



## Full wwPDB EM Validation Report ⓘ

May 12, 2024 – 12:53 pm BST

PDB ID : 6R8Y  
EMDB ID : EMD-4762  
Title : Cryo-EM structure of NCP-6-4PP(-1)-UV-DDB  
Authors : Matsumoto, S.; Cavadini, S.; Bunker, R.D.; Thoma, N.H.  
Deposited on : 2019-04-02  
Resolution : 4.30 Å(reported)  
Based on initial models : 4ZUX, 3EI4, 4E54, 5Y0C

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.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) : 2.36.2

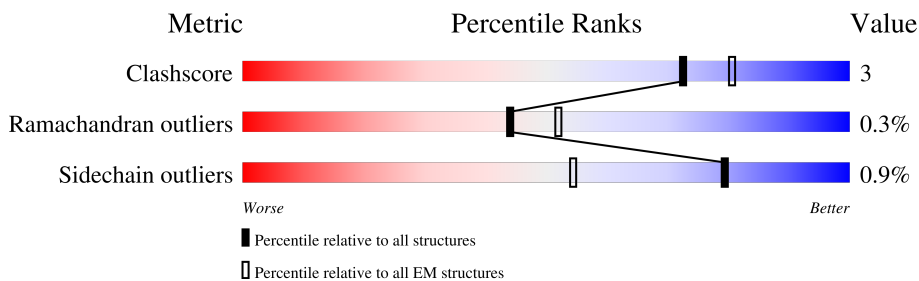
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.30 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.




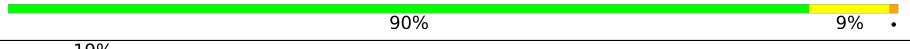
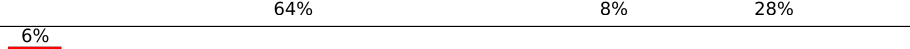
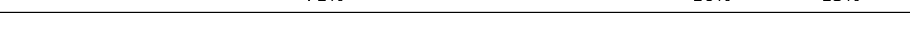
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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

Mol	Chain	Length	Quality of chain
1	A	139	
1	E	139	
2	B	106	
3	C	133	
3	G	133	
4	D	129	
4	H	129	
5	F	103	

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Mol	Chain	Length	Quality of chain
6	I	145	 86% 14%
7	J	144	 90% 9%
8	K	1144	 19% 64% 8% 28%
9	L	431	 6% 71% 16% 13%

## 2 Entry composition i

There are 9 unique types of molecules in this entry. The entry contains 40986 atoms, of which 19269 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 Histone H3.1.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	A	101	Total	C	H	N	O	S	0	0
			1705	525	873	161	142	4		
1	E	101	Total	C	H	N	O	S	0	0
			1708	525	876	161	142	4		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP P68431
A	-1	SER	-	expression tag	UNP P68431
A	0	HIS	-	expression tag	UNP P68431
E	-2	GLY	-	expression tag	UNP P68431
E	-1	SER	-	expression tag	UNP P68431
E	0	HIS	-	expression tag	UNP P68431

- Molecule 2 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	B	86	Total	C	H	N	O	S	0	0
			1434	436	740	140	117	1		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	GLY	-	expression tag	UNP P62805
B	-1	SER	-	expression tag	UNP P62805
B	0	HIS	-	expression tag	UNP P62805

- Molecule 3 is a protein called Histone H2A type 1-B/E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
3	C	117	Total	C	H	N	O	0	0
			1875	571	966	181	157		

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
3	G	117	1873	571	964	181	157	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	GLY	-	expression tag	UNP P04908
C	-1	SER	-	expression tag	UNP P04908
C	0	HIS	-	expression tag	UNP P04908
G	-2	GLY	-	expression tag	UNP P04908
G	-1	SER	-	expression tag	UNP P04908
G	0	HIS	-	expression tag	UNP P04908

- Molecule 4 is a protein called Histone H2B type 1-J.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
4	D	97	1560	480	794	142	142	2	0	0
4	H	97	1560	480	794	142	142	2	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-2	GLY	-	expression tag	UNP P06899
D	-1	SER	-	expression tag	UNP P06899
D	0	HIS	-	expression tag	UNP P06899
H	-2	GLY	-	expression tag	UNP P06899
H	-1	SER	-	expression tag	UNP P06899
H	0	HIS	-	expression tag	UNP P06899

- Molecule 5 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
5	F	82	1347	412	694	127	113	1	0	0

- Molecule 6 is a DNA chain called Human alpha-satellite DNA (145-MER).

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
6	I	145	4612	1422	1640	537	869	144	0	0

- Molecule 7 is a DNA chain called Human alpha-satellite DNA (145-MER) with a 6-4PP at positions 95-96.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
7	J	144	4607	1420	1640	536	867	144	0	0

- Molecule 8 is a protein called DNA damage-binding protein 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
8	K	825	12894	4100	6416	1092	1250	36	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	-3	GLY	-	expression tag	UNP Q16531
K	-2	GLY	-	expression tag	UNP Q16531
K	-1	GLY	-	expression tag	UNP Q16531
K	0	ARG	-	expression tag	UNP Q16531

- Molecule 9 is a protein called DNA damage-binding protein 2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
9	L	373	5811	1868	2872	528	526	17	0	0

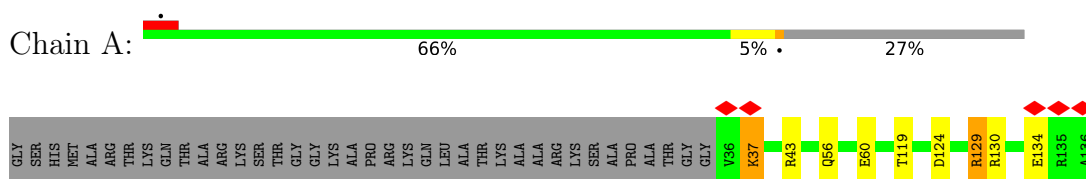
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	-3	GLY	-	expression tag	UNP Q92466
L	-2	GLY	-	expression tag	UNP Q92466
L	-1	GLY	-	expression tag	UNP Q92466
L	0	ARG	-	expression tag	UNP Q92466

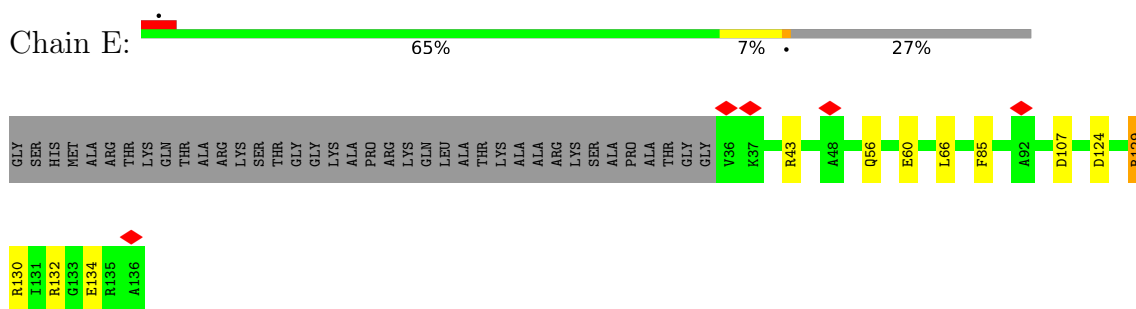
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

