Full wwPDB EM Validation Report ⓘ

Jul 7, 2024 – 11:38 am BST

PDB ID	:	7QNZ
EMDB ID	:	EMD-14078
Title	:	human Lig1-DNA-PCNA complex reconstituted in absence of ATP
Authors	:	Blair, K.; Tehseen, M.; Raducanu, V.S.; Shahid, T.; Lancey, C.; Cruehet, R.; Hamdan, S.; De Biasio, A.
Deposited on	:	2021-12-23
Resolution	:	4.58 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

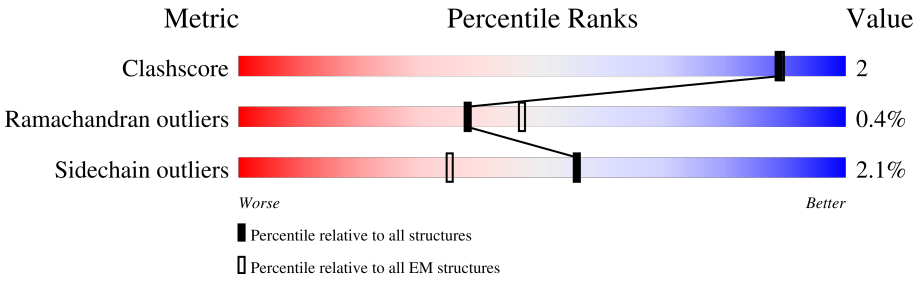
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 4.58 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 >=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 <=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	919	11% 63% 6% • 30%
2	B	264	14% 87% 7% 6%
2	C	264	23% 85% 8% • 6%
2	D	264	11% 91% 5% •
3	H	19	5% 11% 68% 21%
4	I	13	8% 23% 62% 8% 8%
5	J	32	16% 66% 16% •

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 11946 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called DNA ligase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	640	Total	C	N	O	S	0	0
			4960	3146	865	933	16		

- Molecule 2 is a protein called Proliferating cell nuclear antigen.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	249	Total	C	N	O	S	0	0
			1899	1198	312	373	16		
2	C	248	Total	C	N	O	S	0	0
			1880	1186	307	371	16		
2	D	253	Total	C	N	O	S	0	0
			1914	1208	316	374	16		

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	GLY	-	expression tag	UNP P12004
B	-1	PRO	-	expression tag	UNP P12004
B	0	HIS	-	expression tag	UNP P12004
C	-2	GLY	-	expression tag	UNP P12004
C	-1	PRO	-	expression tag	UNP P12004
C	0	HIS	-	expression tag	UNP P12004
D	-2	GLY	-	expression tag	UNP P12004
D	-1	PRO	-	expression tag	UNP P12004
D	0	HIS	-	expression tag	UNP P12004

- Molecule 3 is a DNA chain called Oligo19ddC.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	H	19	Total	C	N	O	P	0	0
			387	185	64	119	19		

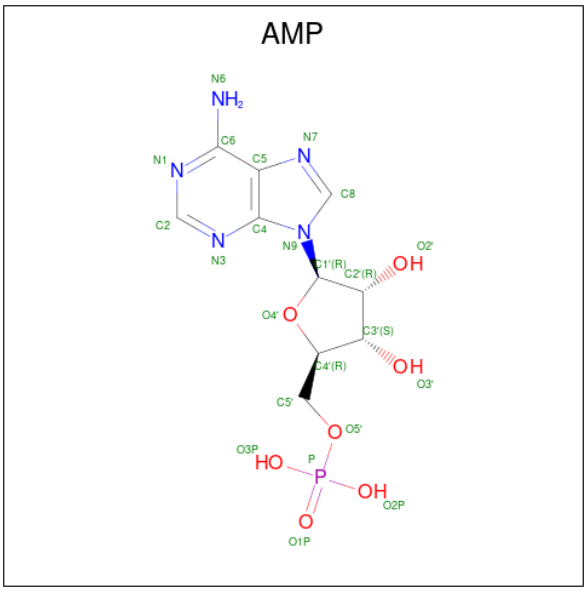
- Molecule 4 is a DNA chain called Oligo13P.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	I	12	Total	C	N	O	P	0	0
			248	117	48	71	12		

- Molecule 5 is a DNA chain called Oligo32.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	J	31	Total	C	N	O	P	0	0
			635	300	123	181	31		

- Molecule 6 is ADENOSINE MONOPHOSPHATE (three-letter code: AMP) (formula: $C_{10}H_{14}N_5O_7P$) (labeled as "Ligand of Interest" by depositor).



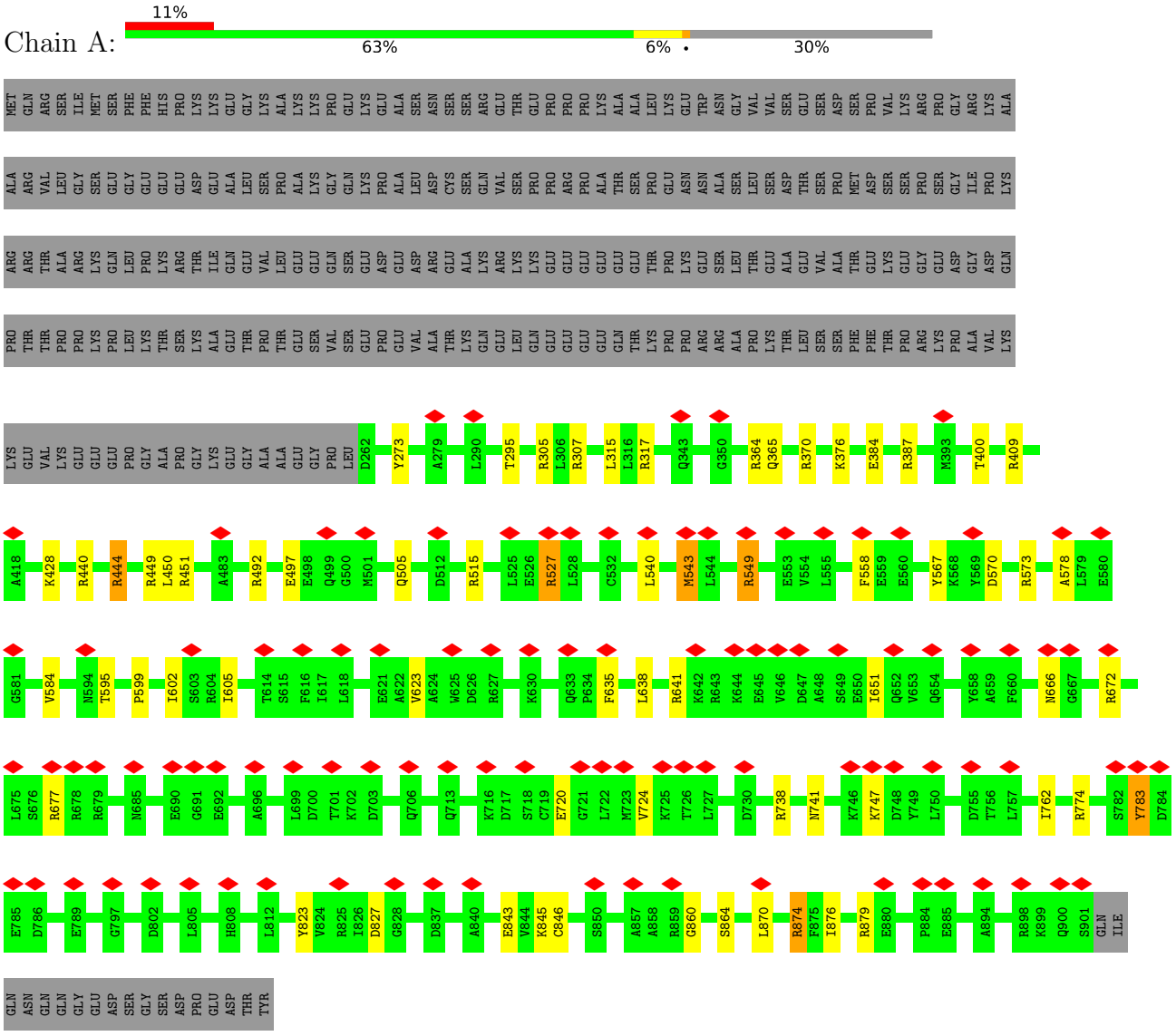
Mol	Chain	Residues	Atoms					AltConf
6	I	1	Total	C	N	O	P	0
			23	10	5	7	1	

3 Residue-property plots (i)

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

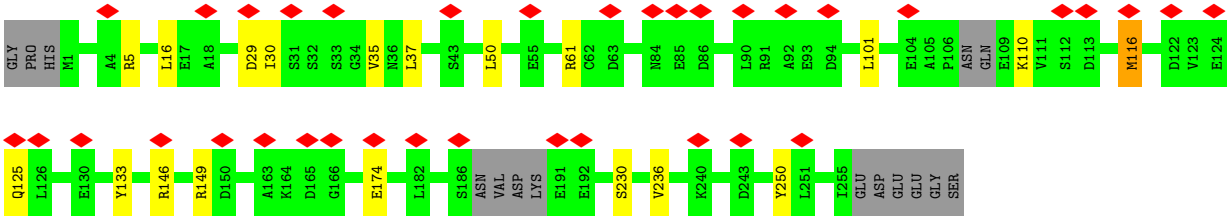
• Molecule 1: DNA ligase 1

Chain A:

