



Full wwPDB EM Validation Report ⓘ

Jan 27, 2026 – 02:42 PM EST

PDB ID : 9Y6V / pdb_00009y6v
EMDB ID : EMD-72632
Title : attPsym bound large serine integrase and RDF complex in the dimeric state
Authors : Shin, H.; Olorunniji, F.J.; Rice, P.A.
Deposited on : 2025-09-09
Resolution : 7.10 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:

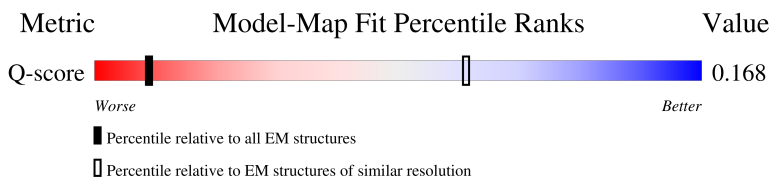
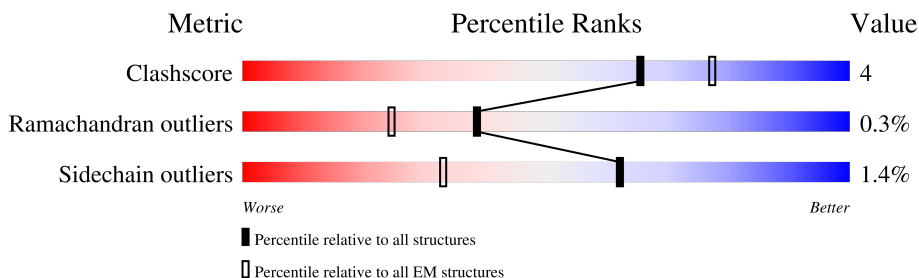
EMDB validation analysis : 0.0.1.dev129
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

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 7.10 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	464 (6.60 - 7.60)

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	620	
1	B	620	
1	C	620	
1	D	620	

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Mol	Chain	Length	Quality of chain
2	E	67	 46% 31% 7% 15%
3	F	67	 57% 21% 6% 15%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 23114 atoms, of which 11105 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 Resolvase homolog YokA,SPbeta prophage-derived uncharacterized protein YotN.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	535	Total	C	H	N	O	S	0	0
			8784	2741	4430	753	841	19		
1	B	56	Total	C	H	N	O		0	0
			955	306	474	81	94			
1	C	535	Total	C	H	N	O	S	0	0
			8784	2741	4430	753	841	19		
1	D	56	Total	C	H	N	O		0	0
			955	306	474	81	94			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	546	THR	-	linker	UNP O32006
A	547	SER	-	linker	UNP O32006
A	548	GLY	-	linker	UNP O32006
A	549	SER	-	linker	UNP O32006
A	550	GLY	-	linker	UNP O32006
A	551	GLY	-	linker	UNP O32006
A	552	SER	-	linker	UNP O32006
A	553	GLY	-	linker	UNP O32006
A	554	GLY	-	linker	UNP O32006
A	555	SER	-	linker	UNP O32006
A	556	GLY	-	linker	UNP O32006
A	557	GLY	-	linker	UNP O32006
A	558	SER	-	linker	UNP O32006
A	559	GLY	-	linker	UNP O32006
A	560	ARG	-	linker	UNP O32006
A	561	SER	-	linker	UNP O32006
A	562	GLY	-	linker	UNP O32006
A	563	THR	-	linker	UNP O32006
B	-16	THR	-	linker	UNP O32006
B	-15	SER	-	linker	UNP O32006
B	-14	GLY	-	linker	UNP O32006

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-13	SER	-	linker	UNP O32006
B	-12	GLY	-	linker	UNP O32006
B	-11	GLY	-	linker	UNP O32006
B	-10	SER	-	linker	UNP O32006
B	-9	GLY	-	linker	UNP O32006
B	-8	GLY	-	linker	UNP O32006
B	-7	SER	-	linker	UNP O32006
B	-6	GLY	-	linker	UNP O32006
B	-5	GLY	-	linker	UNP O32006
B	-4	SER	-	linker	UNP O32006
B	-3	GLY	-	linker	UNP O32006
B	-2	ARG	-	linker	UNP O32006
B	-1	SER	-	linker	UNP O32006
B	0	GLY	-	linker	UNP O32006
B	1	THR	-	linker	UNP O32006
C	546	THR	-	linker	UNP O32006
C	547	SER	-	linker	UNP O32006
C	548	GLY	-	linker	UNP O32006
C	549	SER	-	linker	UNP O32006
C	550	GLY	-	linker	UNP O32006
C	551	GLY	-	linker	UNP O32006
C	552	SER	-	linker	UNP O32006
C	553	GLY	-	linker	UNP O32006
C	554	GLY	-	linker	UNP O32006
C	555	SER	-	linker	UNP O32006
C	556	GLY	-	linker	UNP O32006
C	557	GLY	-	linker	UNP O32006
C	558	SER	-	linker	UNP O32006
C	559	GLY	-	linker	UNP O32006
C	560	ARG	-	linker	UNP O32006
C	561	SER	-	linker	UNP O32006
C	562	GLY	-	linker	UNP O32006
C	563	THR	-	linker	UNP O32006
D	-16	THR	-	linker	UNP O32006
D	-15	SER	-	linker	UNP O32006
D	-14	GLY	-	linker	UNP O32006
D	-13	SER	-	linker	UNP O32006
D	-12	GLY	-	linker	UNP O32006
D	-11	GLY	-	linker	UNP O32006
D	-10	SER	-	linker	UNP O32006
D	-9	GLY	-	linker	UNP O32006
D	-8	GLY	-	linker	UNP O32006

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-7	SER	-	linker	UNP O32006
D	-6	GLY	-	linker	UNP O32006
D	-5	GLY	-	linker	UNP O32006
D	-4	SER	-	linker	UNP O32006
D	-3	GLY	-	linker	UNP O32006
D	-2	ARG	-	linker	UNP O32006
D	-1	SER	-	linker	UNP O32006
D	0	GLY	-	linker	UNP O32006
D	1	THR	-	linker	UNP O32006

- Molecule 2 is a DNA chain called attPsym.

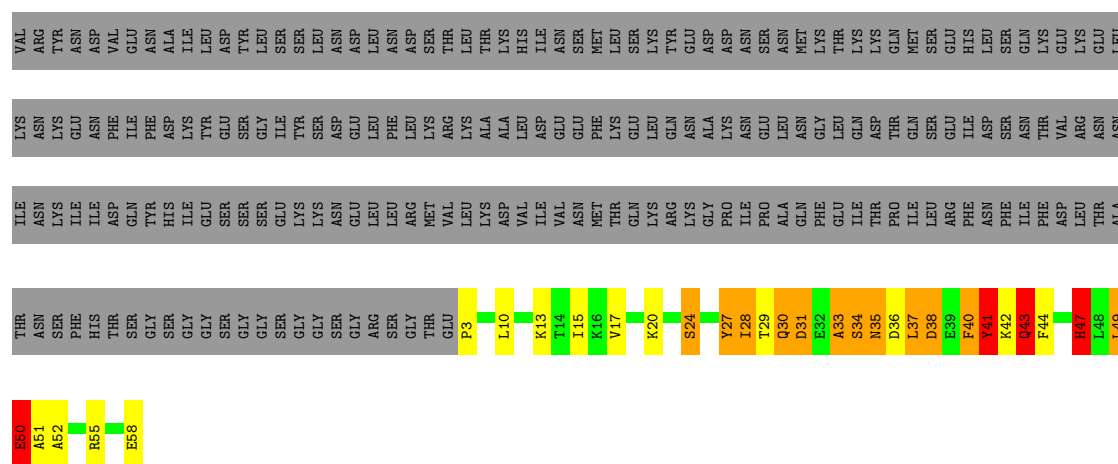
Mol	Chain	Residues	Atoms						AltConf	Trace
2	E	57	Total	C	H	N	O	P	0	0
			1820	564	645	219	335	57		

- Molecule 3 is a DNA chain called attPsym.