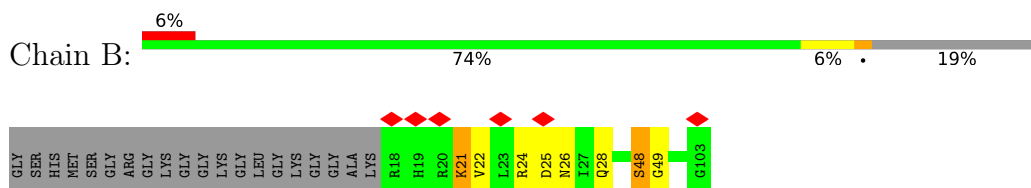
- Molecule 1: Histone H3.1



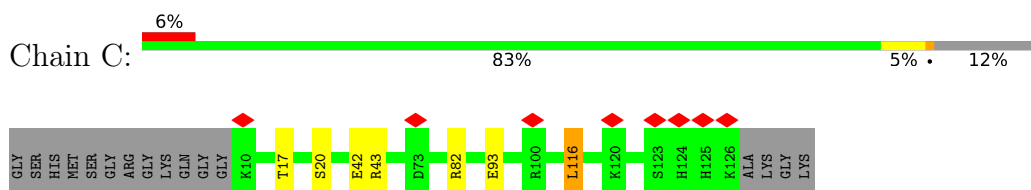
- Molecule 1: Histone H3.1



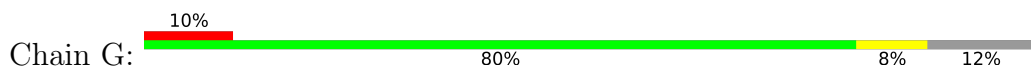
- Molecule 2: Histone H4

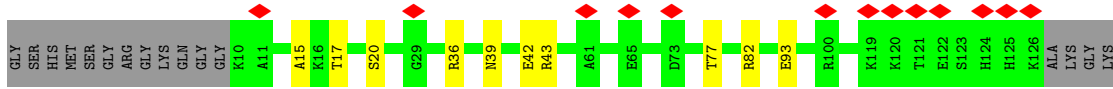


- Molecule 3: Histone H2A type 1-B/E

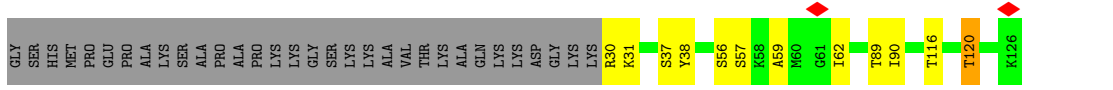


- Molecule 3: Histone H2A type 1-B/E

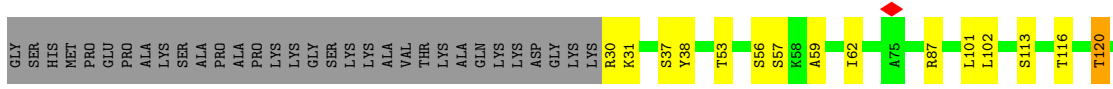




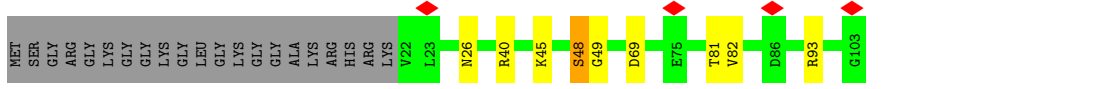
• Molecule 4: Histone H2B type 1-J



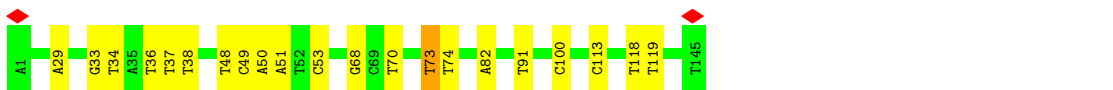
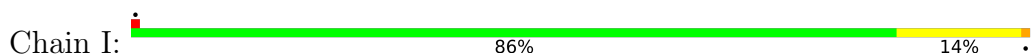
• Molecule 4: Histone H2B type 1-J



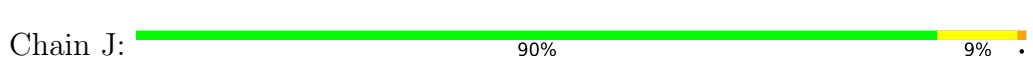
• Molecule 5: Histone H4



• Molecule 6: Human alpha-satellite DNA (145-MER)



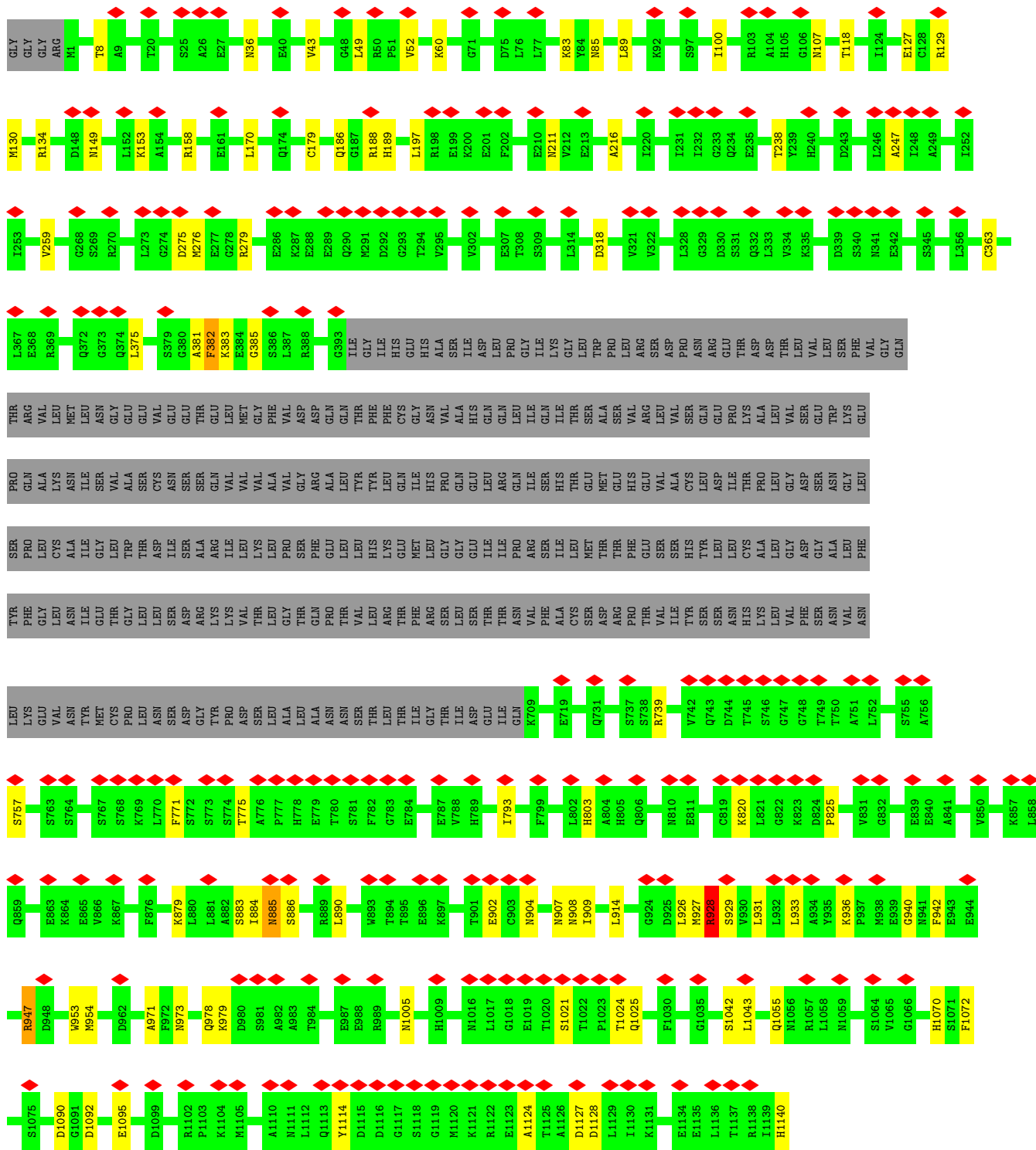
• Molecule 7: Human alpha-satellite DNA (145-MER) with a 6-4PP at positions 95-96



• Molecule 8: DNA damage-binding protein 1

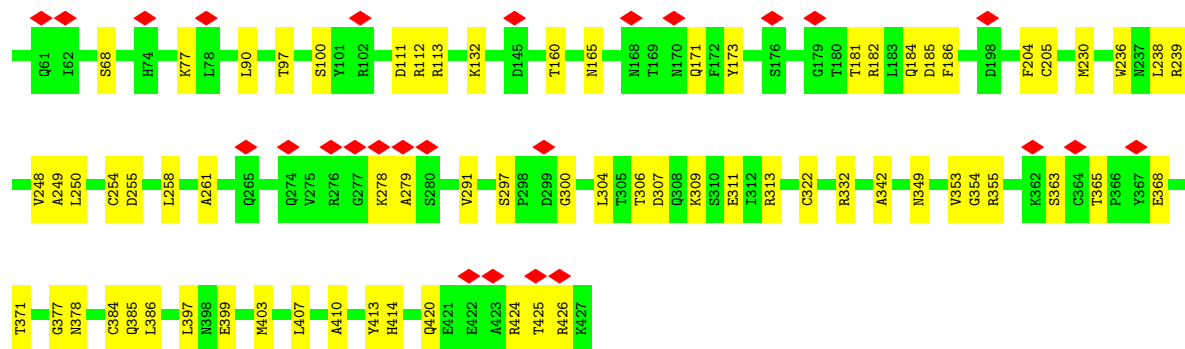






● Molecule 9: DNA damage-binding protein 2





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	84000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40.0	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	32.150	Depositor
Minimum map value	-14.283	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.952	Depositor
Recommended contour level	3.4	Depositor
Map size (Å)	258.0, 258.0, 258.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	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: T64