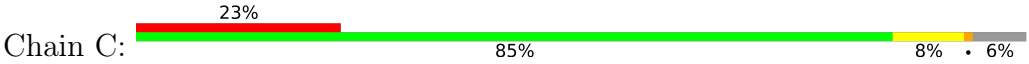


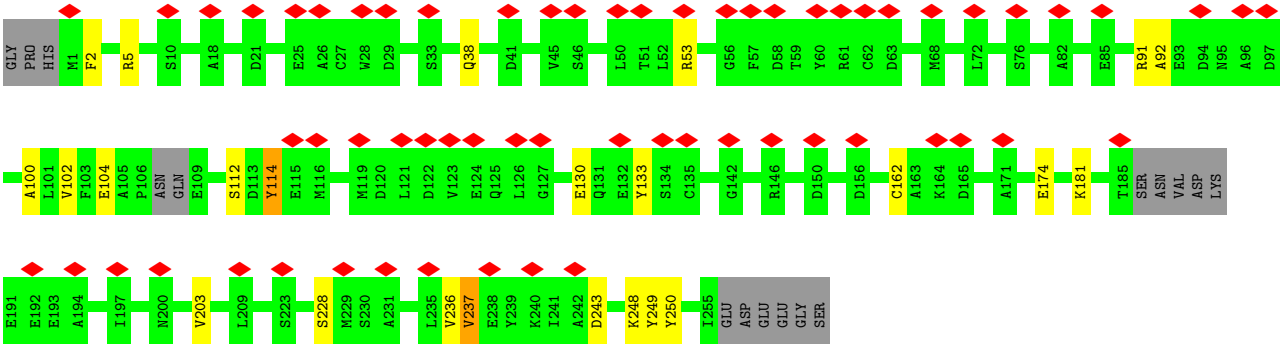
• Molecule 2: Proliferating cell nuclear antigen

Chain B:

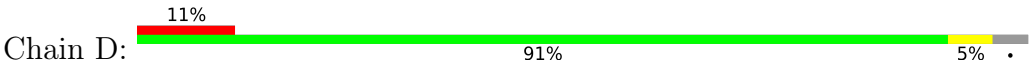


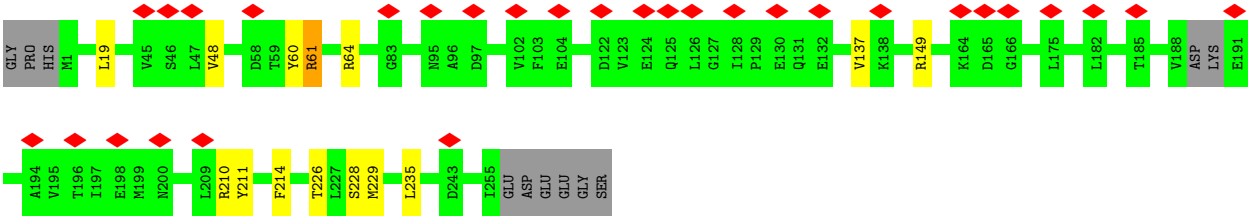
• Molecule 2: Proliferating cell nuclear antigen



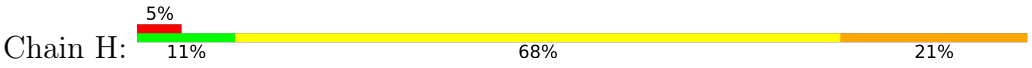


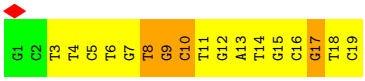
• Molecule 2: Proliferating cell nuclear antigen



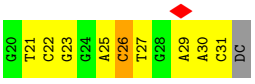


• Molecule 3: Oligo19ddC



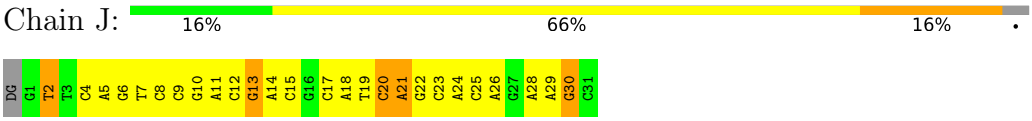


• Molecule 4: Oligo13P



• Molecule 5: Oligo32

Chain J:


16%
66%
16%
DG
G1
T2
T3
C4
A5
G6
T7
C8
C9
G10
A11
C12
G13
A14
C15
G16
C17
A18
T19
C20
A21
G22
C23
A24
C25
A26
G27
A28
A29
G30
C31

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	73886	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 ($e^-/Å^2$)	18	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	14.312	Depositor
Minimum map value	-12.285	Depositor
Average map value	0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	2.0	Depositor
Map size (Å)	128.59, 119.405, 128.59	wwPDB
Map dimensions	154, 143, 154	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.835, 0.835, 0.835	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.64	0/5059	1.04	24/6859 (0.3%)
2	B	0.59	0/1923	0.94	4/2596 (0.2%)
2	C	0.58	0/1904	0.94	5/2573 (0.2%)
2	D	0.58	0/1939	0.95	5/2621 (0.2%)
3	H	1.65	2/411 (0.5%)	2.14	26/633 (4.1%)
4	I	1.65	0/278	2.25	20/427 (4.7%)
5	J	1.61	2/713 (0.3%)	2.20	48/1097 (4.4%)
All	All	0.80	4/12227 (0.0%)	1.21	132/16806 (0.8%)

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	5
2	D	0	1
3	H	0	2
4	I	0	1
5	J	0	4
All	All	0	13

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	17	DG	O3'-P	-7.56	1.52	1.61
3	H	16	DC	C4-N4	-5.51	1.28	1.33
5	J	15	DC	C4-N4	-5.03	1.29	1.33
5	J	29	DA	C5-C4	-5.03	1.35	1.38