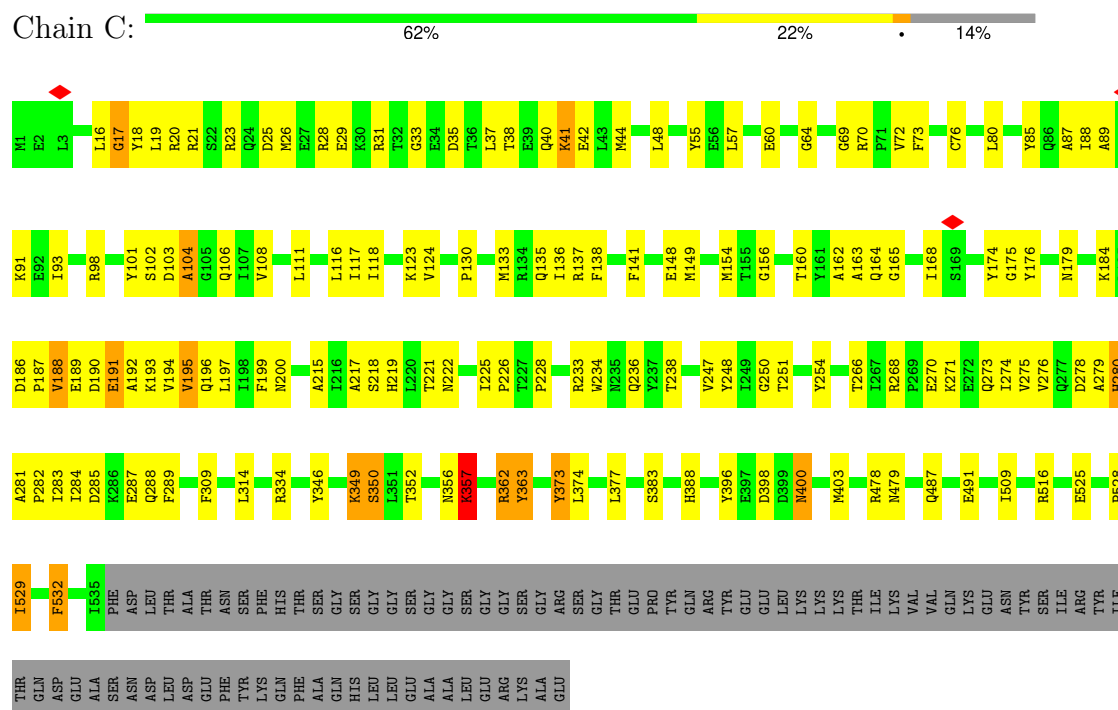
Mol	Chain	Residues	Atoms						AltConf	Trace
3	F	57	Total	C	H	N	O	P	0	0
			1814	562	652	194	349	57		

- Molecule 4 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

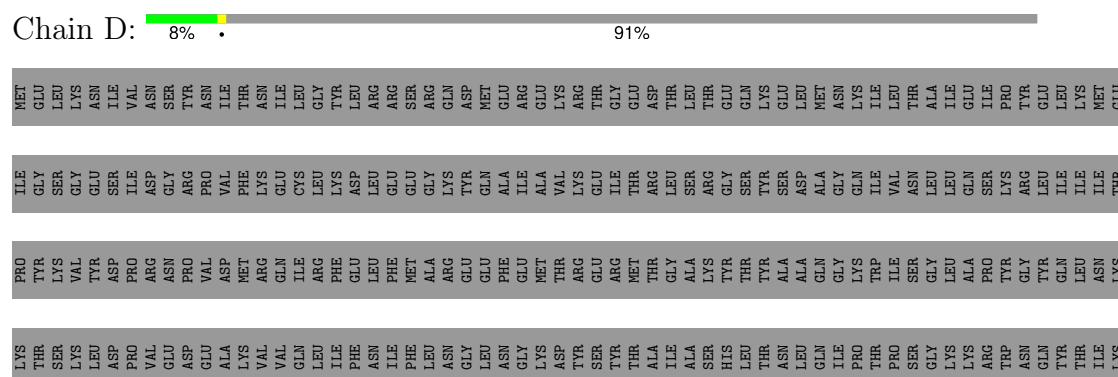
Mol	Chain	Residues	Atoms		AltConf
4	A	1	Total	Zn	0
			1	1	
4	C	1	Total	Zn	0
			1	1	



- Molecule 1: Resolvase homolog YokA,SPbeta prophage-derived uncharacterized protein YotN



- Molecule 1: Resolvase homolog YokA,SPbeta prophage-derived uncharacterized protein YotN



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	24616	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	65	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	1900	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.050	Depositor
Minimum map value	-0.597	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.022	Depositor
Recommended contour level	0.006	Depositor
Map size ($\text{\AA}$)	340.80002, 340.80002, 340.80002	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.065, 1.065, 1.065	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	1.66	51/4420 (1.2%)	1.85	167/5937 (2.8%)
1	B	1.90	16/489 (3.3%)	3.03	30/654 (4.6%)
1	C	1.67	42/4420 (1.0%)	1.89	183/5937 (3.1%)
1	D	0.68	0/489	1.24	1/654 (0.2%)
2	E	0.73	0/1321	1.51	4/2037 (0.2%)
3	F	0.72	0/1299	1.50	9/2002 (0.4%)
All	All	1.50	109/12438 (0.9%)	1.83	394/17221 (2.3%)

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	10
1	B	0	7
1	C	0	10
1	D	0	2
2	E	0	18
3	F	0	13
All	All	0	60