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.80	0/844	0.79	2/1130 (0.2%)
1	E	0.81	0/844	0.79	3/1130 (0.3%)
2	B	0.95	0/702	0.79	0/937
3	C	0.80	0/921	0.76	1/1239 (0.1%)
3	G	0.87	0/921	0.76	0/1239
4	D	0.91	0/777	0.66	0/1040
4	H	0.90	1/777 (0.1%)	0.67	1/1040 (0.1%)
5	F	0.93	0/660	0.83	1/883 (0.1%)
6	I	1.55	13/3334 (0.4%)	1.15	6/5145 (0.1%)
7	J	1.55	7/3283 (0.2%)	1.13	7/5062 (0.1%)
8	K	0.47	1/6595 (0.0%)	0.65	1/8919 (0.0%)
9	L	0.73	1/3021 (0.0%)	0.71	3/4103 (0.1%)
All	All	1.02	23/22679 (0.1%)	0.87	25/31867 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	1
8	K	0	2
9	L	0	1
All	All	0	4

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	I	48	DT	C5-C7	-7.21	1.45	1.50
6	I	36	DT	C5-C7	-6.61	1.46	1.50
7	J	89	DT	N1-C6	-6.17	1.33	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	I	73	DT	C5-C7	-5.86	1.46	1.50
4	H	102	LEU	C-N	-5.84	1.20	1.34
6	I	82	DA	N7-C5	-5.84	1.35	1.39
6	I	53	DC	C1'-N1	5.82	1.56	1.49
7	J	64	DT	C5-C7	-5.79	1.46	1.50
7	J	62	DT	C5-C7	-5.78	1.46	1.50
6	I	49	DC	C4-C5	-5.66	1.38	1.43
6	I	48	DT	C4-C5	-5.56	1.40	1.45
6	I	91	DT	C5-C7	-5.53	1.46	1.50
6	I	82	DA	N9-C4	-5.44	1.34	1.37
7	J	131	DC	C1'-N1	5.36	1.56	1.49
8	K	953	TRP	CB-CG	-5.36	1.40	1.50
6	I	82	DA	C5-C6	-5.30	1.36	1.41
6	I	118	DT	C5-C7	-5.28	1.46	1.50
7	J	101	DA	N7-C5	-5.28	1.36	1.39
7	J	90	DT	C5-C7	-5.19	1.47	1.50
7	J	64	DT	C4-C5	-5.10	1.40	1.45
9	L	248	VAL	CB-CG2	-5.09	1.42	1.52
6	I	29	DA	C6-N6	-5.08	1.29	1.33
6	I	50	DA	N7-C5	-5.07	1.36	1.39

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	J	79	DT	O4'-C1'-N1	8.49	113.94	108.00
1	E	66	LEU	CB-CG-CD1	7.33	123.47	111.00
9	L	68	SER	C-N-CA	7.16	139.60	121.70
7	J	87	DC	O4'-C4'-C3'	-5.78	102.19	104.50
1	A	37	LYS	CB-CG-CD	5.64	126.26	111.60
6	I	29	DA	O4'-C4'-C3'	-5.63	102.25	104.50
7	J	79	DT	O4'-C1'-C2'	-5.61	101.41	105.90
3	C	116	LEU	CA-CB-CG	5.57	128.11	115.30
8	K	947	ARG	NE-CZ-NH1	5.52	123.06	120.30
1	E	129	ARG	NE-CZ-NH2	-5.41	117.59	120.30
7	J	79	DT	N3-C4-O4	5.35	123.11	119.90
1	E	129	ARG	NE-CZ-NH1	5.35	122.97	120.30
9	L	239	ARG	NE-CZ-NH1	5.34	122.97	120.30
5	F	40	ARG	NE-CZ-NH1	5.32	122.96	120.30
6	I	48	DT	N3-C4-O4	5.26	123.06	119.90
7	J	77	DG	O4'-C1'-N9	5.16	111.61	108.00
1	A	129	ARG	NE-CZ-NH2	-5.15	117.73	120.30
6	I	37	DT	N3-C4-O4	5.14	122.98	119.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	L	424	ARG	CA-CB-CG	5.11	124.65	113.40
6	I	38	DT	N3-C4-O4	5.08	122.95	119.90
6	I	49	DC	O4'-C4'-C3'	-5.06	102.47	104.50
7	J	90	DT	N3-C4-O4	5.03	122.92	119.90
7	J	116	DT	N3-C4-O4	5.03	122.92	119.90
6	I	119	DT	N3-C4-O4	5.01	122.91	119.90
4	H	87	ARG	NE-CZ-NH1	5.00	122.80	120.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	21	LYS	Peptide
8	K	382	PHE	Mainchain
8	K	928	ARG	Peptide
9	L	111	ASP	Peptide

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

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	832	873	878	5	0
1	E	832	876	878	7	0
2	B	694	740	742	4	0
3	C	909	966	973	6	0
3	G	909	964	973	9	0
4	D	766	794	797	7	0
4	H	766	794	797	7	0
5	F	653	694	696	7	0
6	I	2972	1640	1641	7	0
7	J	2967	1640	1640	6	0
8	K	6478	6416	6445	59	0
9	L	2939	2872	2909	45	0
All	All	21717	19269	19369	141	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 3.