All (132) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	I	30	DA	C5-C6-N1	9.02	122.21	117.70
1	A	492	ARG	NE-CZ-NH2	8.84	124.72	120.30
5	J	5	DA	C5-C6-N1	8.68	122.04	117.70
5	J	28	DA	N1-C6-N6	-8.51	113.50	118.60
1	A	783	TYR	CB-CG-CD1	-8.48	115.91	121.00
4	I	25	DA	C5-C6-N1	8.36	121.88	117.70
5	J	29	DA	C4-C5-C6	-8.08	112.96	117.00
1	A	387	ARG	NE-CZ-NH2	8.02	124.31	120.30
3	H	4	DT	C6-C5-C7	-7.96	118.13	122.90
4	I	25	DA	N1-C6-N6	-7.88	113.87	118.60
5	J	29	DA	C5-C6-N1	7.78	121.59	117.70
4	I	29	DA	C5-C6-N1	7.77	121.59	117.70
3	H	5	DC	N1-C2-O2	7.71	123.53	118.90
1	A	549	ARG	NE-CZ-NH2	7.61	124.10	120.30
5	J	14	DA	C5-C6-N1	7.51	121.45	117.70
1	A	549	ARG	NE-CZ-NH1	-7.47	116.57	120.30
5	J	8	DC	N3-C2-O2	-7.39	116.73	121.90
5	J	28	DA	C5-C6-N1	7.36	121.38	117.70
5	J	28	DA	C4-C5-C6	-7.33	113.33	117.00
3	H	13	DA	N1-C6-N6	-7.31	114.21	118.60
2	D	60	TYR	CB-CG-CD1	-7.30	116.62	121.00
5	J	17	DC	N3-C2-O2	-7.30	116.79	121.90
3	H	13	DA	C4-C5-C6	-7.20	113.40	117.00
4	I	21	DT	C6-C5-C7	-7.18	118.59	122.90
4	I	29	DA	C4-C5-C6	-7.17	113.42	117.00
5	J	14	DA	N1-C6-N6	-7.08	114.35	118.60
1	A	879	ARG	NE-CZ-NH2	7.05	123.83	120.30
5	J	23	DC	N3-C4-C5	7.03	124.71	121.90
1	A	573	ARG	NE-CZ-NH2	6.98	123.79	120.30
1	A	451	ARG	NE-CZ-NH2	6.94	123.77	120.30
5	J	18	DA	C5-C6-N1	6.92	121.16	117.70
1	A	567	TYR	CB-CG-CD2	-6.87	116.88	121.00
4	I	31	DC	N1-C2-O2	6.84	123.00	118.90
4	I	30	DA	C4-C5-C6	-6.76	113.62	117.00
5	J	26	DA	C5-C6-N1	6.73	121.07	117.70
1	A	449	ARG	NE-CZ-NH2	6.73	123.66	120.30
5	J	25	DC	N3-C2-O2	-6.73	117.19	121.90
3	H	9	DG	C5-C6-N1	6.71	114.86	111.50
1	A	641	ARG	NE-CZ-NH2	6.67	123.63	120.30
1	A	823	TYR	CB-CG-CD2	-6.66	117.00	121.00
5	J	22	DG	O4'-C1'-N9	6.66	112.66	108.00
5	J	18	DA	C4-C5-C6	-6.63	113.69	117.00
4	I	25	DA	C4-C5-C6	-6.61	113.69	117.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	J	11	DA	C5-C6-N1	6.55	120.97	117.70
2	B	5	ARG	NE-CZ-NH2	6.48	123.54	120.30
5	J	20	DC	N1-C2-O2	6.47	122.78	118.90
5	J	5	DA	C4-C5-C6	-6.47	113.77	117.00
1	A	677	ARG	NE-CZ-NH2	6.41	123.51	120.30
4	I	31	DC	N3-C2-O2	-6.29	117.50	121.90
5	J	24	DA	C5-C6-N1	6.16	120.78	117.70
2	B	146	ARG	NE-CZ-NH2	6.16	123.38	120.30
2	D	61	ARG	NE-CZ-NH2	6.15	123.38	120.30
5	J	14	DA	C4-C5-C6	-6.14	113.93	117.00
5	J	15	DC	N3-C4-C5	6.13	124.35	121.90
4	I	22	DC	N3-C4-C5	6.13	124.35	121.90
5	J	10	DG	O4'-C1'-N9	6.08	112.25	108.00
3	H	16	DC	N1-C2-O2	6.07	122.54	118.90
2	C	250	TYR	CB-CG-CD2	-6.06	117.36	121.00
2	D	149	ARG	NE-CZ-NH2	6.04	123.32	120.30
5	J	20	DC	N3-C2-O2	-6.04	117.67	121.90
2	C	53	ARG	NE-CZ-NH2	6.03	123.32	120.30
5	J	25	DC	N3-C4-C5	5.99	124.29	121.90
4	I	26	DC	N3-C2-O2	-5.97	117.72	121.90
3	H	8	DT	C6-C5-C7	-5.93	119.34	122.90
3	H	8	DT	C4'-C3'-C2'	-5.90	97.79	103.10
3	H	11	DT	C6-C5-C7	-5.89	119.36	122.90
1	A	317	ARG	NE-CZ-NH2	5.87	123.24	120.30
4	I	22	DC	C5-C4-N4	-5.85	116.10	120.20
3	H	13	DA	C5-C6-N1	5.85	120.62	117.70
2	C	114	TYR	CB-CG-CD1	-5.82	117.51	121.00
4	I	31	DC	N3-C4-N4	-5.80	113.94	118.00
1	A	874	ARG	NE-CZ-NH2	5.76	123.18	120.30
3	H	7	DG	C5-C6-N1	5.76	114.38	111.50
5	J	9	DC	N3-C2-O2	-5.75	117.88	121.90
5	J	24	DA	O4'-C1'-N9	5.75	112.03	108.00
3	H	15	DG	C5-C6-N1	5.73	114.36	111.50
4	I	30	DA	N1-C6-N6	-5.71	115.17	118.60
2	B	61	ARG	NE-CZ-NH2	5.64	123.12	120.30
5	J	8	DC	N1-C2-O2	5.59	122.25	118.90
1	A	527	ARG	NE-CZ-NH2	5.54	123.07	120.30
4	I	26	DC	N1-C2-O2	5.53	122.22	118.90
2	D	210	ARG	NE-CZ-NH2	5.52	123.06	120.30
5	J	12	DC	N3-C2-O2	-5.51	118.04	121.90
2	C	237	VAL	CA-CB-CG2	5.48	119.12	110.90
5	J	22	DG	C5-C6-N1	5.47	114.24	111.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	J	23	DC	C2-N3-C4	-5.46	117.17	119.90
3	H	6	DT	N3-C2-O2	-5.46	119.03	122.30
5	J	4	DC	N3-C2-O2	-5.45	118.09	121.90
3	H	8	DT	O4'-C1'-N1	5.44	111.81	108.00
5	J	24	DA	C4-C5-C6	-5.43	114.28	117.00
5	J	15	DC	N3-C2-O2	-5.42	118.11	121.90
5	J	21	DA	N1-C6-N6	-5.41	115.35	118.60
1	A	440	ARG	NE-CZ-NH2	5.39	122.99	120.30
3	H	5	DC	N3-C2-O2	-5.38	118.13	121.90
3	H	10	DC	N3-C4-C5	5.37	124.05	121.90
2	D	214	PHE	CB-CG-CD2	-5.37	117.05	120.80
4	I	27	DT	C5-C6-N1	-5.34	120.50	123.70
1	A	370	ARG	NE-CZ-NH2	5.32	122.96	120.30
5	J	19	DT	C6-C5-C7	-5.32	119.71	122.90
4	I	23	DG	P-O3'-C3'	5.31	126.07	119.70
5	J	26	DA	N1-C6-N6	-5.30	115.42	118.60
5	J	25	DC	N1-C2-O2	5.29	122.08	118.90
5	J	15	DC	N1-C2-O2	5.29	122.07	118.90
3	H	6	DT	C6-C5-C7	-5.28	119.73	122.90
1	A	515	ARG	NE-CZ-NH2	5.27	122.93	120.30
3	H	14	DT	C6-C5-C7	-5.25	119.75	122.90
5	J	2	DT	C5-C6-N1	-5.23	120.56	123.70
3	H	16	DC	N3-C4-C5	5.21	123.98	121.90
4	I	27	DT	C6-C5-C7	-5.21	119.78	122.90
1	A	444	ARG	NE-CZ-NH2	5.20	122.90	120.30
3	H	16	DC	N3-C2-O2	-5.20	118.26	121.90
1	A	672	ARG	NE-CZ-NH2	5.20	122.90	120.30
3	H	8	DT	C5-C6-N1	-5.19	120.58	123.70
3	H	12	DG	C5-C6-N1	5.19	114.09	111.50
2	C	5	ARG	NE-CZ-NH2	5.18	122.89	120.30
5	J	8	DC	O4'-C1'-C2'	-5.18	101.76	105.90
5	J	30	DG	C5-C6-N1	5.18	114.09	111.50
3	H	6	DT	O4'-C1'-N1	5.17	111.62	108.00
1	A	305	ARG	NE-CZ-NH2	5.17	122.88	120.30
5	J	4	DC	N3-C4-C5	5.17	123.97	121.90
3	H	4	DT	N3-C2-O2	-5.12	119.23	122.30
2	B	149	ARG	NE-CZ-NH2	5.10	122.85	120.30
5	J	15	DC	O4'-C4'-C3'	5.10	109.06	106.00
3	H	11	DT	O4'-C1'-N1	5.09	111.56	108.00
4	I	26	DC	N3-C4-C5	5.08	123.93	121.90
1	A	738	ARG	NE-CZ-NH2	5.07	122.84	120.30
1	A	543	MET	CG-SD-CE	-5.04	92.13	100.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	J	9	DC	C1'-O4'-C4'	-5.04	105.06	110.10
5	J	6	DG	C5-C6-N1	5.04	114.02	111.50
3	H	6	DT	C4-C5-C6	5.02	121.01	118.00
5	J	21	DA	C5-C6-N1	5.02	120.21	117.70
5	J	17	DC	N3-C4-C5	5.00	123.90	121.90

There are no chirality outliers.

All (13) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	273	TYR	Sidechain
1	A	307	ARG	Sidechain
1	A	409	ARG	Sidechain
1	A	783	TYR	Sidechain
1	A	874	ARG	Sidechain
2	D	211	TYR	Sidechain
3	H	3	DT	Sidechain
3	H	8	DT	Sidechain
4	I	26	DC	Sidechain
5	J	13	DG	Sidechain
5	J	2	DT	Sidechain
5	J	30	DG	Sidechain
5	J	7	DT	Sidechain

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	4960	0	4994	18	0
2	B	1899	0	1911	7	0
2	C	1880	0	1875	8	0
2	D	1914	0	1913	4	0
3	H	387	0	215	3	0
4	I	248	0	135	0	0
5	J	635	0	344	2	0
6	I	23	0	12	0	0
All	All	11946	0	11399	41	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 2.