All (109) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	34	SER	CB-OG	-12.23	1.17	1.42
1	A	529	ILE	CB-CG1	-11.86	1.29	1.53
1	B	24	SER	CB-OG	-9.94	1.22	1.42
1	B	37	LEU	CB-CG	-9.05	1.35	1.53
1	A	280	HIS	CE1-NE2	-8.89	1.23	1.32
1	A	530	LEU	CB-CG	-8.76	1.35	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	219	HIS	CE1-NE2	-8.69	1.23	1.32
1	C	280	HIS	CE1-NE2	-8.68	1.23	1.32
1	C	70	ARG	CZ-NH2	-8.48	1.22	1.33
1	A	70	ARG	CZ-NH2	-8.36	1.22	1.33
1	A	23	ARG	CZ-NH2	-8.30	1.22	1.33
1	C	280	HIS	CD2-NE2	-8.29	1.28	1.37
1	C	21	ARG	CZ-NH2	-8.29	1.22	1.33
1	C	23	ARG	CZ-NH2	-8.28	1.22	1.33
1	A	137	ARG	CZ-NH2	-8.27	1.22	1.33
1	A	21	ARG	CZ-NH2	-8.26	1.22	1.33
1	A	20	ARG	CZ-NH2	-8.24	1.22	1.33
1	C	137	ARG	CZ-NH2	-8.22	1.22	1.33
1	C	20	ARG	CZ-NH2	-8.22	1.22	1.33
1	A	233	ARG	CZ-NH2	-8.19	1.22	1.33
1	A	95	ARG	CZ-NH2	-8.18	1.22	1.33
1	C	219	HIS	CD2-NE2	-8.14	1.28	1.37
1	A	280	HIS	CD2-NE2	-8.10	1.28	1.37
1	B	35	ASN	CA-CB	-7.89	1.40	1.53
1	A	134	ARG	CZ-NH2	-7.87	1.23	1.33
1	C	233	ARG	CZ-NH2	-7.86	1.23	1.33
1	C	89	ALA	CA-CB	-7.57	1.43	1.53
1	A	89	ALA	CA-CB	-7.49	1.43	1.53
1	B	41	TYR	CB-CG	-7.29	1.35	1.51
1	B	47	HIS	CA-CB	-7.24	1.41	1.53
1	B	51	ALA	CA-CB	-7.08	1.42	1.53
1	A	192	ALA	CA-CB	-6.99	1.42	1.53
1	A	506	LYS	CA-CB	6.99	1.64	1.53
1	A	217	ALA	CA-CB	-6.98	1.42	1.53
1	A	162	ALA	CA-CB	-6.97	1.42	1.53
1	A	104	ALA	CA-CB	-6.91	1.42	1.53
1	C	192	ALA	CA-CB	-6.89	1.42	1.53
1	C	20	ARG	CZ-NH1	-6.88	1.23	1.32
1	C	162	ALA	CA-CB	-6.87	1.42	1.53
1	C	104	ALA	CA-CB	-6.84	1.42	1.53
1	A	20	ARG	CZ-NH1	-6.81	1.23	1.32
1	A	95	ARG	CZ-NH1	-6.72	1.23	1.32
1	A	233	ARG	CZ-NH1	-6.71	1.23	1.32
1	C	21	ARG	CZ-NH1	-6.70	1.23	1.32
1	C	70	ARG	CZ-NH1	-6.69	1.23	1.32
1	A	23	ARG	CZ-NH1	-6.68	1.23	1.32
1	C	137	ARG	CZ-NH1	-6.67	1.23	1.32
1	A	21	ARG	CZ-NH1	-6.66	1.23	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	70	ARG	CZ-NH1	-6.65	1.23	1.32
1	C	23	ARG	CZ-NH1	-6.65	1.23	1.32
1	A	137	ARG	CZ-NH1	-6.59	1.23	1.32
1	B	17	VAL	CA-CB	-6.54	1.46	1.53
1	A	163	ALA	CA-CB	-6.45	1.42	1.53
1	A	134	ARG	CZ-NH1	-6.37	1.23	1.32
1	C	233	ARG	CZ-NH1	-6.31	1.24	1.32
1	C	163	ALA	CA-CB	-6.31	1.42	1.53
1	A	156	GLY	N-CA	-6.16	1.37	1.45
1	B	49	LEU	CA-CB	-6.11	1.43	1.53
1	C	215	ALA	CA-CB	-6.10	1.43	1.53
1	C	279	ALA	CA-CB	-6.07	1.42	1.53
1	C	217	ALA	CA-CB	-5.99	1.44	1.53
1	C	156	GLY	N-CA	-5.96	1.37	1.45
1	A	279	ALA	CA-CB	-5.90	1.42	1.53
1	B	36	ASP	CB-CG	-5.85	1.37	1.52
1	C	226	PRO	CA-CB	-5.78	1.46	1.53
1	C	70	ARG	CA-CB	-5.76	1.46	1.53
1	A	70	ARG	CA-CB	-5.71	1.46	1.53
1	A	95	ARG	CD-NE	-5.68	1.38	1.46
1	B	47	HIS	CB-CG	-5.66	1.42	1.50
1	A	175	GLY	N-CA	-5.63	1.37	1.45
1	C	23	ARG	CD-NE	-5.61	1.38	1.46
1	B	52	ALA	CA-CB	-5.58	1.44	1.53
1	A	70	ARG	CD-NE	-5.57	1.38	1.46
1	A	120	THR	N-CA	-5.55	1.41	1.45
1	A	137	ARG	CD-NE	-5.53	1.38	1.46
1	C	20	ARG	CD-NE	-5.52	1.38	1.46
1	C	33	GLY	N-CA	-5.48	1.37	1.45
1	C	165	GLY	N-CA	-5.47	1.37	1.45
1	B	34	SER	CA-C	5.43	1.60	1.53
1	C	281	ALA	CA-CB	-5.43	1.42	1.53
1	A	20	ARG	CD-NE	-5.42	1.38	1.46
1	C	64	GLY	N-CA	-5.37	1.37	1.45
1	A	21	ARG	CD-NE	-5.33	1.38	1.46
1	A	23	ARG	CD-NE	-5.32	1.38	1.46
1	C	21	ARG	CD-NE	-5.31	1.38	1.46
1	C	175	GLY	N-CA	-5.31	1.37	1.45
1	A	282	PRO	CA-CB	-5.29	1.46	1.53
1	A	99	GLY	N-CA	-5.29	1.37	1.44
1	B	55	ARG	CB-CG	-5.29	1.36	1.52
1	C	282	PRO	CA-CB	-5.29	1.46	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	233	ARG	CD-NE	-5.28	1.38	1.46
1	C	233	ARG	CD-NE	-5.28	1.38	1.46
1	A	534	PHE	CA-CB	-5.25	1.44	1.53
1	A	527	THR	CA-C	5.25	1.59	1.52
1	C	137	ARG	CD-NE	-5.25	1.39	1.46
1	A	134	ARG	CD-NE	-5.24	1.39	1.46
1	A	64	GLY	N-CA	-5.22	1.37	1.45
1	C	70	ARG	CD-NE	-5.22	1.39	1.46
1	C	179	ASN	CA-CB	-5.21	1.46	1.52
1	A	281	ALA	CA-CB	-5.19	1.42	1.53
1	A	1	MET	N-CA	-5.14	1.38	1.49
1	C	187	PRO	CA-CB	-5.13	1.47	1.53
1	B	42	LYS	CB-CG	-5.13	1.37	1.52
1	C	250	GLY	N-CA	-5.11	1.37	1.45
1	B	33	ALA	C-N	-5.11	1.25	1.33
1	A	165	GLY	N-CA	-5.08	1.37	1.45
1	A	273	GLN	CD-NE2	-5.07	1.22	1.33
1	A	250	GLY	N-CA	-5.02	1.37	1.45
1	A	529	ILE	N-CA	5.02	1.52	1.46