All (141) 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)
9:L:371:THR:OG1	9:L:386:LEU:O	2.02	0.78
8:K:926:LEU:HD21	9:L:90:LEU:HD22	1.68	0.75
9:L:173:TYR:OH	9:L:230:MET:SD	2.44	0.74
8:K:929:SER:OG	8:K:954:MET:SD	2.47	0.72
8:K:85:ASN:ND2	8:K:107:ASN:OD1	2.23	0.71
7:J:95:T64:H5MB	7:J:95:T64:H5A	1.73	0.71
2:B:24:ARG:O	2:B:26:ASN:ND2	2.23	0.70
9:L:254:CYS:SG	9:L:255:ASP:N	2.65	0.70
2:B:24:ARG:NH1	2:B:28:GLN:OE1	2.25	0.70
8:K:904:ASN:H	9:L:426:ARG:HG2	1.56	0.70
7:J:95:T64:OP1	9:L:112:ARG:NH1	2.27	0.68
8:K:275:ASP:OD2	8:K:279:ARG:N	2.27	0.68
4:D:116:THR:O	4:D:120:THR:OG1	2.11	0.68
8:K:127:GLU:OE1	8:K:129:ARG:NH2	2.27	0.68
9:L:384:CYS:SG	9:L:385:GLN:N	2.66	0.67
9:L:97:THR:OG1	9:L:420:GLN:NE2	2.28	0.67
8:K:942:PHE:O	9:L:426:ARG:NH2	2.28	0.67
3:G:93:GLU:N	3:G:93:GLU:OE1	2.28	0.66
8:K:381:ALA:O	8:K:385:GLY:N	2.30	0.65
9:L:250:LEU:HD23	9:L:258:LEU:HD13	1.79	0.64
3:C:93:GLU:N	3:C:93:GLU:OE1	2.31	0.64
8:K:928:ARG:NH2	9:L:403:MET:SD	2.71	0.63
9:L:311:GLU:OE2	9:L:313:ARG:NE	2.28	0.63
1:A:43:ARG:NH2	6:I:68:DG:OP1	2.31	0.63
3:C:42:GLU:N	3:C:42:GLU:OE1	2.30	0.62
1:A:60:GLU:N	1:A:60:GLU:OE1	2.31	0.62
8:K:820:LYS:NZ	8:K:825:PRO:O	2.28	0.62
8:K:771:PHE:O	8:K:775:THR:OG1	2.10	0.62
1:E:60:GLU:N	1:E:60:GLU:OE1	2.34	0.61
8:K:1055:GLN:OE1	8:K:1090:ASP:N	2.34	0.60
8:K:928:ARG:NH2	9:L:403:MET:O	2.35	0.60
9:L:355:ARG:NH1	9:L:368:GLU:OE2	2.35	0.59
3:G:42:GLU:N	3:G:42:GLU:OE1	2.36	0.59
4:H:37:SER:OG	4:H:38:TYR:N	2.36	0.59
6:I:51:DA:O5'	9:L:332:ARG:NH2	2.34	0.59
8:K:186:GLN:N	8:K:186:GLN:OE1	2.36	0.59
3:G:17:THR:O	3:G:20:SER:OG	2.18	0.59
9:L:113:ARG:HB3	9:L:132:LYS:HB2	1.85	0.58
8:K:8:THR:OG1	8:K:1092:ASP:OD2	2.21	0.57
9:L:249:ALA:O	9:L:258:LEU:HD12	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:43:ARG:HD2	4:D:89:THR:HG22	1.87	0.57
9:L:397:LEU:HB2	9:L:410:ALA:HB3	1.85	0.57
8:K:1024:THR:HG22	8:K:1043:LEU:HD23	1.86	0.56
9:L:160:THR:HG21	9:L:205:CYS:HA	1.86	0.56
8:K:739:ARG:NH1	8:K:757:SER:OG	2.37	0.56
4:D:59:ALA:HA	4:D:62:ILE:HD12	1.88	0.55
8:K:43:VAL:HG23	8:K:52:VAL:HG21	1.90	0.54
9:L:97:THR:O	9:L:420:GLN:NE2	2.40	0.54
8:K:1005:ASN:ND2	9:L:77:LYS:O	2.38	0.54
8:K:1070:HIS:NE2	8:K:1090:ASP:OD2	2.32	0.54
1:E:43:ARG:NH2	7:J:68:DG:OP1	2.39	0.54
1:A:56:GLN:O	3:G:82:ARG:NH2	2.41	0.54
9:L:399:GLU:O	9:L:407:LEU:HD12	2.09	0.53
3:G:43:ARG:NH2	7:J:37:DT:O3'	2.42	0.52
8:K:149:ASN:OD1	8:K:153:LYS:N	2.42	0.52
3:C:116:LEU:O	5:F:45:LYS:NZ	2.37	0.52
8:K:238:THR:HG22	8:K:247:ALA:CB	2.39	0.52
4:D:37:SER:OG	4:D:38:TYR:N	2.41	0.52
2:B:21:LYS:O	2:B:25:ASP:N	2.42	0.52
8:K:188:ARG:NH1	8:K:216:ALA:O	2.43	0.51
3:G:77:THR:O	4:H:53:THR:HG23	2.10	0.50
1:E:85:PHE:CE1	5:F:82:VAL:HG11	2.46	0.50
4:H:30:ARG:O	4:H:30:ARG:NE	2.32	0.49
8:K:931:LEU:HD21	8:K:933:LEU:HD21	1.93	0.49
8:K:928:ARG:HH22	9:L:403:MET:CG	2.24	0.49
8:K:1095:GLU:OE2	8:K:1140:HIS:NE2	2.37	0.49
9:L:182:ARG:NE	9:L:184:GLN:OE1	2.45	0.49
9:L:185:ASP:OD1	9:L:186:PHE:N	2.45	0.49
8:K:1114:TYR:CB	8:K:1124:ALA:HB2	2.43	0.49
8:K:886:SER:OG	8:K:886:SER:O	2.31	0.49
9:L:363:SER:OG	9:L:365:THR:O	2.26	0.48
9:L:250:LEU:CD2	9:L:258:LEU:HD13	2.42	0.48
8:K:907:ASN:OD1	8:K:947:ARG:NH2	2.46	0.48
9:L:181:THR:HG23	9:L:204:PHE:CD2	2.48	0.48
3:G:36:ARG:NH2	6:I:113:DC:OP2	2.47	0.47
9:L:307:ASP:OD1	9:L:311:GLU:N	2.47	0.47
8:K:83:LYS:NZ	8:K:1072:PHE:O	2.45	0.47
1:E:129:ARG:NH2	1:E:134:GLU:O	2.47	0.47
8:K:1025:GLN:O	8:K:1042:SER:OG	2.17	0.47
8:K:936:LYS:O	8:K:940:GLY:N	2.44	0.47
1:A:129:ARG:NH2	1:A:134:GLU:O	2.48	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:K:890:LEU:O	8:K:902:GLU:N	2.45	0.47
5:F:93:ARG:NH2	4:H:101:LEU:O	2.48	0.47
5:F:48:SER:OG	5:F:49:GLY:N	2.48	0.47
8:K:926:LEU:HD11	9:L:90:LEU:CD1	2.46	0.46
5:F:69:ASP:OD1	5:F:93:ARG:NH2	2.47	0.46
4:H:56:SER:OG	4:H:57:SER:N	2.49	0.46
8:K:158:ARG:NH1	9:L:322:CYS:SG	2.88	0.46
9:L:349:ASN:OD1	9:L:378:ASN:N	2.48	0.46
5:F:81:THR:OG1	6:I:100:DC:O3'	2.31	0.46
8:K:363:CYS:O	8:K:375:LEU:HD12	2.15	0.46
9:L:349:ASN:O	9:L:377:GLY:N	2.47	0.46
9:L:261:ALA:HB1	9:L:291:VAL:CG2	2.46	0.46
8:K:130:MET:HE2	8:K:197:LEU:HD21	1.98	0.45
1:A:119:THR:N	6:I:70:DT:OP1	2.49	0.45
4:D:56:SER:OG	4:D:57:SER:N	2.49	0.45
3:G:15:ALA:HB1	7:J:30:DA:H4'	1.97	0.45
6:I:33:DG:H2'	6:I:34:DT:H71	1.98	0.45
3:C:82:ARG:NH2	1:E:56:GLN:O	2.49	0.44
9:L:413:TYR:O	9:L:414:HIS:ND1	2.51	0.44
7:J:116:DT:H2'	7:J:117:DT:H72	1.99	0.44
8:K:49:LEU:HD23	8:K:49:LEU:H	1.81	0.44
8:K:879:LYS:HB2	8:K:890:LEU:HD11	2.00	0.44
8:K:884:ILE:HG22	8:K:885:ASN:H	1.81	0.44
8:K:259:VAL:HG21	8:K:276:MET:SD	2.57	0.43
8:K:886:SER:OG	8:K:908:ASN:O	2.08	0.43
2:B:48:SER:OG	2:B:49:GLY:N	2.52	0.43
9:L:100:SER:O	9:L:100:SER:OG	2.34	0.43
9:L:353:VAL:HG12	9:L:354:GLY:N	2.34	0.43
1:E:85:PHE:HE1	5:F:82:VAL:HG11	1.83	0.43
8:K:36:ASN:OD1	8:K:60:LYS:NZ	2.46	0.43
9:L:297:SER:OG	9:L:300:GLY:N	2.47	0.43
9:L:165:ASN:ND2	9:L:171:GLN:OE1	2.52	0.43
3:C:17:THR:O	3:C:20:SER:OG	2.34	0.43
4:H:59:ALA:HA	4:H:62:ILE:HD12	2.01	0.43
9:L:238:LEU:HD21	9:L:278:LYS:N	2.33	0.43
6:I:73:DT:H2'	6:I:74:DT:H71	2.01	0.42
8:K:170:LEU:HD21	8:K:179:CYS:HB3	2.01	0.42
8:K:978:GLN:NE2	8:K:979:LYS:O	2.52	0.42
8:K:189:HIS:ND1	8:K:211:ASN:OD1	2.50	0.42
8:K:904:ASN:ND2	9:L:425:THR:O	2.44	0.42
8:K:89:LEU:HD23	8:K:100:ILE:HG21	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:116:THR:O	4:H:120:THR:OG1	2.37	0.42
8:K:926:LEU:HD11	9:L:90:LEU:HD13	2.02	0.42
4:D:30:ARG:O	4:D:30:ARG:NE	2.36	0.41
4:D:90:ILE:HG23	4:D:90:ILE:O	2.20	0.41
9:L:307:ASP:OD2	9:L:309:LYS:N	2.49	0.41
8:K:1127:ASP:OD1	8:K:1128:ASP:N	2.53	0.41
8:K:883:SER:OG	8:K:914:LEU:HD11	2.21	0.41
8:K:1114:TYR:HB3	8:K:1124:ALA:HB2	2.01	0.41
8:K:971:ALA:O	8:K:973:ASN:ND2	2.53	0.41
9:L:278:LYS:O	9:L:279:ALA:HB3	2.21	0.41
9:L:304:LEU:HD21	9:L:342:ALA:HB1	2.02	0.41
8:K:793:ILE:HD13	8:K:803:HIS:HB3	2.03	0.40
8:K:909:ILE:HG21	8:K:927:MET:SD	2.61	0.40
3:G:39:ASN:OD1	3:G:39:ASN:N	2.53	0.40
8:K:1021:SER:O	8:K:1021:SER:OG	2.37	0.40
1:E:107:ASP:OD1	1:E:132:ARG:NH2	2.49	0.40
8:K:318:ASP:OD1	8:K:318:ASP:N	2.54	0.40
8:K:1114:TYR:HB2	8:K:1124:ALA:HB2	2.03	0.40
8:K:118:THR:OG1	8:K:134:ARG:NH2	2.47	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	A	99/139 (71%)	95 (96%)	4 (4%)	0	100	100
1	E	99/139 (71%)	97 (98%)	2 (2%)	0	100	100
2	B	84/106 (79%)	75 (89%)	8 (10%)	1 (1%)	13	50
3	C	115/133 (86%)	110 (96%)	5 (4%)	0	100	100
3	G	115/133 (86%)	110 (96%)	5 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	D	95/129 (74%)	90 (95%)	5 (5%)	0	100	100
4	H	95/129 (74%)	89 (94%)	6 (6%)	0	100	100
5	F	80/103 (78%)	79 (99%)	1 (1%)	0	100	100
8	K	821/1144 (72%)	794 (97%)	24 (3%)	3 (0%)	34	72
9	L	371/431 (86%)	317 (85%)	53 (14%)	1 (0%)	41	76
All	All	1974/2586 (76%)	1856 (94%)	113 (6%)	5 (0%)	44	76

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	K	382	PHE
2	B	22	VAL
8	K	885	ASN
9	L	236	TRP
8	K	383	LYS