All (41) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:845:LYS:HG3	1:A:876:ILE:HD11	1.68	0.75
1:A:623:VAL:HA	1:A:638:LEU:HD21	1.83	0.61
2:C:2:PHE:HB3	2:C:92:ALA:HB3	1.84	0.60
3:H:19:DOC:HN41	5:J:13:DG:H1	1.53	0.57
1:A:635:PHE:HA	1:A:638:LEU:HD13	1.87	0.54
2:C:112:SER:HB3	2:C:114:TYR:CE2	2.44	0.52
2:C:133:TYR:CG	2:C:228:SER:HB3	2.44	0.51
1:A:543:MET:HE1	1:A:741:ASN:H	1.75	0.51
1:A:444:ARG:HB3	1:A:450:LEU:HA	1.93	0.51
1:A:843:GLU:HG2	1:A:876:ILE:HD12	1.92	0.51
1:A:845:LYS:CG	1:A:876:ILE:HD11	2.40	0.51
1:A:558:PHE:CE2	1:A:724:VAL:HG12	2.47	0.50
1:A:295:THR:HG21	1:A:315:LEU:HD22	1.92	0.50
1:A:860:GLY:HA2	1:A:864:SER:HA	1.94	0.49
1:A:543:MET:CE	1:A:741:ASN:HB2	2.42	0.49
3:H:17:DG:C8	3:H:18:DT:H72	2.48	0.49
2:D:228:SER:O	2:D:235:LEU:HD12	2.13	0.48
2:C:91:ARG:HB3	2:C:100:ALA:HB3	1.95	0.47
2:D:229:MET:SD	2:D:235:LEU:HD13	2.55	0.47
5:J:20:DC:H2"	5:J:21:DA:C8	2.50	0.47
2:D:19:LEU:HD11	2:D:48:VAL:HG21	1.97	0.46
2:C:228:SER:HB2	2:C:236:VAL:HB	1.97	0.46
3:H:9:DG:H2"	3:H:10:DC:H5'	1.98	0.45
1:A:599:PRO:HA	1:A:602:ILE:HD12	1.98	0.45
2:C:237:VAL:HG22	2:C:249:TYR:HB2	1.99	0.44
1:A:846:CYS:HB3	1:A:870:LEU:HD23	2.00	0.43
1:A:584:VAL:HG11	1:A:605:ILE:HG13	1.99	0.43
2:B:133:TYR:HA	2:B:230:SER:HB2	2.00	0.43
2:B:30:ILE:HD12	2:B:35:VAL:HG22	1.99	0.43
2:B:29:ASP:C	2:B:30:ILE:HD13	2.40	0.42
1:A:595:THR:HG23	1:A:602:ILE:HD11	2.01	0.42
2:B:37:LEU:HB2	2:B:50:LEU:HB3	2.01	0.42
2:B:236:VAL:HG22	2:B:250:TYR:CE2	2.54	0.42
2:C:162:CYS:HB3	2:C:203:VAL:HG12	2.01	0.42
2:B:101:LEU:HD13	2:B:116:MET:SD	2.60	0.42
1:A:543:MET:HE1	1:A:741:ASN:HB2	2.02	0.41
2:D:137:VAL:O	2:D:226:THR:HA	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:578:ALA:HA	1:A:584:VAL:HG12	2.02	0.41
1:A:570:ASP:HB3	1:A:720:GLU:HG3	2.02	0.41
2:C:102:VAL:HA	2:C:112:SER:O	2.20	0.41
2:B:16:LEU:HD13	2:B:16:LEU:HA	1.93	0.41

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	638/919 (69%)	600 (94%)	35 (6%)	3 (0%)	29	68
2	B	243/264 (92%)	234 (96%)	8 (3%)	1 (0%)	34	72
2	C	242/264 (92%)	239 (99%)	2 (1%)	1 (0%)	34	72
2	D	249/264 (94%)	241 (97%)	8 (3%)	0	100	100
All	All	1372/1711 (80%)	1314 (96%)	53 (4%)	5 (0%)	38	72

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	384	GLU
1	A	651	ILE
1	A	666	ASN
2	B	174	GLU
2	C	243	ASP

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	533/786 (68%)	519 (97%)	14 (3%)	46	67
2	B	213/230 (93%)	210 (99%)	3 (1%)	67	81
2	C	209/230 (91%)	203 (97%)	6 (3%)	42	64
2	D	211/230 (92%)	209 (99%)	2 (1%)	78	87
All	All	1166/1476 (79%)	1141 (98%)	25 (2%)	56	72

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	364	ARG
1	A	365	GLN
1	A	376	LYS
1	A	400	THR
1	A	428	LYS
1	A	497	GLU
1	A	505	GLN
1	A	527	ARG
1	A	540	LEU
1	A	549	ARG
1	A	747	LYS
1	A	762	ILE
1	A	774	ARG
1	A	827	ASP
2	B	110	LYS
2	B	116	MET
2	B	125	GLN
2	C	38	GLN
2	C	104	GLU
2	C	130	GLU
2	C	174	GLU
2	C	181	LYS
2	C	248	LYS
2	D	61	ARG
2	D	64	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA (i)

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	$\#\|Z\| > 2$
3	DOC	H	19	3,5	16,19,20	0.35	0	20,26,29	0.47	0

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
3	DOC	H	19	3,5	-	2/7/18/19	0/2/2/2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	H	19	DOC	O4'-C4'-C5'-O5'
3	H	19	DOC	C3'-C4'-C5'-O5'

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	H	19	DOC	1	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

1 ligand 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	$\#\|Z\| > 2$
6	AMP	I	100	4	22,25,25	1.22	2 (9%)	25,38,38	1.45	2 (8%)

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
6	AMP	I	100	4	-	1/6/26/26	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	I	100	AMP	C2-N3	3.82	1.38	1.32
6	I	100	AMP	C2-N1	2.38	1.38	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	I	100	AMP	N3-C2-N1	-5.00	120.87	128.68
6	I	100	AMP	P-O5'-C5'	2.86	126.18	118.30

There are no chirality outliers.

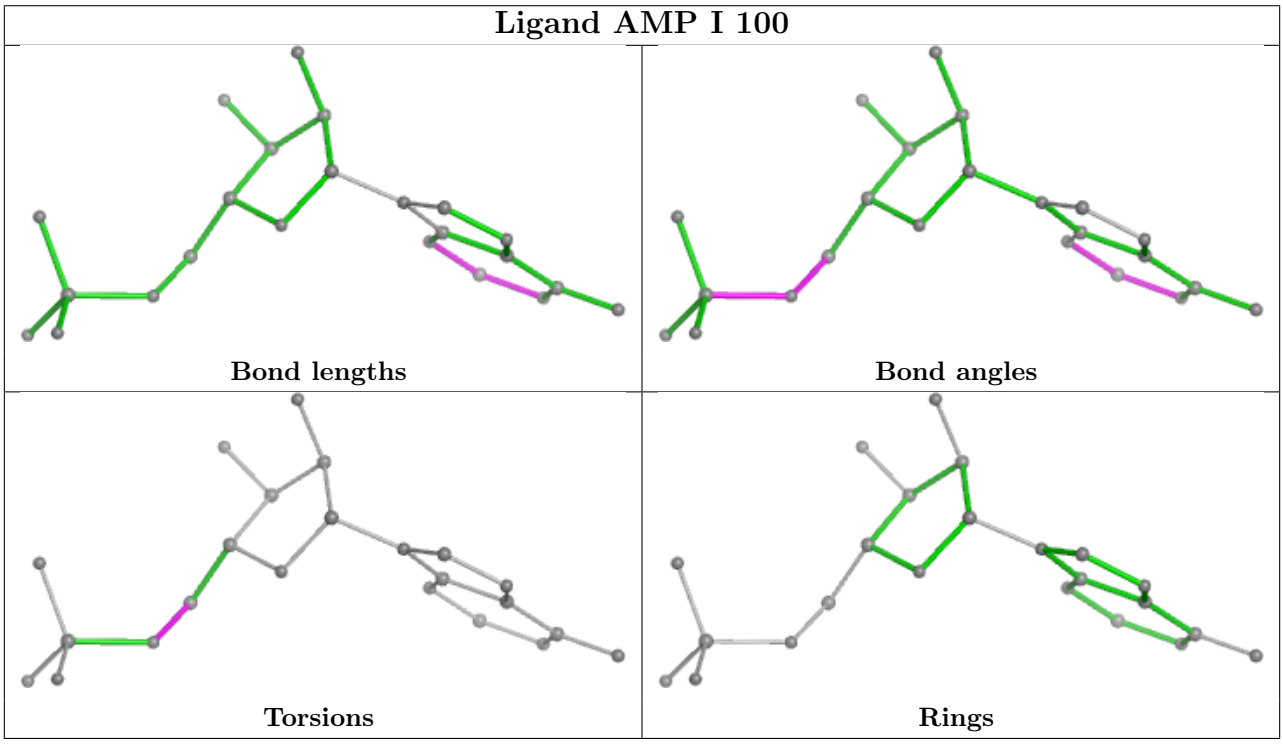
All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	I	100	AMP	C4'-C5'-O5'-P

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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.

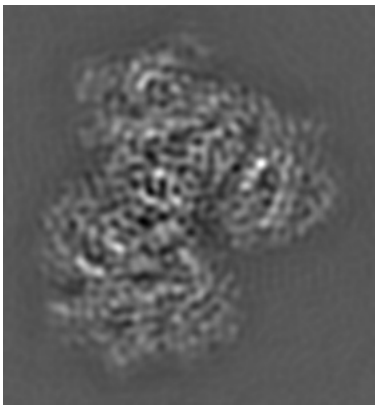
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-14078. These allow visual inspection of the internal detail of the map and identification of artifacts.