All (394) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	33	ALA	O-C-N	-36.11	81.62	122.79
1	B	33	ALA	CA-C-O	-29.44	87.72	121.87
1	B	47	HIS	CB-CG-CD2	-19.34	106.06	131.20
1	B	33	ALA	N-CA-C	-19.32	85.03	110.53
1	B	34	SER	CA-CB-OG	-15.58	79.95	111.10
1	B	34	SER	N-CA-C	-13.75	89.88	109.69
1	A	457	ASN	CA-CB-CG	-12.49	100.11	112.60
1	A	457	ASN	N-CA-C	12.28	125.83	111.71
1	B	34	SER	N-CA-CB	-11.16	94.03	110.87
1	B	43	GLN	OE1-CD-NE2	-10.60	112.00	122.60
1	B	55	ARG	CB-CG-CD	10.51	135.47	111.30
1	C	350	SER	N-CA-C	9.55	123.66	109.24
1	A	528	PRO	O-C-N	-9.38	111.85	123.10
1	B	35	ASN	CA-CB-CG	9.06	121.66	112.60
1	A	470	SER	N-CA-C	9.01	122.23	110.43
1	B	30	GLN	OE1-CD-NE2	-8.45	114.15	122.60
1	A	275	VAL	CA-C-N	8.23	130.78	122.96
1	A	275	VAL	C-N-CA	8.23	130.78	122.96
1	B	44	PHE	CA-CB-CG	7.97	121.77	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	58	GLU	CA-CB-CG	7.77	129.64	114.10
1	B	31	ASP	CA-CB-CG	-7.55	105.05	112.60
1	B	41	TYR	CA-CB-CG	7.47	127.35	113.90
1	A	475	ASN	N-CA-C	7.37	120.19	111.71
1	C	69	GLY	CA-C-N	7.25	131.84	123.21
1	C	69	GLY	C-N-CA	7.25	131.84	123.21
1	A	69	GLY	CA-C-N	7.17	131.74	123.21
1	A	69	GLY	C-N-CA	7.17	131.74	123.21
1	C	199	PHE	CA-CB-CG	7.11	120.91	113.80
1	A	289	PHE	CA-CB-CG	6.94	120.74	113.80
1	B	34	SER	O-C-N	-6.91	113.00	122.81
1	A	179	ASN	CA-CB-CG	6.89	119.49	112.60
1	C	400	ASN	CA-C-N	6.85	134.63	121.54
1	C	400	ASN	C-N-CA	6.85	134.63	121.54
2	E	-26	DG	C4'-C3'-O3'	6.83	120.25	110.00
1	C	349	LYS	CA-C-N	6.81	133.24	122.21
1	C	349	LYS	C-N-CA	6.81	133.24	122.21
1	A	186	ASP	CA-CB-CG	6.80	119.40	112.60
1	A	117	ILE	CA-C-N	6.75	131.43	122.93
1	A	117	ILE	C-N-CA	6.75	131.43	122.93
1	C	103	ASP	CA-CB-CG	6.74	119.34	112.60
1	A	73	PHE	CA-CB-CG	6.73	120.53	113.80
1	C	35	ASP	CA-CB-CG	6.72	119.33	112.60
1	C	179	ASN	CA-CB-CG	6.72	119.32	112.60
1	A	285	ASP	CA-CB-CG	6.72	119.32	112.60
1	C	73	PHE	CA-CB-CG	6.72	120.52	113.80
1	C	289	PHE	CA-CB-CG	6.70	120.50	113.80
1	A	283	ILE	CA-C-N	6.67	131.34	122.93
1	A	283	ILE	C-N-CA	6.67	131.34	122.93
1	A	531	ARG	NE-CZ-NH2	6.64	125.18	119.20
1	A	103	ASP	CA-CB-CG	6.63	119.23	112.60
1	C	278	ASP	CA-CB-CG	6.57	119.17	112.60
1	A	268	ARG	NE-CZ-NH2	6.56	125.10	119.20
1	A	278	ASP	CA-CB-CG	6.56	119.16	112.60
1	C	200	ASN	CA-CB-CG	6.56	119.16	112.60
1	C	186	ASP	CA-CB-CG	6.54	119.14	112.60
3	F	-4	DG	C2'-C3'-O3'	6.53	121.29	111.50
1	A	35	ASP	CA-CB-CG	6.52	119.12	112.60
1	A	187	PRO	CA-C-N	6.51	129.83	120.98
1	A	187	PRO	C-N-CA	6.51	129.83	120.98
1	C	273	GLN	CA-C-N	6.51	130.77	122.37
1	C	273	GLN	C-N-CA	6.51	130.77	122.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	-4	DG	O3'-P-O5'	-6.47	94.29	104.00
1	C	138	PHE	CA-CB-CG	6.44	120.24	113.80
1	A	531	ARG	NE-CZ-NH1	-6.43	115.07	121.50
1	C	356	ASN	CA-C-N	6.43	133.81	121.54
1	C	356	ASN	C-N-CA	6.43	133.81	121.54
1	C	25	ASP	CA-CB-CG	6.38	118.98	112.60
1	A	18	TYR	CA-C-N	6.36	131.49	122.72
1	A	18	TYR	C-N-CA	6.36	131.49	122.72
1	B	20	LYS	CA-CB-CG	-6.34	101.42	114.10
1	A	273	GLN	CA-C-N	6.33	131.35	123.12
1	A	273	GLN	C-N-CA	6.33	131.35	123.12
3	F	5	DT	C5'-C4'-C3'	-6.32	105.43	114.90
3	F	3	DT	C5'-C4'-C3'	-6.30	105.44	114.90
1	C	190	ASP	CA-CB-CG	6.29	118.89	112.60
1	A	25	ASP	CA-CB-CG	6.27	118.87	112.60
1	A	506	LYS	CA-C-N	6.25	133.06	121.62
1	A	506	LYS	C-N-CA	6.25	133.06	121.62
1	A	520	ILE	N-CA-CB	6.21	115.86	110.08
1	A	188	VAL	N-CA-CB	6.17	117.89	110.31
1	B	28	ILE	CA-CB-CG1	6.15	120.85	110.40
1	C	18	TYR	CA-C-N	6.14	131.19	122.72
1	C	18	TYR	C-N-CA	6.14	131.19	122.72
1	A	87	ALA	CA-C-N	6.13	131.25	123.10
1	A	87	ALA	C-N-CA	6.13	131.25	123.10
1	C	118	ILE	CA-C-N	6.13	131.25	123.10
1	C	118	ILE	C-N-CA	6.13	131.25	123.10
1	C	285	ASP	CA-CB-CG	6.11	118.71	112.60
1	C	141	PHE	CA-CB-CG	6.10	119.90	113.80
1	A	23	ARG	CD-NE-CZ	6.08	132.91	124.40
1	C	137	ARG	CD-NE-CZ	6.07	132.89	124.40
1	A	534	PHE	N-CA-C	6.06	118.68	111.71
1	C	222	ASN	CA-CB-CG	6.06	118.66	112.60
1	C	187	PRO	CA-C-N	6.06	130.80	121.71
1	C	187	PRO	C-N-CA	6.06	130.80	121.71
1	A	138	PHE	CA-CB-CG	6.05	119.85	113.80
1	A	461	GLU	N-CA-C	6.05	118.37	111.11
1	A	527	THR	CA-C-N	6.03	125.79	119.76
1	A	527	THR	C-N-CA	6.03	125.79	119.76
1	C	21	ARG	CD-NE-CZ	6.03	132.84	124.40
1	C	87	ALA	CA-C-N	6.03	131.03	123.14
1	C	87	ALA	C-N-CA	6.03	131.03	123.14
1	C	275	VAL	CA-C-N	5.99	131.06	123.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	275	VAL	C-N-CA	5.99	131.06	123.10
1	A	233	ARG	CD-NE-CZ	5.98	132.78	124.40
1	A	282	PRO	CA-C-N	5.98	130.50	121.65
1	A	282	PRO	C-N-CA	5.98	130.50	121.65
1	A	190	ASP	CA-CB-CG	5.98	118.58	112.60
1	C	266	THR	CA-C-N	5.90	130.95	123.10
1	C	266	THR	C-N-CA	5.90	130.95	123.10
1	D	3	PRO	CA-N-CD	-5.90	103.74	112.00
1	A	266	THR	CA-C-N	5.87	128.36	120.50
1	A	266	THR	C-N-CA	5.87	128.36	120.50
1	A	271	LYS	CA-C-N	5.87	128.62	120.29
1	A	271	LYS	C-N-CA	5.87	128.62	120.29
1	A	88	ILE	CA-C-N	5.86	130.56	122.77
1	A	88	ILE	C-N-CA	5.86	130.56	122.77
1	C	117	ILE	CA-C-N	5.85	130.49	121.71
1	C	117	ILE	C-N-CA	5.85	130.49	121.71
1	A	17	GLY	CA-C-N	5.84	130.54	122.77
1	A	17	GLY	C-N-CA	5.84	130.54	122.77
1	C	197	LEU	CA-C-N	5.84	127.91	120.56
1	C	197	LEU	C-N-CA	5.84	127.91	120.56
1	A	194	VAL	CA-C-N	5.79	127.86	120.56
1	A	194	VAL	C-N-CA	5.79	127.86	120.56
1	A	191	GLU	CA-C-N	5.77	127.94	120.44
1	A	191	GLU	C-N-CA	5.77	127.94	120.44
1	B	27	TYR	CA-CB-CG	5.77	124.28	113.90
1	A	298	ASN	CA-CB-CG	5.77	118.37	112.60