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	88/113 (78%)	85 (97%)	3 (3%)	37	61
1	E	88/113 (78%)	86 (98%)	2 (2%)	50	70
2	B	71/81 (88%)	70 (99%)	1 (1%)	67	81
3	C	93/102 (91%)	93 (100%)	0	100	100
3	G	93/102 (91%)	93 (100%)	0	100	100
4	D	83/107 (78%)	81 (98%)	2 (2%)	49	69
4	H	83/107 (78%)	80 (96%)	3 (4%)	35	60
5	F	67/79 (85%)	65 (97%)	2 (3%)	41	64
8	K	720/1000 (72%)	719 (100%)	1 (0%)	93	97
9	L	322/372 (87%)	321 (100%)	1 (0%)	92	95

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1708/2176 (78%)	1693 (99%)	15 (1%)	79 88

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	37	LYS
1	A	124	ASP
1	A	130	ARG
2	B	48	SER
4	D	31	LYS
4	D	120	THR
1	E	124	ASP
1	E	130	ARG
5	F	26	ASN
5	F	48	SER
4	H	31	LYS
4	H	113	SER
4	H	120	THR
8	K	928	ARG
9	L	306	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	40	HIS
3	C	25	GLN
8	K	93	GLN
8	K	908	ASN
8	K	1034	ASN
8	K	1059	ASN
9	L	241	HIS
9	L	345	HIS
9	L	420	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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
7	T64	J	95	7	41,44,45	3.67	19 (46%)	53,69,72	4.34	20 (37%)

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
7	T64	J	95	7	-	15/22/76/77	0/3/5/5

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	95	T64	C6T-N1T	9.48	1.54	1.38
7	J	95	T64	C2-N3	8.32	1.52	1.38
7	J	95	T64	C6T-C5T	7.93	1.47	1.34
7	J	95	T64	C2-N1	7.69	1.52	1.36
7	J	95	T64	C6-C4T	7.18	1.61	1.51
7	J	95	T64	C4-N3	5.79	1.46	1.37
7	J	95	T64	C2T-N3T	5.57	1.47	1.36
7	J	95	T64	C5A-C5	4.94	1.61	1.52
7	J	95	T64	C2T-N1T	4.27	1.49	1.40
7	J	95	T64	C1'-N1	4.16	1.51	1.45
7	J	95	T64	C4T-N3T	3.72	1.42	1.31
7	J	95	T64	C1R-N1T	-3.07	1.40	1.48
7	J	95	T64	C2'-C3R	-3.02	1.46	1.52
7	J	95	T64	PB-O3R	2.96	1.68	1.60
7	J	95	T64	O2T-C2T	-2.77	1.18	1.23
7	J	95	T64	O2-C2	-2.48	1.18	1.23
7	J	95	T64	O4-C4	-2.42	1.18	1.22
7	J	95	T64	O3R-C3R	-2.32	1.41	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	95	T64	PB-O5R	2.06	1.67	1.59

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	J	95	T64	O4T-C5-C4	-16.67	83.98	109.87
7	J	95	T64	O4T-C5-C5A	-12.45	84.90	109.09
7	J	95	T64	C2'-C1'-N1	9.53	128.47	115.59
7	J	95	T64	C6-C5-C4	9.53	124.57	109.70
7	J	95	T64	O4T-C5-C6	-7.28	91.36	107.84
7	J	95	T64	N3-C2-N1	6.75	123.70	116.69
7	J	95	T64	C5T-C4T-N3T	-6.49	119.61	123.49
7	J	95	T64	C6T-N1T-C2T	-5.54	113.20	120.87
7	J	95	T64	C5A-C5-C6	5.51	118.32	109.64
7	J	95	T64	C5A-C5-C4	5.26	116.19	108.72
7	J	95	T64	O4'-C1'-N1	-4.95	102.79	108.65
7	J	95	T64	C1R-N1T-C6T	4.12	127.88	120.77
7	J	95	T64	C4-N3-C2	-4.02	120.48	126.67
7	J	95	T64	C5M-C5T-C6T	-3.68	117.93	122.85
7	J	95	T64	C2T-N3T-C4T	3.56	122.31	119.02
7	J	95	T64	O2-C2-N3	-3.26	115.44	121.50
7	J	95	T64	C5M-C5T-C4T	2.87	122.16	118.36
7	J	95	T64	O5P-PB-O5R	2.45	119.11	107.75
7	J	95	T64	O4R-C1R-N1T	-2.23	103.87	107.86
7	J	95	T64	C2R-C3'-C4'	2.19	107.31	102.76

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	J	95	T64	C3R-O3R-PB-O5R
7	J	95	T64	C5R-O5R-PB-O4P
7	J	95	T64	C5R-O5R-PB-O5P
7	J	95	T64	C2'-C3R-O3R-PB
7	J	95	T64	C3'-C4'-C5R-O5R
7	J	95	T64	O4R-C4'-C5R-O5R
7	J	95	T64	C3R-C4R-C5'-O5'
7	J	95	T64	O4'-C4R-C5'-O5'
7	J	95	T64	C5R-O5R-PB-O3R
7	J	95	T64	C2R-C1R-N1T-C6T
7	J	95	T64	C2R-C1R-N1T-C2T
7	J	95	T64	O4R-C1R-N1T-C6T

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Mol	Chain	Res	Type	Atoms
7	J	95	T64	O4R-C1R-N1T-C2T
7	J	95	T64	C4R-C5'-O5'-P
7	J	95	T64	O4'-C1'-N1-C2

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	J	95	T64	2	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 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.

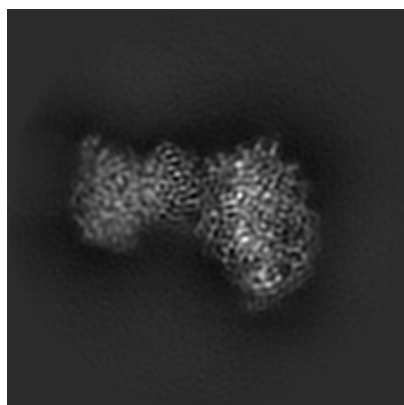
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4762. These allow visual inspection of the internal detail of the map and identification of artifacts.

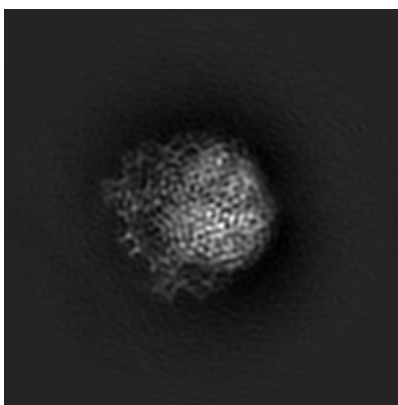
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

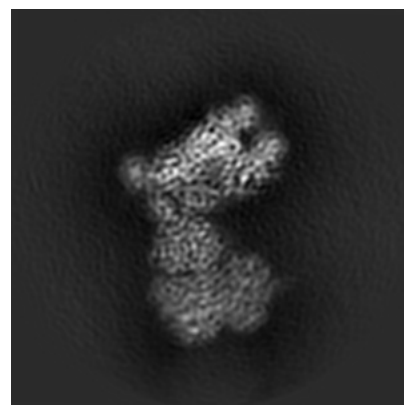
#### 6.1.1 Primary map



X



Y

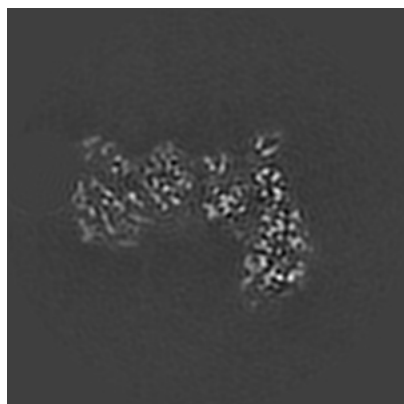


Z

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

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

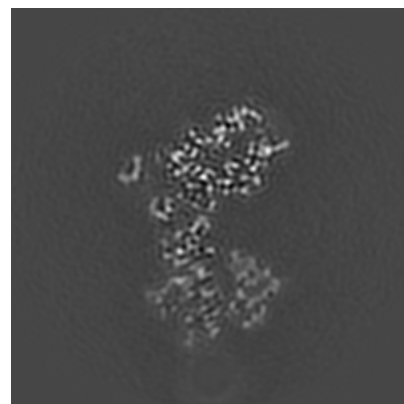
#### 6.2.1 Primary map



X Index: 150



Y Index: 150



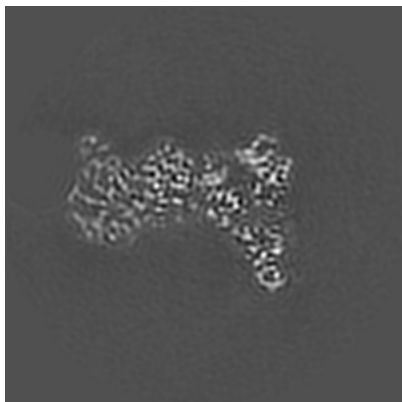
Z Index: 150



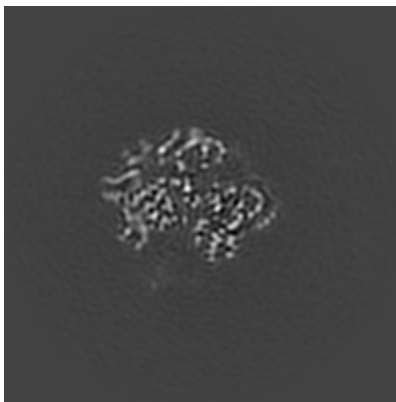
The images above show central slices of the map in three orthogonal directions.