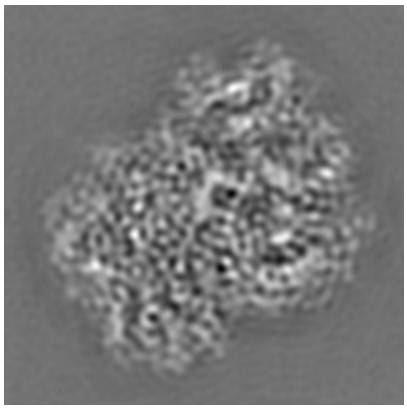
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

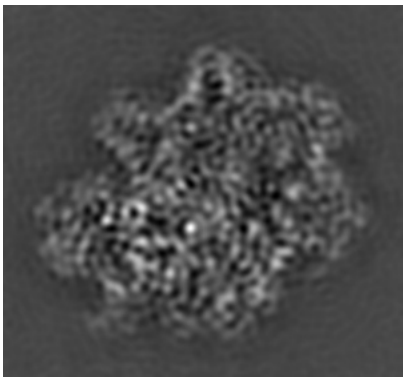
6.1.1 Primary map



X

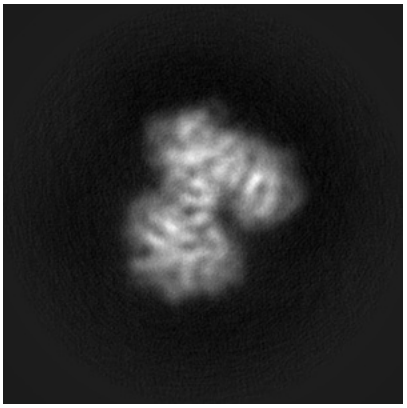


Y

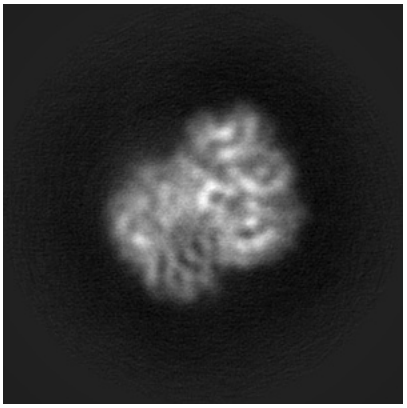


Z

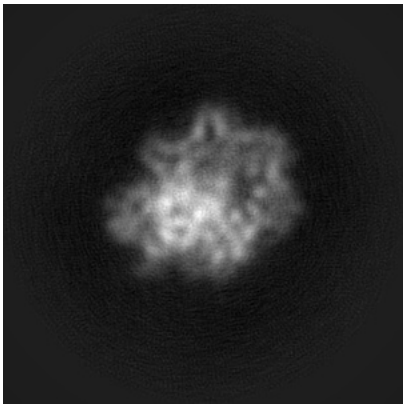
6.1.2 Raw map



X



Y

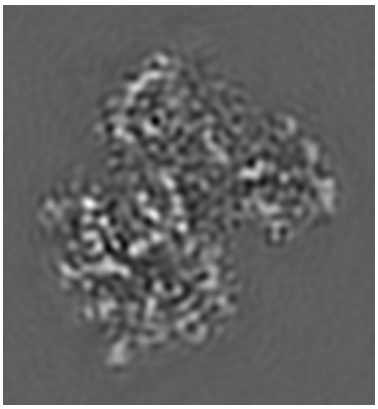


Z

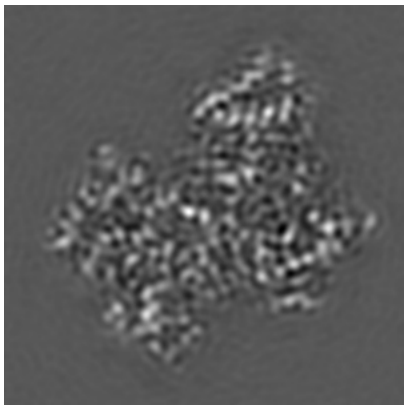
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

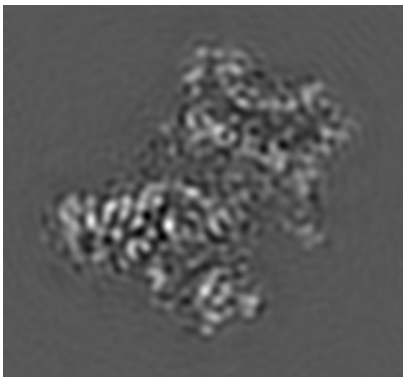
6.2.1 Primary map



X Index: 77

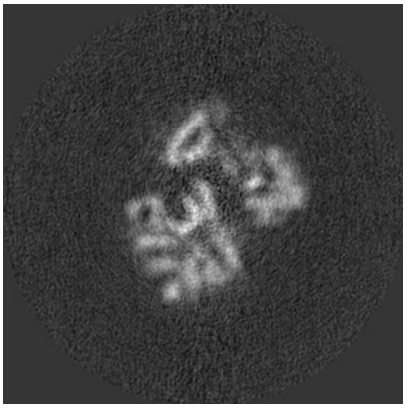


Y Index: 71

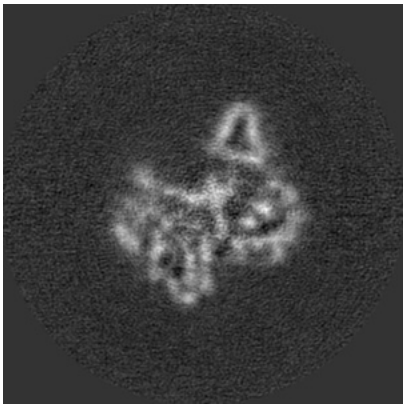


Z Index: 77

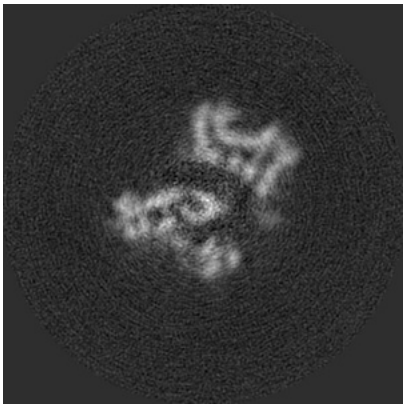
6.2.2 Raw map



X Index: 129



Y Index: 129

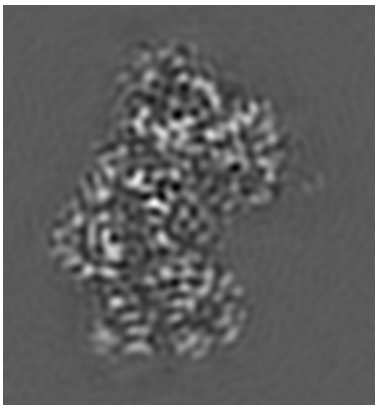


Z Index: 129

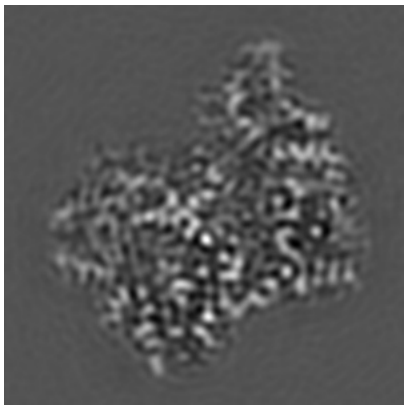
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

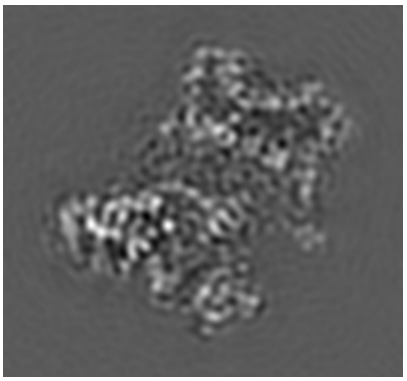
6.3.1 Primary map



X Index: 64

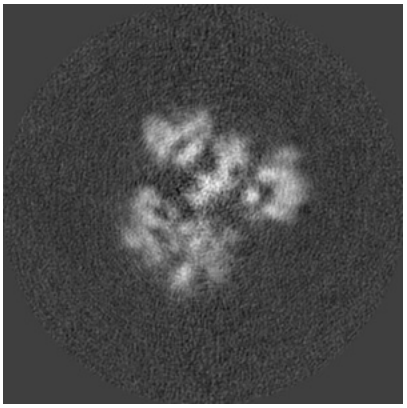


Y Index: 58

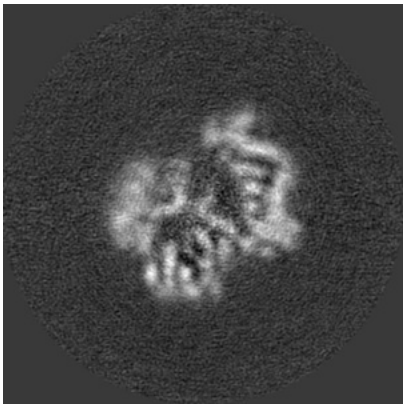


Z Index: 78

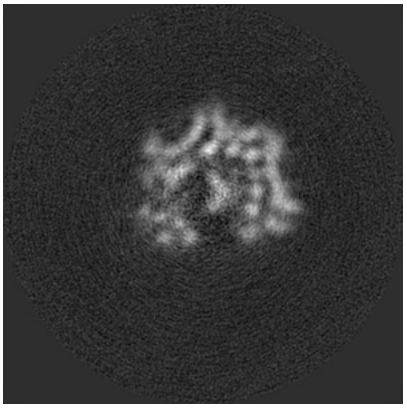
6.3.2 Raw map



X Index: 138



Y Index: 118

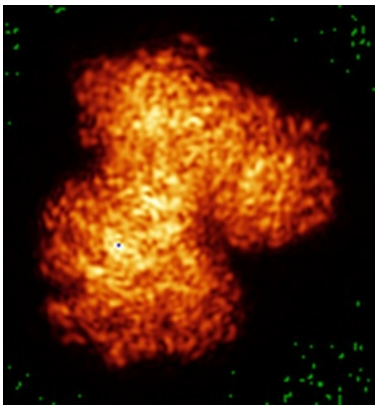


Z Index: 145

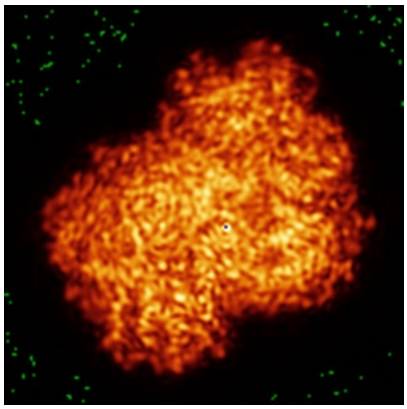
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