1	A	141	PHE	CA-CB-CG	5.76	119.56	113.80
1	C	215	ALA	CA-C-N	5.76	127.81	120.56
1	C	215	ALA	C-N-CA	5.76	127.81	120.56
1	C	478	ARG	NE-CZ-NH2	5.75	124.37	119.20
1	C	106	GLN	CA-C-N	5.72	127.77	120.56
1	C	106	GLN	C-N-CA	5.72	127.77	120.56
1	C	251	THR	CA-C-N	5.70	130.73	121.62
1	C	251	THR	C-N-CA	5.70	130.73	121.62
1	A	118	ILE	CA-C-N	5.69	130.67	123.10
1	A	118	ILE	C-N-CA	5.69	130.67	123.10
1	C	479	ASN	N-CA-C	5.69	119.42	111.90
1	A	251	THR	CA-C-N	5.69	130.25	121.71
1	A	251	THR	C-N-CA	5.69	130.25	121.71
1	A	35	ASP	CA-C-N	5.66	127.87	120.28
1	A	35	ASP	C-N-CA	5.66	127.87	120.28
1	A	134	ARG	CD-NE-CZ	5.66	132.32	124.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	106	GLN	CA-C-N	5.64	127.67	120.56
1	A	106	GLN	C-N-CA	5.64	127.67	120.56
1	A	176	TYR	CA-C-N	5.64	130.72	121.58
1	A	176	TYR	C-N-CA	5.64	130.72	121.58
1	C	193	LYS	CA-C-N	5.64	127.67	120.56
1	C	193	LYS	C-N-CA	5.64	127.67	120.56
1	C	176	TYR	CA-C-N	5.62	130.74	121.86
1	C	176	TYR	C-N-CA	5.62	130.74	121.86
1	A	21	ARG	CD-NE-CZ	5.62	132.26	124.40
1	A	276	VAL	CA-C-N	5.62	128.69	120.71
1	A	276	VAL	C-N-CA	5.62	128.69	120.71
1	A	135	GLN	CA-C-N	5.60	127.62	120.56
1	A	135	GLN	C-N-CA	5.60	127.62	120.56
1	A	528	PRO	N-CA-CB	5.60	108.55	103.34
1	A	289	PHE	CA-C-N	5.60	127.72	120.44
1	A	289	PHE	C-N-CA	5.60	127.72	120.44
3	F	4	DC	C2'-C3'-O3'	5.59	119.89	111.50
1	C	124	VAL	CA-C-N	5.59	130.87	123.05
1	C	124	VAL	C-N-CA	5.59	130.87	123.05
1	A	534	PHE	CA-C-N	5.58	131.75	121.70
1	A	534	PHE	C-N-CA	5.58	131.75	121.70
1	C	225	ILE	N-CA-CB	5.54	117.15	110.33
1	B	31	ASP	O-C-N	-5.53	115.02	122.43
1	C	200	ASN	CA-C-N	5.53	127.52	120.56
1	C	200	ASN	C-N-CA	5.53	127.52	120.56
1	B	55	ARG	CA-CB-CG	5.53	125.15	114.10
1	A	298	ASN	N-CA-CB	-5.51	102.48	110.70
1	C	194	VAL	CA-C-N	5.51	127.51	120.56
1	C	194	VAL	C-N-CA	5.51	127.51	120.56
1	C	42	GLU	CA-C-N	5.51	127.60	120.44
1	C	42	GLU	C-N-CA	5.51	127.60	120.44
1	A	287	GLU	N-CA-CB	5.51	118.00	110.01
1	C	219	HIS	CA-CB-CG	5.50	119.30	113.80
1	C	383	SER	N-CA-C	5.50	116.96	110.97
1	A	133	MET	CA-C-N	5.49	127.58	120.44
1	A	133	MET	C-N-CA	5.49	127.58	120.44
1	A	22	SER	N-CA-CB	5.47	118.09	110.26
1	C	98	ARG	NE-CZ-NH2	5.47	124.12	119.20
1	A	124	VAL	CA-C-N	5.46	130.87	123.11
1	A	124	VAL	C-N-CA	5.46	130.87	123.11
1	B	43	GLN	CB-CG-CD	-5.46	103.32	112.60
1	C	268	ARG	NE-CZ-NH2	5.46	124.11	119.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	218	SER	CA-C-N	5.45	127.52	120.44
1	C	218	SER	C-N-CA	5.45	127.52	120.44
1	A	40	GLN	CA-CB-CG	5.45	125.00	114.10
1	A	193	LYS	CA-C-N	5.44	127.42	120.56
1	A	193	LYS	C-N-CA	5.44	127.42	120.56
1	C	28	ARG	CA-C-N	5.44	127.89	120.54
1	C	28	ARG	C-N-CA	5.44	127.89	120.54
1	A	35	ASP	N-CA-CB	5.43	118.47	109.88
1	C	238	THR	CA-C-N	5.43	127.89	120.77
1	C	238	THR	C-N-CA	5.43	127.89	120.77
1	C	23	ARG	CB-CG-CD	5.43	123.79	111.30
1	C	289	PHE	CA-C-N	5.41	127.47	120.44
1	C	289	PHE	C-N-CA	5.41	127.47	120.44
1	A	21	ARG	CG-CD-NE	5.40	123.88	112.00
1	A	195	VAL	CA-C-N	5.39	127.45	120.44
1	A	195	VAL	C-N-CA	5.39	127.45	120.44
1	C	20	ARG	CA-C-N	5.39	130.24	122.16
1	C	20	ARG	C-N-CA	5.39	130.24	122.16
1	C	282	PRO	CA-C-N	5.39	129.20	121.55
1	C	282	PRO	C-N-CA	5.39	129.20	121.55
1	C	184	LYS	CB-CG-CD	5.38	123.69	111.30
1	C	137	ARG	CA-C-N	5.38	127.80	120.54
1	C	137	ARG	C-N-CA	5.38	127.80	120.54
1	A	64	GLY	CA-C-N	5.37	127.42	120.44
1	A	64	GLY	C-N-CA	5.37	127.42	120.44
1	C	88	ILE	CA-C-N	5.37	130.56	123.05
1	C	88	ILE	C-N-CA	5.37	130.56	123.05
1	C	148	GLU	CA-C-N	5.36	129.80	120.68
1	C	148	GLU	C-N-CA	5.36	129.80	120.68
1	C	274	ILE	N-CA-CB	5.36	116.56	110.72
1	C	271	LYS	CA-C-N	5.36	127.41	120.44
1	C	271	LYS	C-N-CA	5.36	127.41	120.44
1	A	26	MET	CA-C-N	5.35	127.40	120.44
1	A	26	MET	C-N-CA	5.35	127.40	120.44
1	C	135	GLN	CA-C-N	5.35	127.31	120.56
1	C	135	GLN	C-N-CA	5.35	127.31	120.56
1	A	180	LYS	CA-C-N	5.35	127.76	120.54
1	A	180	LYS	C-N-CA	5.35	127.76	120.54
1	C	60	GLU	N-CA-CB	5.34	117.81	109.85
1	C	188	VAL	N-CA-CB	5.34	117.57	110.26
2	E	-3	DA	C2'-C3'-O3'	-5.33	103.50	111.50
1	C	288	GLN	CA-C-N	5.33	127.37	120.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	288	GLN	C-N-CA	5.33	127.37	120.44
1	A	153	ARG	NE-CZ-NH2	5.33	124.00	119.20
1	C	40	GLN	N-CA-CB	5.33	117.73	110.01
1	C	479	ASN	CA-C-N	5.32	129.91	122.08
1	C	479	ASN	C-N-CA	5.32	129.91	122.08
1	B	50	GLU	CB-CG-CD	-5.32	103.56	112.60
1	B	3	PRO	CA-N-CD	-5.32	104.56	112.00
1	C	17	GLY	CA-C-N	5.31	130.41	122.86
1	C	17	GLY	C-N-CA	5.31	130.41	122.86
1	C	35	ASP	CA-C-N	5.31	127.83	120.29
1	C	35	ASP	C-N-CA	5.31	127.83	120.29
1	C	165	GLY	CA-C-N	5.31	129.95	122.09
1	C	165	GLY	C-N-CA	5.31	129.95	122.09
1	C	195	VAL	CA-C-N	5.31	127.34	120.44
1	C	195	VAL	C-N-CA	5.31	127.34	120.44
1	A	217	ALA	CA-C-N	5.31	127.34	120.44
1	A	217	ALA	C-N-CA	5.31	127.34	120.44
1	C	274	ILE	CA-C-N	5.30	130.50	122.98
1	C	274	ILE	C-N-CA	5.30	130.50	122.98
1	C	25	ASP	CA-C-N	5.29	127.32	120.44
1	C	25	ASP	C-N-CA	5.29	127.32	120.44
1	C	516	ARG	NE-CZ-NH2	5.29	123.96	119.20
1	C	357	LYS	O-C-N	-5.29	115.56	122.59
2	E	21	DT	C2'-C3'-O3'	5.29	119.43	111.50
3	F	-13	DT	C2'-C3'-O3'	5.29	119.43	111.50
1	C	70	ARG	CD-NE-CZ	5.29	131.80	124.40
1	A	134	ARG	CA-C-N	5.28	127.67	120.54
1	A	134	ARG	C-N-CA	5.28	127.67	120.54
1	C	287	GLU	CA-C-N	5.28	127.30	120.44
1	C	287	GLU	C-N-CA	5.28	127.30	120.44
1	C	221	THR	CA-C-N	5.28	127.35	120.28
1	C	221	THR	C-N-CA	5.28	127.35	120.28
1	A	274	ILE	CA-C-N	5.28	130.32	122.99
