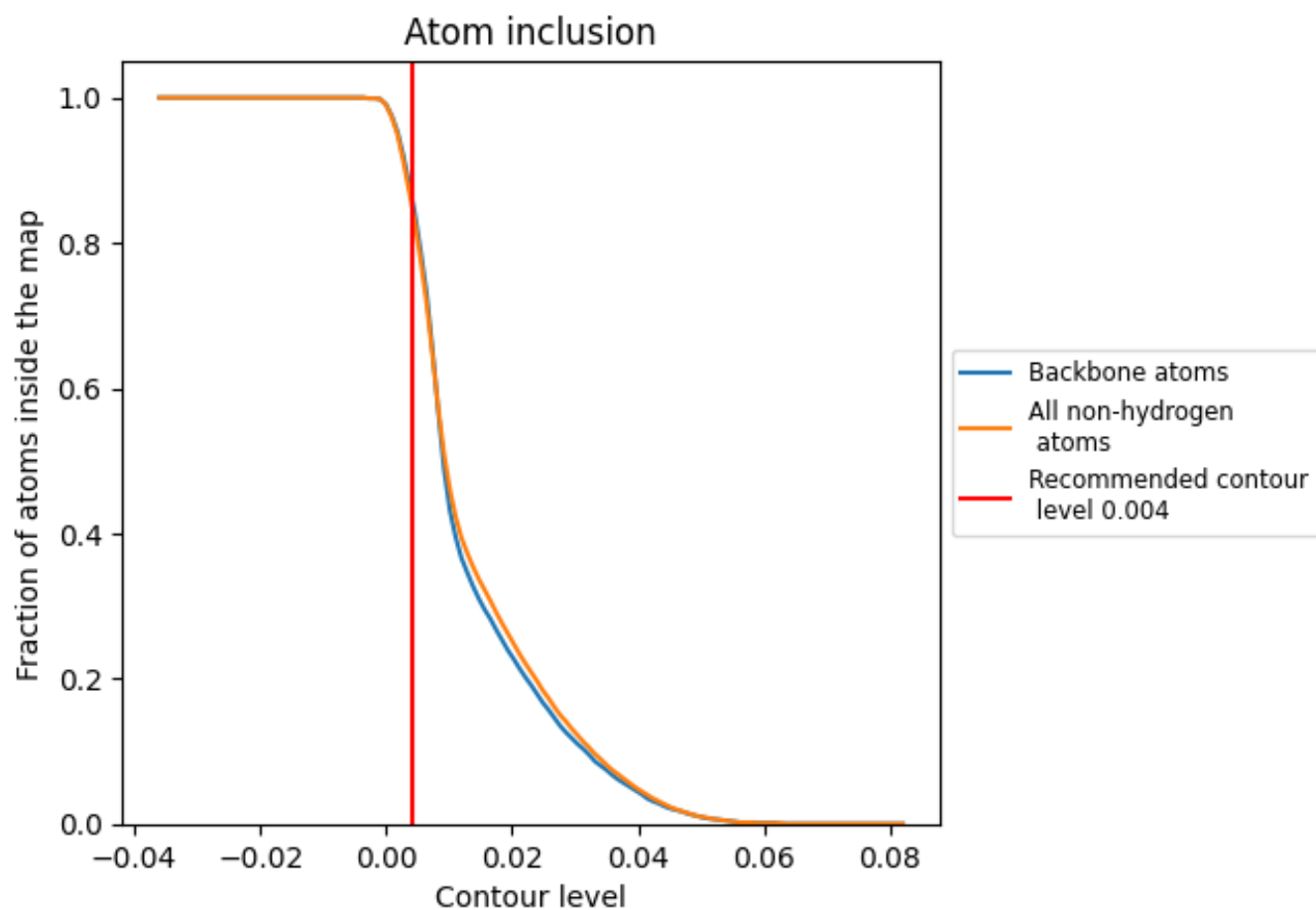
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.004).































































9.4 Atom inclusion [i](#)



At the recommended contour level, 87% of all backbone atoms, 86% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.004) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8550	 0.2310
A	 0.9610	 0.4150
B	 0.9810	 0.4340
C	 0.9720	 0.4110
D	 0.9750	 0.1460
E	 0.9850	 0.3490
F	 0.9750	 0.4570
G	 0.9780	 0.2040
H	 0.9540	 0.4170
I	 0.9730	 0.2390
J	 0.9790	 0.4590
K	 0.9470	 0.4140
L	 0.9790	 0.3900
M	 0.6510	 0.0520
N	 0.8830	 0.1140
P	 0.9840	 0.2390
Q	 0.6500	 0.1010
R	 0.2380	 0.0400
T	 0.8720	 0.1360
U	 0.8490	 0.0610
V	 0.6360	 0.0580
W	 0.9410	 0.0870
X	 0.9740	 0.1480
Y	 0.8040	 0.0610
Z	 0.7260	 0.0840
a	 0.7730	 0.0370
b	 0.9130	 0.0720
c	 1.0000	 0.0690
d	 0.9900	 0.0620
e	 0.9880	 0.0240
f	 0.9980	 0.0480