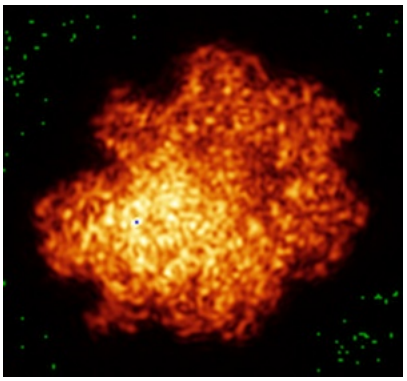
6.4.1 Primary map



X

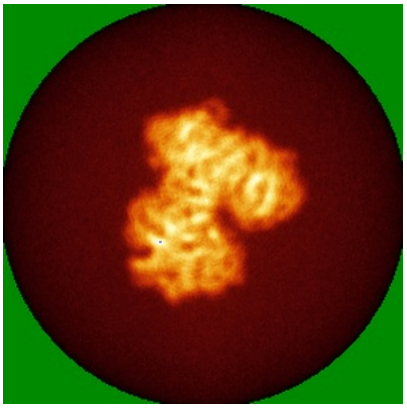


Y

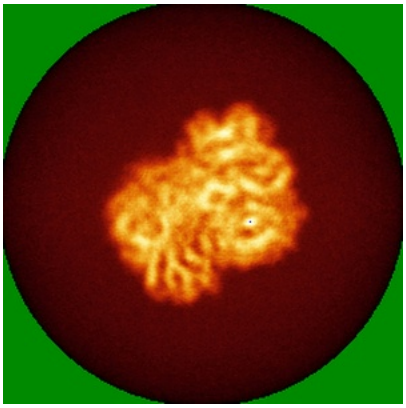


Z

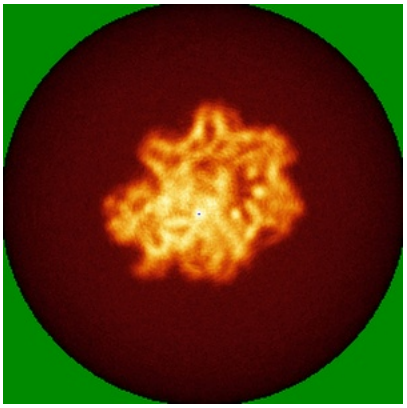
6.4.2 Raw map



X



Y

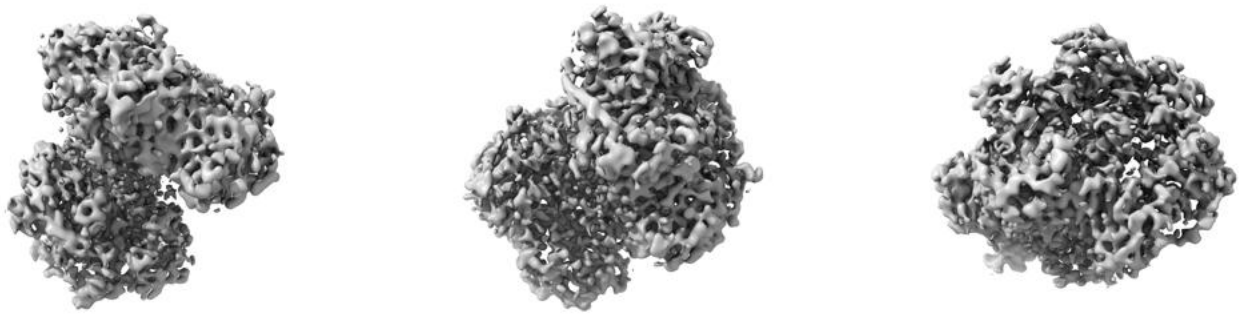


Z

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)

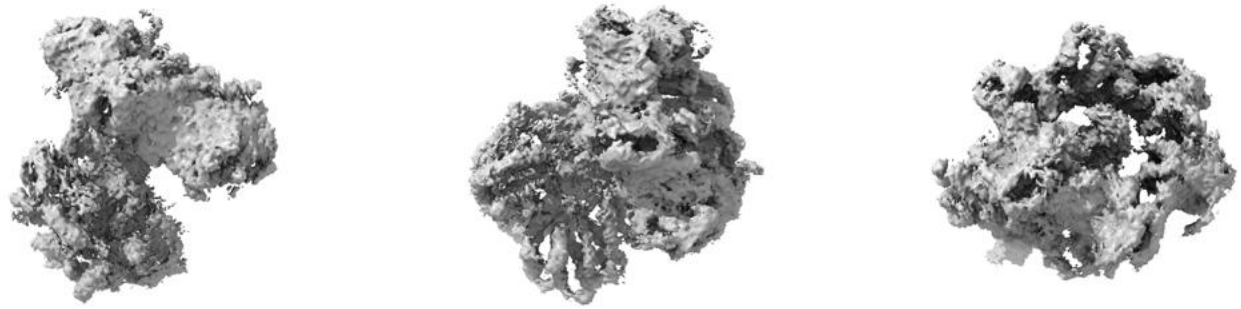
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 2.0. 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



X Y Z

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.

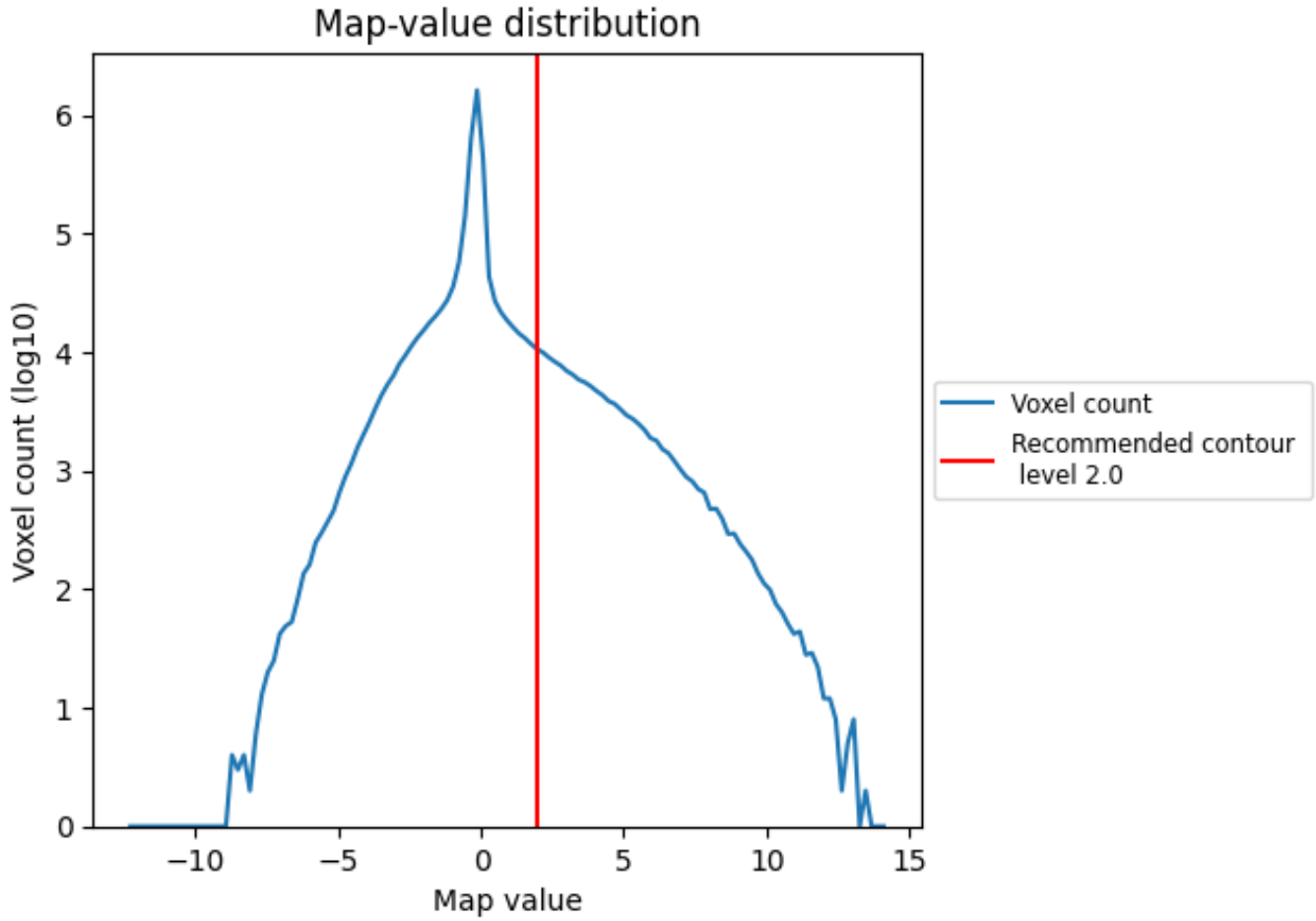
6.6 Mask visualisation (i)