1	A	274	ILE	C-N-CA	5.28	130.32	122.99
1	A	505	LEU	O-C-N	5.27	129.23	123.27
1	C	362	ARG	N-CA-C	5.27	117.98	110.24
3	F	3	DT	O3'-P-O5'	-5.27	96.10	104.00
1	C	250	GLY	CA-C-N	5.26	130.15	122.41
1	C	250	GLY	C-N-CA	5.26	130.15	122.41
1	A	185	LEU	CA-C-N	5.26	131.79	122.48
1	A	185	LEU	C-N-CA	5.26	131.79	122.48
1	A	73	PHE	N-CA-CB	5.26	117.85	110.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	70	ARG	CG-CD-NE	5.26	123.57	112.00
1	C	26	MET	CA-C-N	5.25	127.26	120.44
1	C	26	MET	C-N-CA	5.25	127.26	120.44
1	C	191	GLU	CA-C-N	5.25	127.26	120.44
1	C	191	GLU	C-N-CA	5.25	127.26	120.44
3	F	4	DC	O3'-P-O5'	-5.24	96.14	104.00
1	C	403	MET	CA-C-N	5.24	129.47	120.72
1	C	403	MET	C-N-CA	5.24	129.47	120.72
1	A	42	GLU	CA-C-N	5.24	127.25	120.44
1	A	42	GLU	C-N-CA	5.24	127.25	120.44
1	A	232	LYS	CA-C-N	5.24	129.31	121.72
1	A	232	LYS	C-N-CA	5.24	129.31	121.72
1	A	192	ALA	CA-C-N	5.23	127.25	120.44
1	A	192	ALA	C-N-CA	5.23	127.25	120.44
1	C	130	PRO	CA-C-N	5.23	127.15	120.56
1	C	130	PRO	C-N-CA	5.23	127.15	120.56
1	B	30	GLN	N-CA-C	5.23	116.53	109.11
1	C	21	ARG	N-CA-CB	5.22	117.62	110.57
1	C	138	PHE	CA-C-N	5.22	127.28	120.28
1	C	138	PHE	C-N-CA	5.22	127.28	120.28
3	F	-22	DT	O3'-P-O5'	-5.21	96.18	104.00
1	A	152	GLU	N-CA-CB	5.21	117.78	110.12
1	A	21	ARG	CA-CB-CG	5.20	124.51	114.10
1	A	518	GLY	CA-C-N	5.20	124.52	118.85
1	A	518	GLY	C-N-CA	5.20	124.52	118.85
1	A	20	ARG	CA-C-N	5.20	129.96	122.16
1	A	20	ARG	C-N-CA	5.20	129.96	122.16
1	A	144	ARG	NE-CZ-NH2	5.19	123.87	119.20
1	A	190	ASP	CA-C-N	5.19	127.24	120.28
1	A	190	ASP	C-N-CA	5.19	127.24	120.28
1	A	43	LEU	N-CA-CB	5.19	117.54	110.01
1	C	73	PHE	N-CA-CB	5.19	117.75	110.12
1	C	101	TYR	N-CA-CB	5.19	118.34	110.14
1	C	29	GLU	CA-CB-CG	5.19	124.47	114.10
1	C	37	LEU	N-CA-CB	5.18	117.53	110.01
1	C	91	LYS	N-CA-CB	5.18	117.52	110.01
1	A	184	LYS	CA-C-N	5.17	129.06	120.94
1	A	184	LYS	C-N-CA	5.17	129.06	120.94
1	B	29	THR	N-CA-C	-5.17	102.21	109.96
1	A	102	SER	CA-C-N	5.17	127.16	120.44
1	A	102	SER	C-N-CA	5.17	127.16	120.44
1	A	145	GLU	CA-C-N	5.16	127.20	120.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	145	GLU	C-N-CA	5.16	127.20	120.28
1	A	286	LYS	CG-CD-CE	5.16	123.17	111.30
1	C	283	ILE	CA-C-N	5.15	130.88	122.69
1	C	283	ILE	C-N-CA	5.15	130.88	122.69
1	A	146	GLU	CB-CG-CD	5.15	121.36	112.60
1	C	38	THR	CA-C-N	5.15	127.18	120.28
1	C	38	THR	C-N-CA	5.15	127.18	120.28
1	A	138	PHE	N-CA-CB	5.15	117.64	109.82
1	A	134	ARG	CA-CB-CG	5.14	124.39	114.10
1	C	70	ARG	CA-CB-CG	5.14	124.39	114.10
1	C	192	ALA	CA-C-N	5.14	127.48	120.54
1	C	192	ALA	C-N-CA	5.14	127.48	120.54
1	C	270	GLU	CA-C-N	5.12	127.10	120.44
1	C	270	GLU	C-N-CA	5.12	127.10	120.44
1	A	184	LYS	CB-CG-CD	5.12	123.07	111.30
1	C	284	ILE	CA-C-N	5.12	127.97	120.71
1	C	284	ILE	C-N-CA	5.12	127.97	120.71
1	A	103	ASP	CA-C-N	5.11	127.09	120.44
1	A	103	ASP	C-N-CA	5.11	127.09	120.44
1	C	487	GLN	OE1-CD-NE2	-5.11	117.49	122.60
1	C	40	GLN	CA-C-N	5.11	127.08	120.44
1	C	40	GLN	C-N-CA	5.11	127.08	120.44
1	A	268	ARG	NH1-CZ-NH2	-5.10	112.67	119.30
2	E	-26	DG	C4'-C3'-C2'	-5.10	94.75	102.40
1	A	37	LEU	N-CA-CB	5.09	117.40	110.01
1	A	138	PHE	CA-C-N	5.09	127.10	120.28
1	A	138	PHE	C-N-CA	5.09	127.10	120.28
1	A	95	ARG	CA-C-N	5.09	127.36	120.65
1	A	95	ARG	C-N-CA	5.09	127.36	120.65
1	A	239	ILE	N-CA-CB	5.08	115.96	110.62
1	B	15	ILE	N-CA-C	-5.08	105.75	110.53
1	A	265	ARG	CA-C-N	5.08	129.80	122.44
1	A	265	ARG	C-N-CA	5.08	129.80	122.44
1	C	196	GLN	CA-C-N	5.08	127.39	120.54
1	C	196	GLN	C-N-CA	5.08	127.39	120.54
1	C	532	PHE	CA-CB-CG	-5.08	108.72	113.80
1	C	189	GLU	CA-C-N	5.08	127.04	120.44
1	C	189	GLU	C-N-CA	5.08	127.04	120.44
1	C	276	VAL	CA-C-N	5.08	129.72	122.72
1	C	276	VAL	C-N-CA	5.08	129.72	122.72
1	A	91	LYS	N-CA-CB	5.07	117.36	110.01
1	C	20	ARG	CB-CG-CD	5.06	122.94	111.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	102	SER	CA-C-N	5.06	127.37	120.54
1	C	102	SER	C-N-CA	5.06	127.37	120.54
1	A	188	VAL	CA-C-N	5.06	127.33	120.65
1	A	188	VAL	C-N-CA	5.06	127.33	120.65
1	A	388	HIS	CB-CG-CD2	-5.06	124.62	131.20
1	C	219	HIS	CA-C-N	5.06	127.02	120.44
1	C	219	HIS	C-N-CA	5.06	127.02	120.44
1	A	21	ARG	CA-C-N	5.06	129.42	120.87
1	A	21	ARG	C-N-CA	5.06	129.42	120.87
1	B	29	THR	CA-CB-CG2	5.05	119.09	110.50
1	A	191	GLU	CB-CG-CD	5.05	121.19	112.60
1	C	103	ASP	CA-C-N	5.05	127.01	120.44
1	C	103	ASP	C-N-CA	5.05	127.01	120.44
1	C	179	ASN	N-CA-CB	5.05	117.86	109.88
1	C	388	HIS	CB-CG-CD2	-5.05	124.64	131.20
1	C	217	ALA	CA-C-N	5.05	127.35	120.54
1	C	217	ALA	C-N-CA	5.05	127.35	120.54
1	A	136	ILE	CA-C-N	5.04	127.00	120.44
1	A	136	ILE	C-N-CA	5.04	127.00	120.44
1	B	40	PHE	CA-CB-CG	5.04	118.84	113.80
1	C	184	LYS	CA-C-N	5.03	129.01	121.72
1	C	184	LYS	C-N-CA	5.03	129.01	121.72
1	A	162	ALA	CA-C-N	5.03	127.52	120.28
1	A	162	ALA	C-N-CA	5.03	127.52	120.28
1	A	250	GLY	CA-C-N	5.03	129.48	121.99
1	A	250	GLY	C-N-CA	5.03	129.48	121.99
1	B	36	ASP	CA-CB-CG	-5.03	107.58	112.60
1	C	118	ILE	N-CA-CB	5.03	117.14	110.26
1	C	148	GLU	CB-CG-CD	5.02	121.14	112.60
1	C	40	GLN	CB-CG-CD	5.01	121.12	112.60
1	C	41	LYS	N-CA-CB	5.01	117.28	110.01
1	C	516	ARG	NE-CZ-NH1	-5.01	116.49	121.50
1	A	33	GLY	CA-C-N	5.00	129.47	121.66
1	A	33	GLY	C-N-CA	5.00	129.47	121.66
1	C	31	ARG	NE-CZ-NH2	5.00	123.70	119.20
1	A	29	GLU	CB-CG-CD	5.00	121.10	112.60
1	C	72	VAL	CA-C-N	5.00	126.98	120.28
1	C	72	VAL	C-N-CA	5.00	126.98	120.28
1	C	123	LYS	CB-CG-CD	5.00	122.81	111.30