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

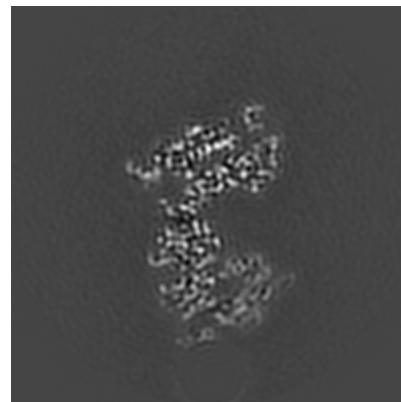
### 6.3.1 Primary map



X Index: 143



Y Index: 193

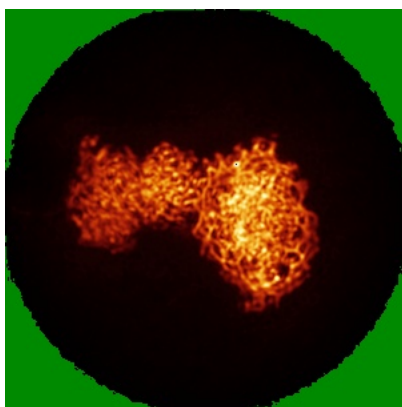


Z Index: 159

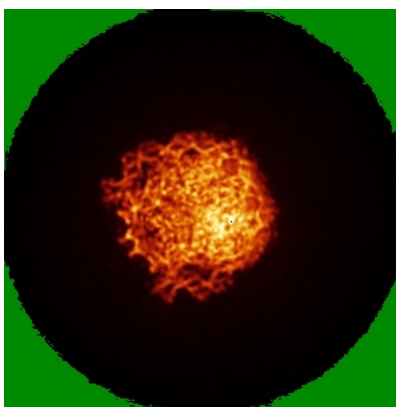
The images above show the largest variance slices of the map in three orthogonal directions.

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

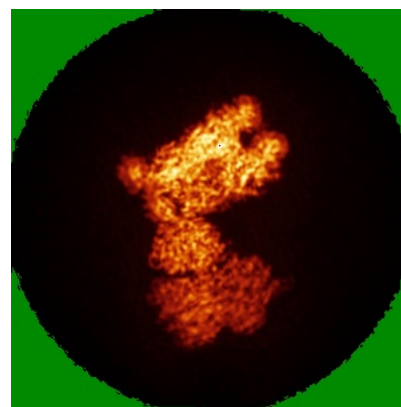
### 6.4.1 Primary map



X



Y

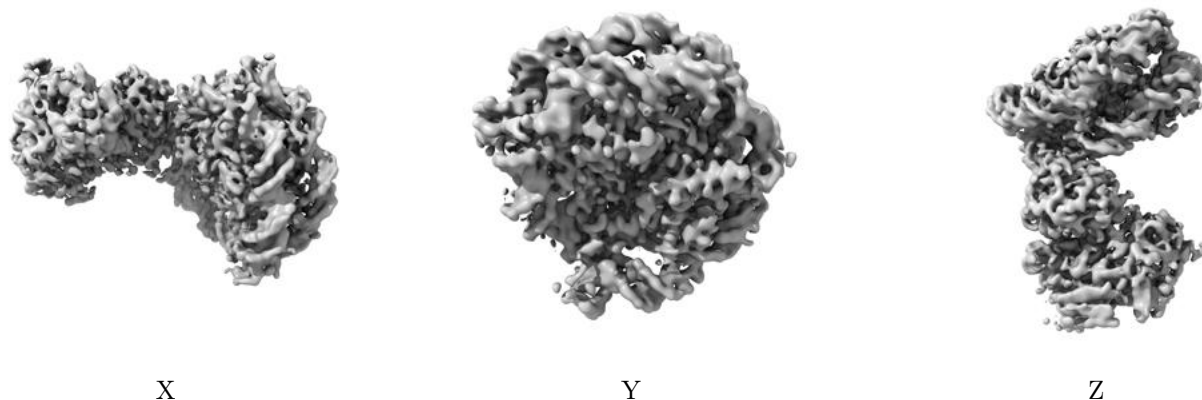


Z

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

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

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 3.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

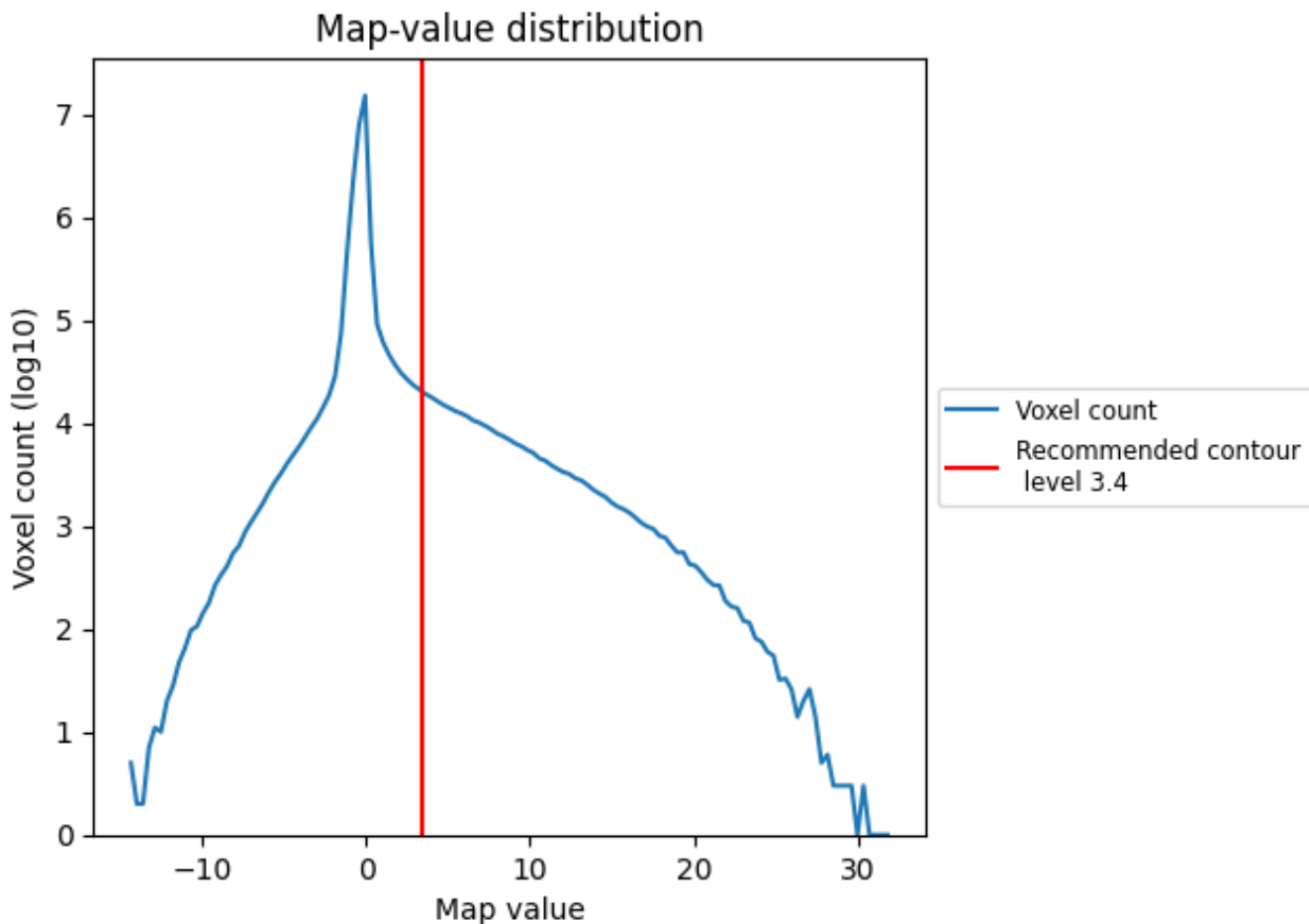
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