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

7 Map analysis

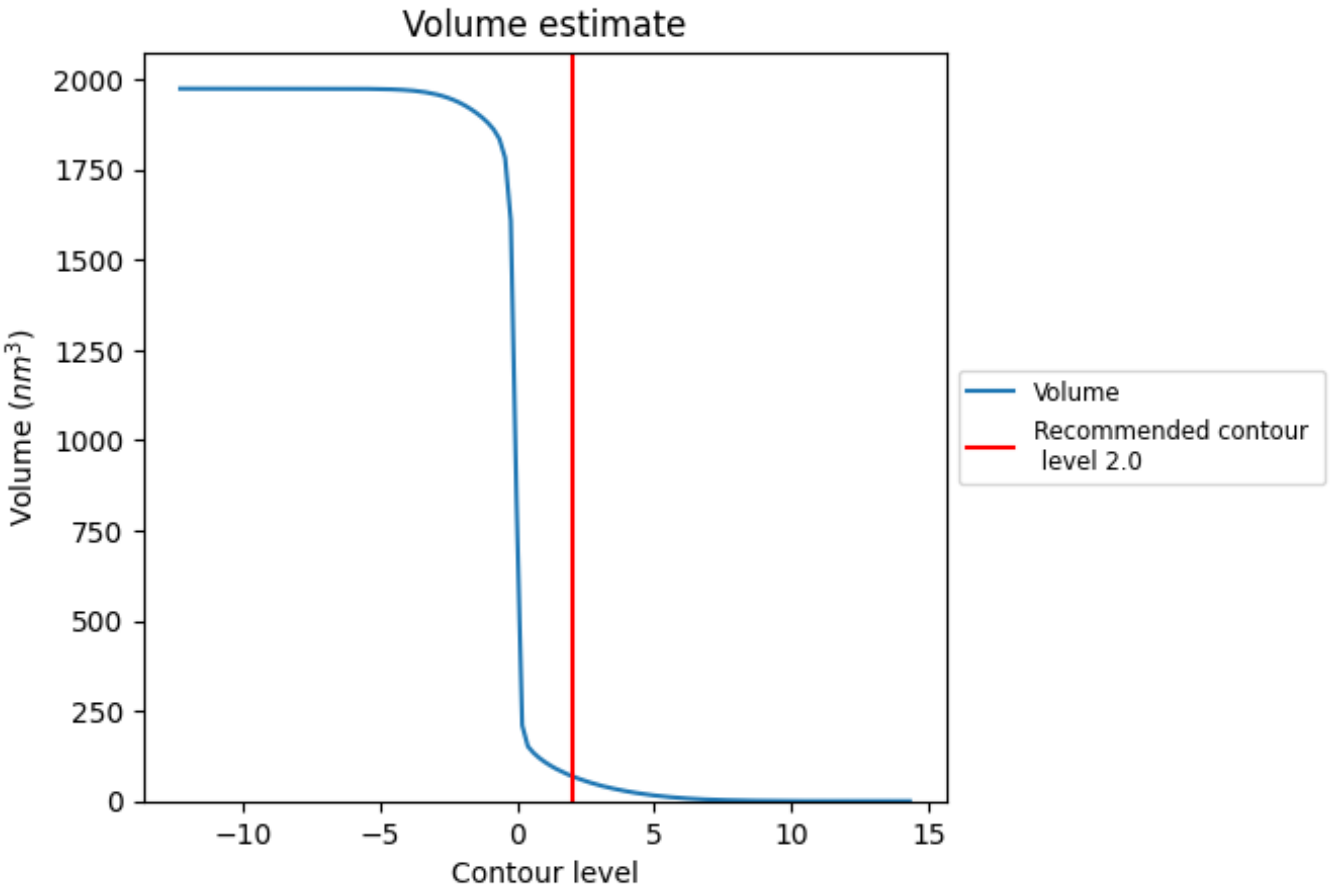
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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



The volume at the recommended contour level is 69 nm^3; this corresponds to an approximate mass of 63 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.

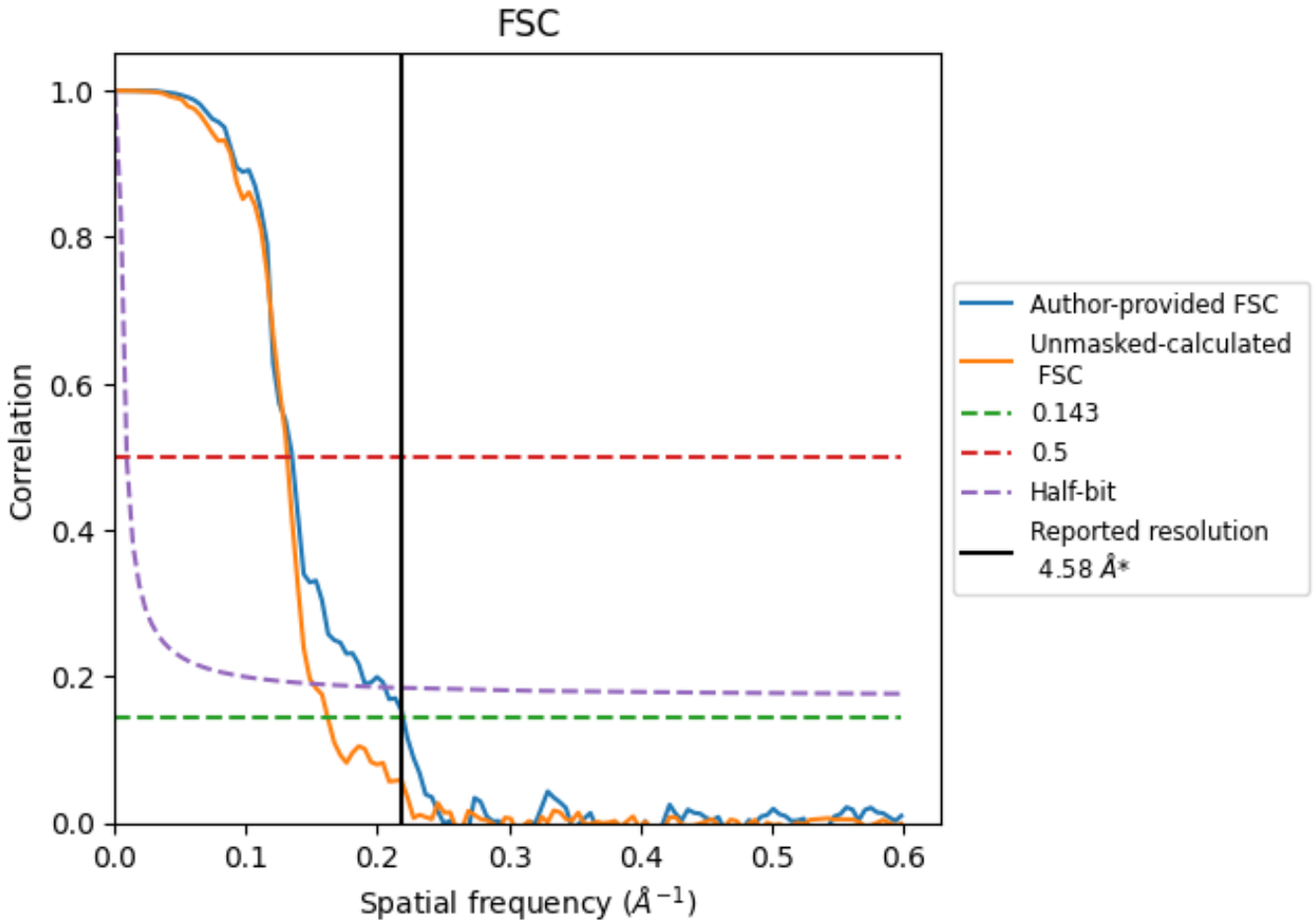
7.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.218 Å^{-1}

8.2 Resolution estimates (i)

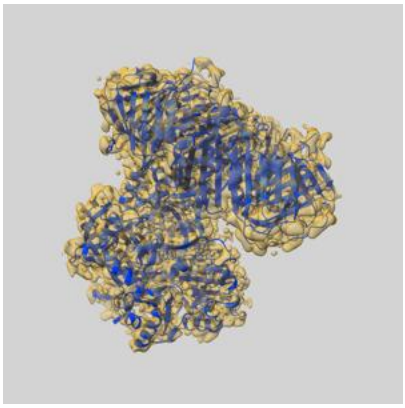
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.58	-	-
Author-provided FSC curve	4.56	7.41	4.86
Unmasked-calculated*	6.17	7.62	6.62

*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 6.17 differs from the reported value 4.58 by more than 10 %

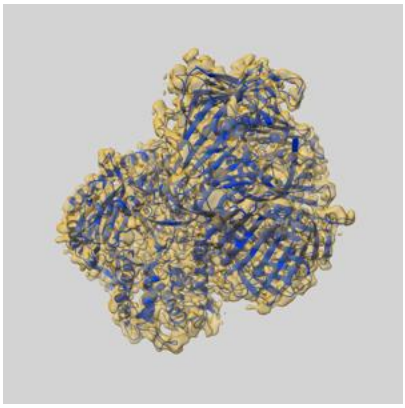
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-14078 and PDB model 7QNZ. Per-residue inclusion information can be found in section 3 on page 5.