There are no chirality outliers.

All (60) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	144	ARG	Sidechain
1	A	151	ARG	Sidechain
1	A	257	ARG	Sidechain
1	A	268	ARG	Sidechain
1	A	330	TYR	Sidechain
1	A	347	HIS	Sidechain
1	A	373	TYR	Sidechain
1	A	428	PHE	Sidechain
1	A	531	ARG	Sidechain
1	A	534	PHE	Sidechain
1	B	27	TYR	Sidechain
1	B	30	GLN	Sidechain
1	B	33	ALA	Mainchain
1	B	41	TYR	Sidechain
1	B	43	GLN	Sidechain
1	B	47	HIS	Sidechain
1	B	50	GLU	Sidechain
1	C	174	TYR	Sidechain
1	C	248	TYR	Sidechain
1	C	334	ARG	Sidechain
1	C	346	TYR	Sidechain
1	C	357	LYS	Mainchain
1	C	362	ARG	Sidechain
1	C	363	TYR	Sidechain
1	C	373	TYR	Sidechain
1	C	396	TYR	Sidechain
1	C	398	ASP	Mainchain
1	D	41	TYR	Sidechain
1	D	55	ARG	Sidechain
2	E	-1	DA	Sidechain
2	E	-10	DA	Sidechain
2	E	-13	DT	Sidechain
2	E	-16	DT	Sidechain
2	E	-21	DA	Sidechain
2	E	-22	DT	Sidechain
2	E	-26	DG	Sidechain
2	E	-7	DA	Sidechain
2	E	-8	DA	Sidechain
2	E	1	DT	Sidechain
2	E	11	DT	Sidechain
2	E	12	DT	Sidechain
2	E	14	DA	Sidechain
2	E	16	DA	Sidechain