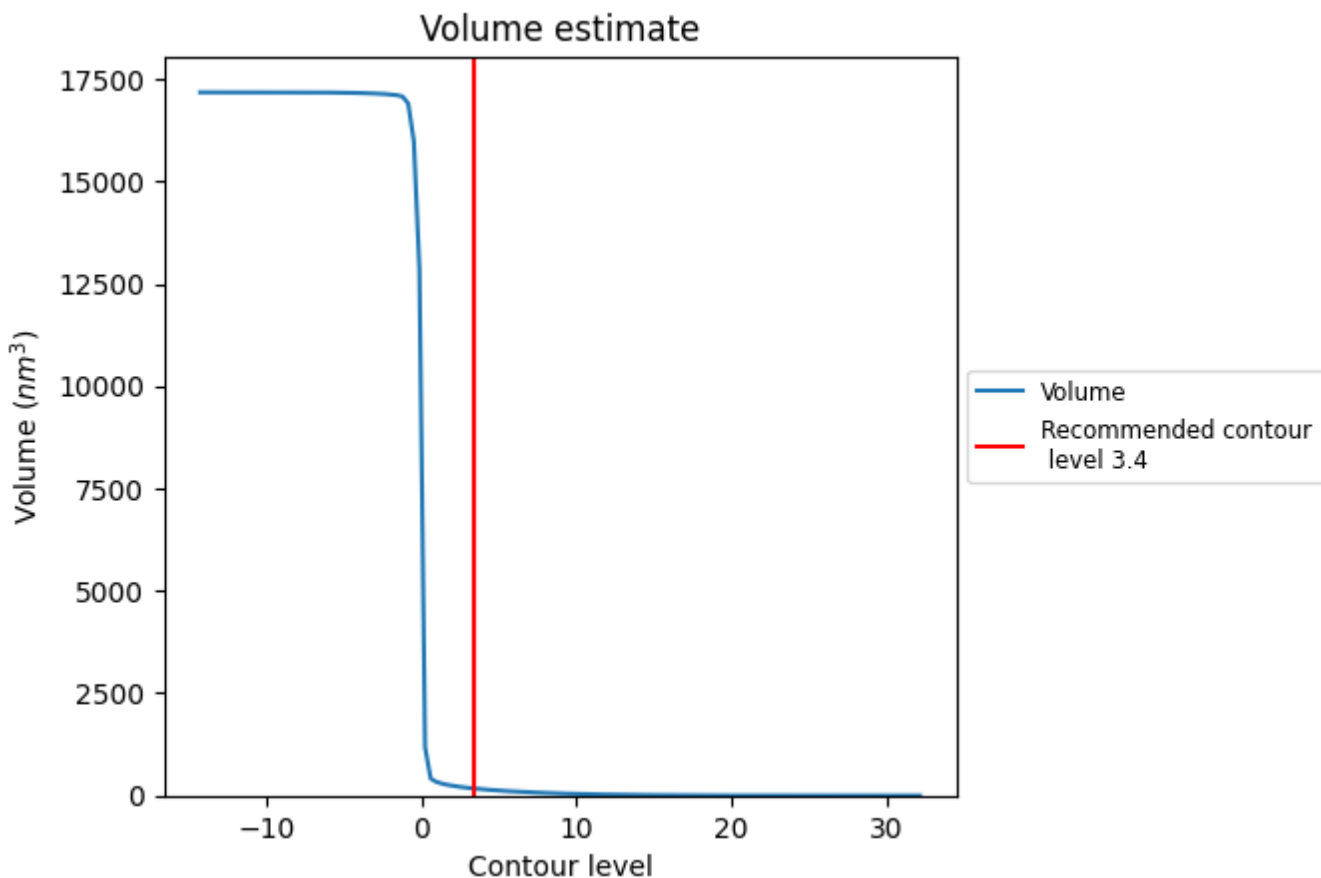
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

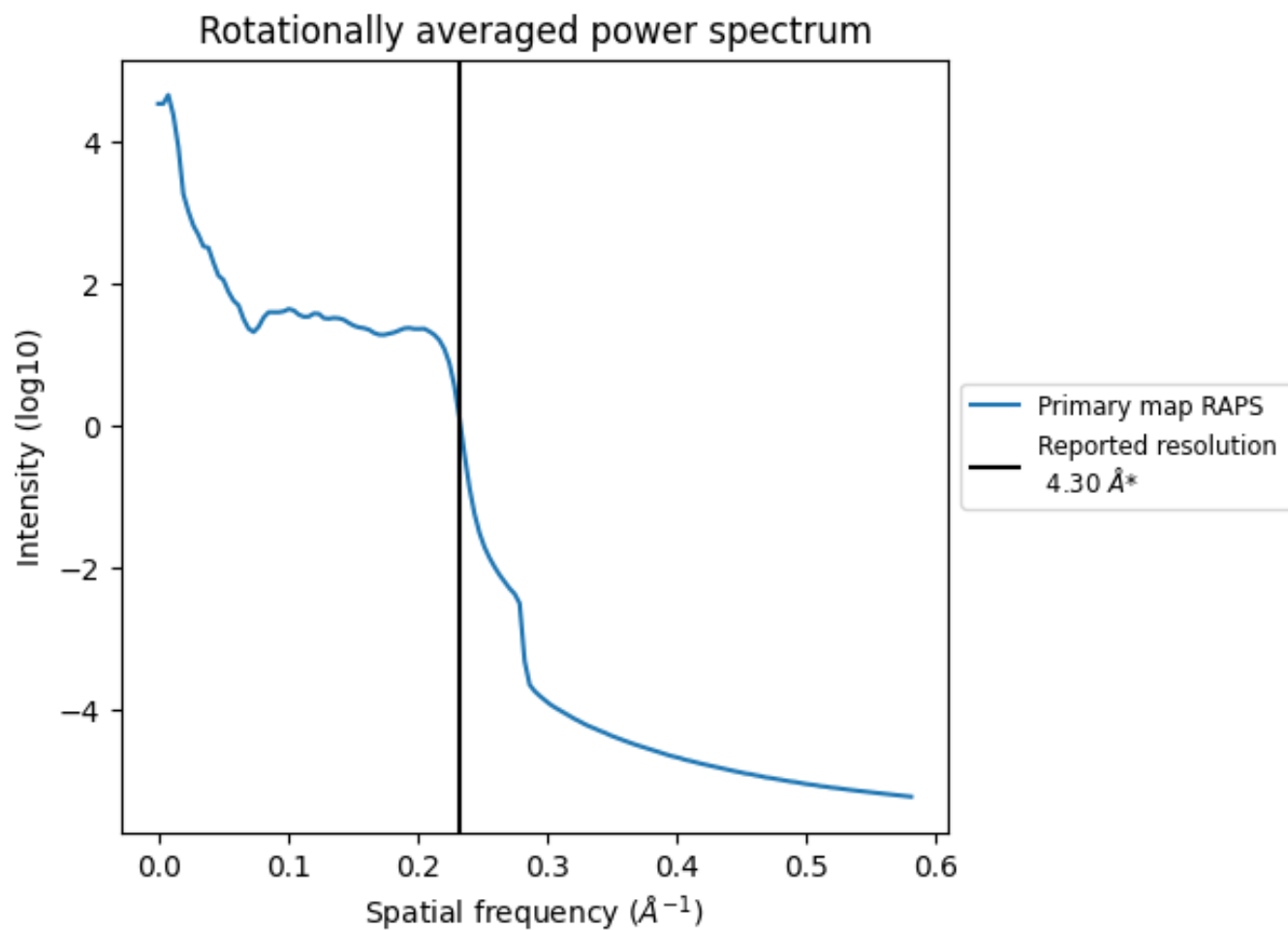
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 172 nm<sup>3</sup>; this corresponds to an approximate mass of 156 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  $0.233 \text{\AA}^{-1}$