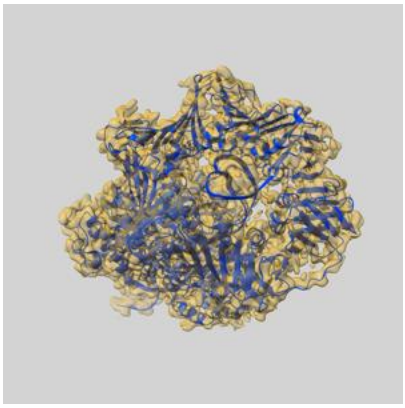
9.1 Map-model overlay



X



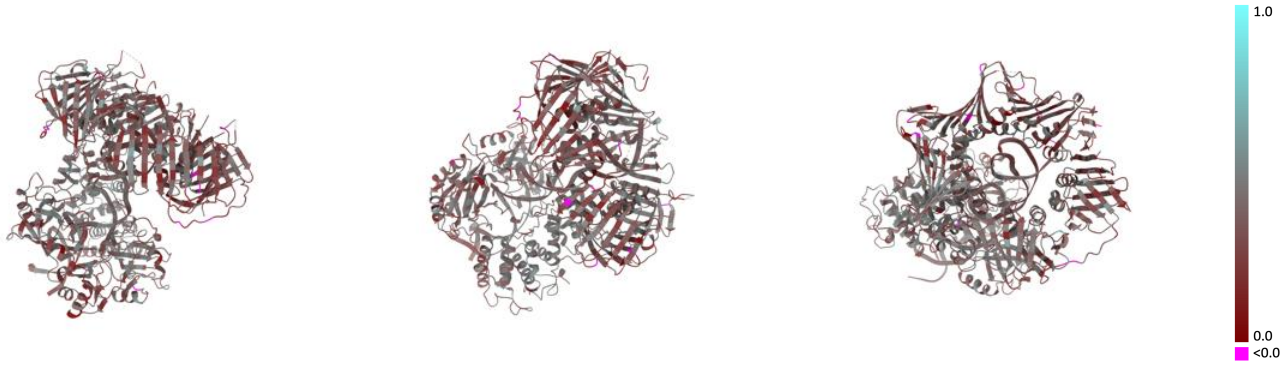
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 2.0 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.

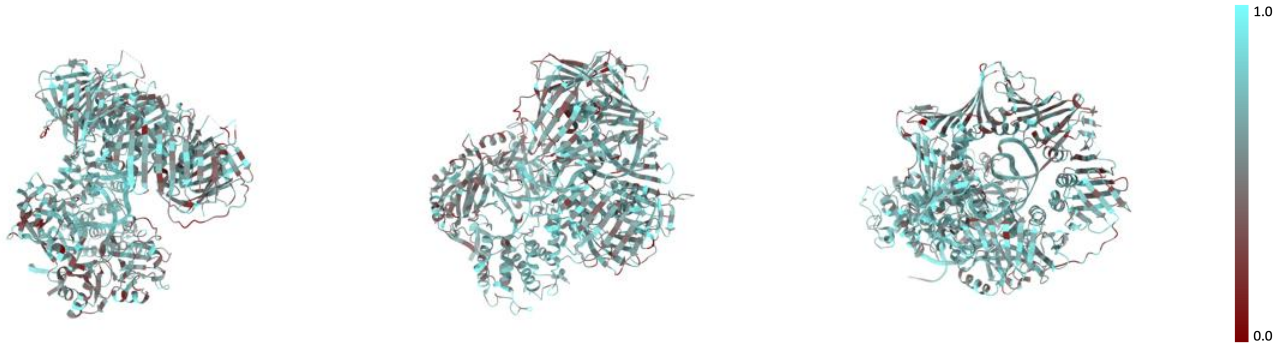
9.2 Q-score mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according 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.

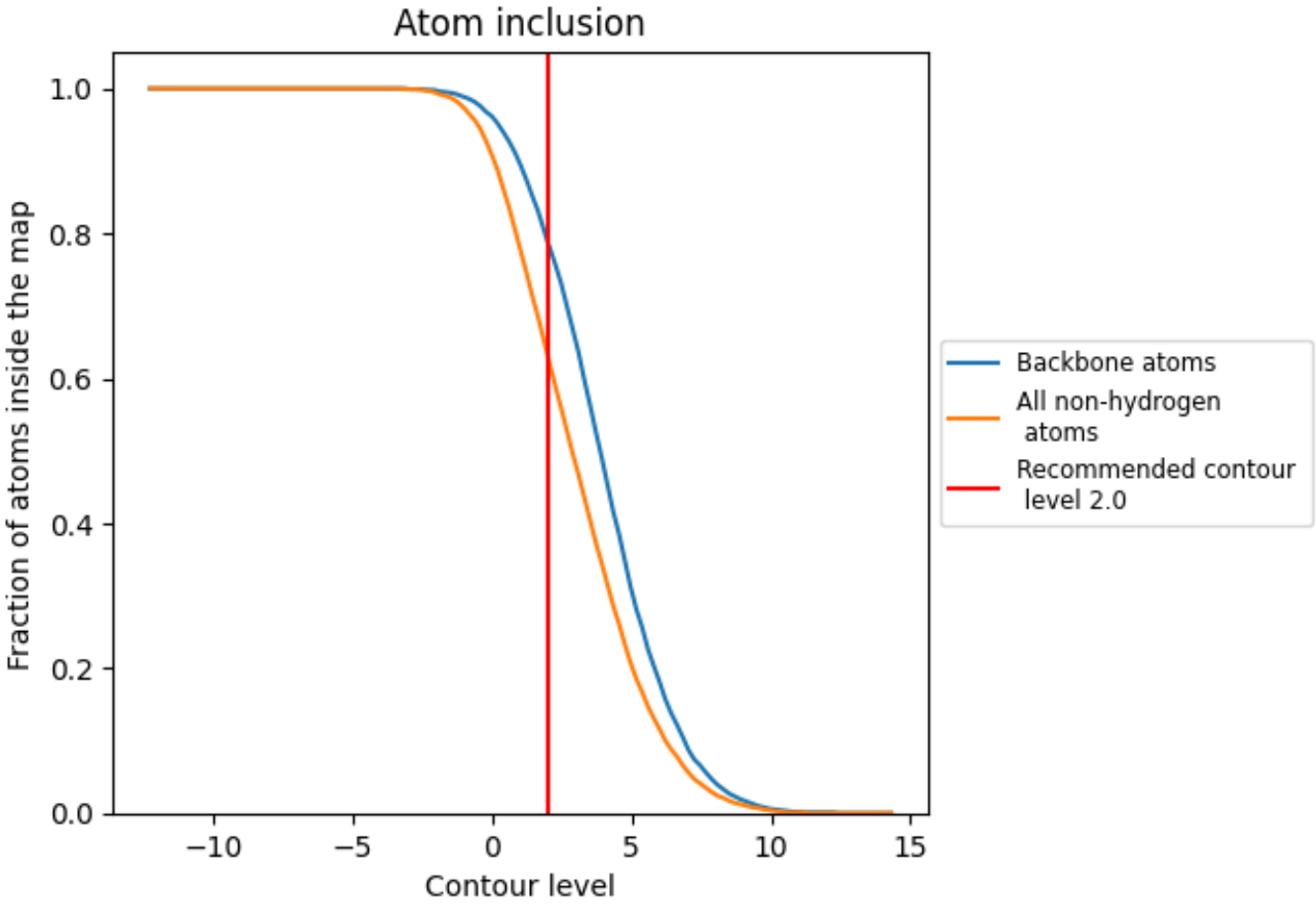
9.3 Atom inclusion mapped to coordinate model



X Y Z

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 (2.0).

9.4 Atom inclusion (i)



At the recommended contour level, 79% of all backbone atoms, 63% 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 (2.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6300	0.3610
A	0.6270	0.3790
B	0.6360	0.3690
C	0.5550	0.3030
D	0.6360	0.3570
H	0.7130	0.3690
I	0.7010	0.3360
J	0.7560	0.3770