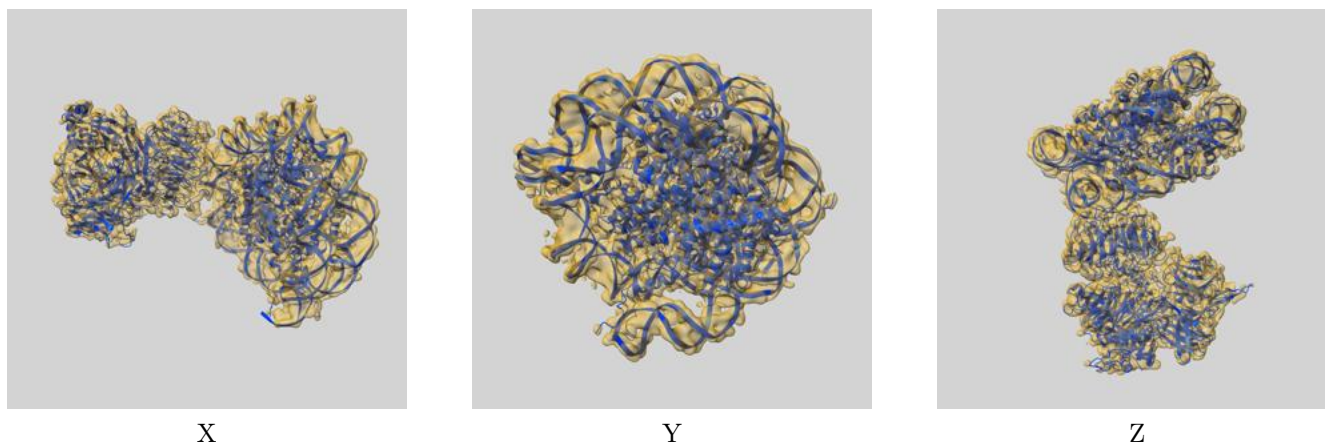
## 8 Fourier-Shell correlation

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

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

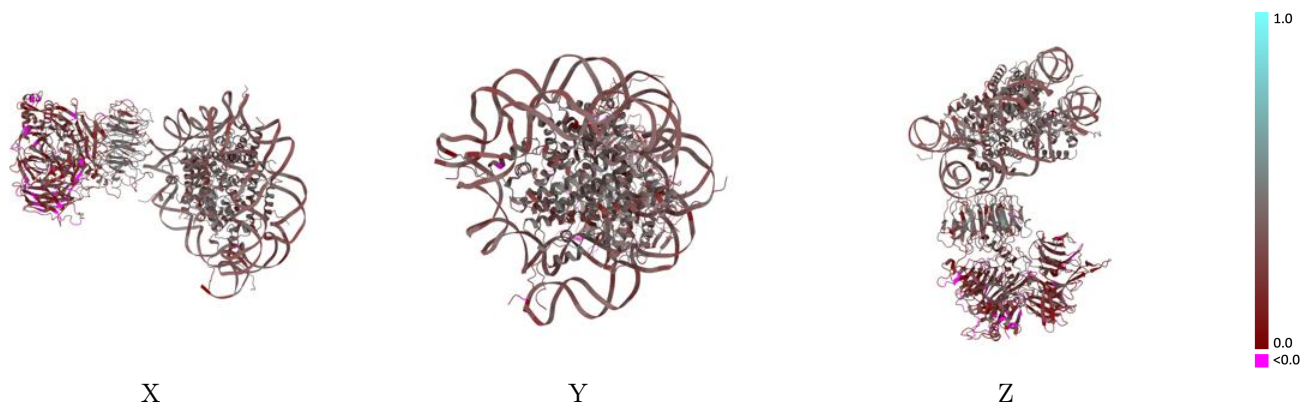
This section contains information regarding the fit between EMDB map EMD-4762 and PDB model 6R8Y. Per-residue inclusion information can be found in section 3 on page 7.

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



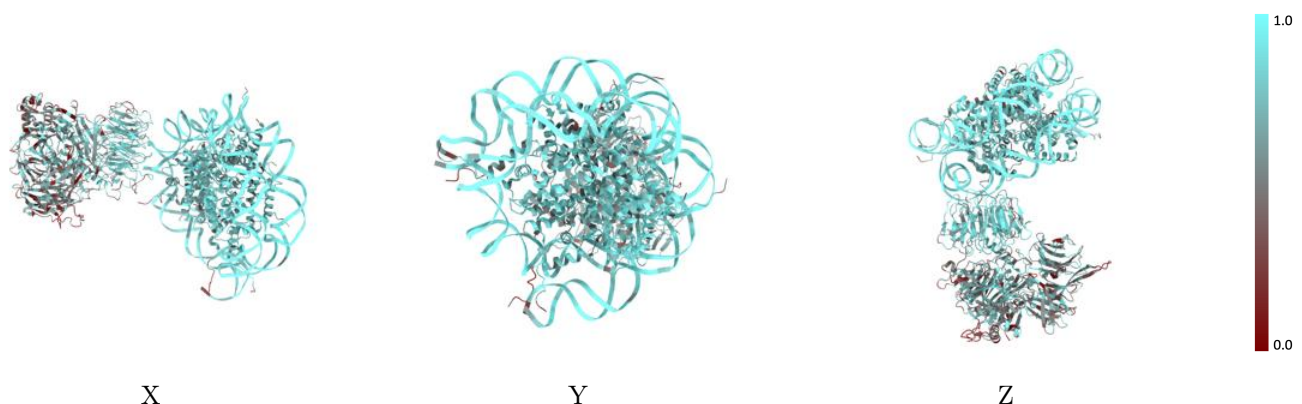
The images above show the 3D surface view of the map at the recommended contour level 3.4 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 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.

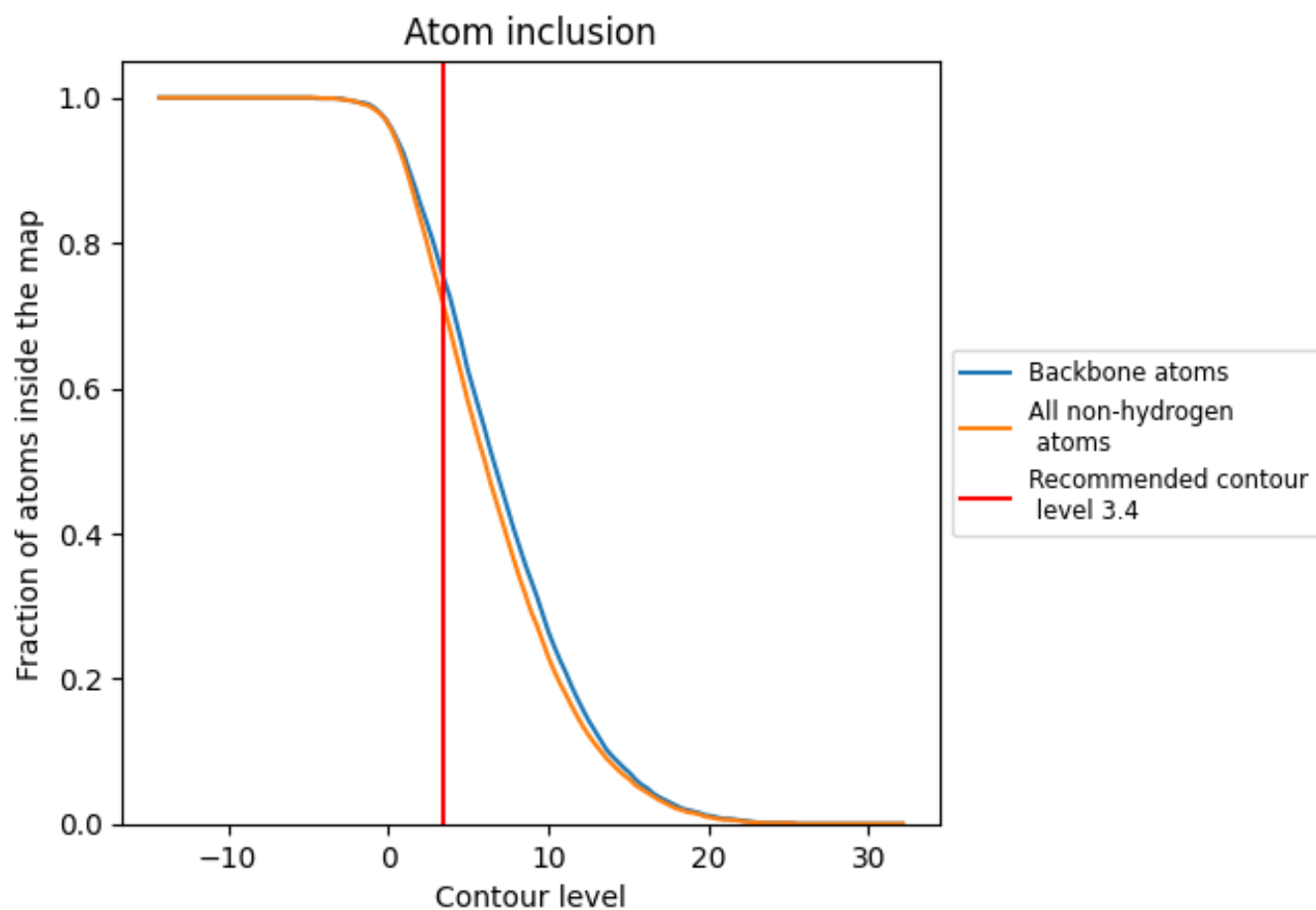
## 9.3 Atom inclusion mapped to coordinate model [i](#)



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 (3.4).





























## 9.4 Atom inclusion [i](#)



At the recommended contour level, 76% of all backbone atoms, 72% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (3.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7190	 0.3130
A	 0.7710	 0.3700
B	 0.7830	 0.4060
C	 0.7680	 0.3710
D	 0.8000	 0.3810
E	 0.7880	 0.3710
F	 0.8180	 0.4110
G	 0.7490	 0.3650
H	 0.7960	 0.3690
I	 0.8800	 0.3270
J	 0.8810	 0.3290
K	 0.5500	 0.2200
L	 0.7360	 0.3470