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Mol	Chain	Res	Type	Group
2	E	17	DT	Sidechain
2	E	2	DA	Sidechain
2	E	20	DT	Sidechain
2	E	7	DT	Sidechain
3	F	-10	DT	Sidechain
3	F	-16	DT	Sidechain
3	F	-25	DT	Sidechain
3	F	-3	DC	Sidechain
3	F	-5	DA	Sidechain
3	F	-7	DA	Sidechain
3	F	-9	DA	Sidechain
3	F	12	DT	Sidechain
3	F	15	DG	Sidechain
3	F	16	DA	Sidechain
3	F	17	DT	Sidechain
3	F	2	DA	Sidechain
3	F	3	DT	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4354	4430	4425	45	0
1	B	481	474	474	17	0
1	C	4354	4430	4426	39	0
1	D	481	474	474	3	0
2	E	1175	645	638	9	0
3	F	1162	652	645	4	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
All	All	12009	11105	11082	88	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (88) 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:C:108:VAL:HG13	1:C:133:MET:HE1	1.62	0.81
1:A:138:PHE:CD2	1:C:149:MET:HE1	2.24	0.73
1:A:532:PHE:HB3	1:B:37:LEU:HD22	1.77	0.67
1:A:503:MET:CG	1:B:47:HIS:CD2	2.82	0.62
1:A:108:VAL:HG13	1:A:133:MET:HE1	1.82	0.61
1:C:108:VAL:HG13	1:C:133:MET:CE	2.30	0.61
1:A:48:LEU:HD13	1:A:55:TYR:CD2	2.36	0.60
1:C:532:PHE:CD1	1:D:40:PHE:HB2	2.38	0.59
1:A:496:LYS:CE	1:A:496:LYS:HA	2.33	0.58
1:C:48:LEU:HD13	1:C:55:TYR:CD2	2.40	0.57
1:A:503:MET:HG2	1:B:47:HIS:CD2	2.39	0.57
1:A:534:PHE:CE1	1:B:41:TYR:CE1	2.93	0.56
1:B:31:ASP:O	1:B:34:SER:HA	2.06	0.55
1:C:16:LEU:HD21	1:C:76:CYS:SG	2.46	0.54
1:C:191:GLU:O	1:C:195:VAL:HG23	2.07	0.54
1:A:37:LEU:HD11	1:A:59:MET:SD	2.49	0.53
1:A:532:PHE:CD1	1:B:40:PHE:CG	2.97	0.53
1:A:496:LYS:HA	1:A:496:LYS:HE2	1.91	0.52
1:A:108:VAL:HG11	1:A:137:ARG:NH1	2.24	0.51
1:A:138:PHE:CD2	1:C:149:MET:CE	2.91	0.51
1:C:16:LEU:HD21	1:C:76:CYS:CB	2.40	0.51
1:C:17:GLY:HA3	1:C:57:LEU:HD23	1.92	0.51
1:C:373:TYR:CD1	1:D:25:ILE:HG21	2.45	0.51
1:A:135:GLN:NE2	1:C:149:MET:HE2	2.25	0.51
1:C:374:LEU:HA	1:C:377:LEU:HD23	1.92	0.50
1:B:10:LEU:HD12	1:B:28:ILE:HD12	1.94	0.50
2:E:-8:DA:H2''	2:E:-7:DA:C8	2.47	0.50
1:A:532:PHE:CE1	1:B:40:PHE:HB2	2.47	0.49
1:A:313:GLU:H	1:A:313:GLU:CD	2.20	0.49
1:C:314:LEU:HG	1:C:363:TYR:CE1	2.47	0.49
1:B:10:LEU:HD13	1:B:13:LYS:HD2	1.94	0.49
1:C:154:MET:HE1	3:F:-1:DA:C4	2.48	0.48
1:A:210:ASP:HB2	1:B:50:GLU:OE2	2.13	0.48
1:A:374:LEU:HD22	1:A:504:VAL:HG11	1.96	0.48
1:A:503:MET:HG3	1:B:47:HIS:CD2	2.48	0.47
1:C:349:LYS:HE2	1:C:363:TYR:CE2	2.49	0.47
1:A:532:PHE:CD1	1:B:40:PHE:CB	2.97	0.47
1:A:258:GLU:HB2	1:A:268:ARG:HD2	1.96	0.47
1:C:309:PHE:CD1	2:E:18:DA:H5'	2.51	0.46
1:A:190:ASP:O	1:A:194:VAL:HG23	2.16	0.46
1:B:50:GLU:HA	1:B:50:GLU:OE1	2.16	0.46
1:A:138:PHE:HD2	1:C:149:MET:HE1	1.76	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:314:LEU:HD12	1:C:363:TYR:HD1	1.81	0.45
1:A:357:LYS:HE2	2:E:-21:DA:H5''	1.98	0.45
1:A:135:GLN:CD	1:C:149:MET:HE2	2.41	0.45
1:B:38:ASP:OD1	1:B:38:ASP:C	2.60	0.45
1:A:23:ARG:HA	1:A:26:MET:HE2	1.99	0.45
1:C:111:LEU:HD23	1:C:116:LEU:HB2	1.99	0.45
1:C:228:PRO:HD3	1:C:234:TRP:CZ3	2.53	0.44
1:C:528:PRO:C	1:C:529:ILE:HD13	2.43	0.44
1:A:506:LYS:HB2	1:A:531:ARG:HA	1.99	0.44
1:C:188:VAL:HG11	1:C:191:GLU:OE2	2.18	0.44
1:C:314:LEU:HD12	1:C:363:TYR:CD1	2.53	0.44
1:A:138:PHE:CE2	1:C:149:MET:SD	3.11	0.43
1:C:160:THR:HG22	1:C:164:GLN:NE2	2.33	0.43
1:A:138:PHE:O	1:A:143:ALA:HB2	2.18	0.43
1:A:254:TYR:CZ	3:F:5:DT:H4'	2.53	0.43
1:A:167:TRP:HB3	1:A:178:LEU:HD13	2.00	0.43
1:C:93:ILE:HD13	1:C:136:ILE:HA	2.01	0.43
1:C:349:LYS:HE2	1:C:363:TYR:CD2	2.54	0.43
3:F:-10:DT:H2''	3:F:-9:DA:C8	2.53	0.43
1:C:247:VAL:HG13	1:C:280:HIS:CE1	2.54	0.43
1:C:529:ILE:HD12	1:D:28:ILE:HD11	2.00	0.42
1:C:19:LEU:HD23	1:C:44:MET:SD	2.59	0.42
1:A:171:LEU:HD21	2:E:-5:DA:O4'	2.19	0.42
1:A:176:TYR:CE2	1:A:283:ILE:HD12	2.53	0.42
1:C:349:LYS:HG2	1:C:363:TYR:CD2	2.55	0.42
1:A:503:MET:HE2	1:B:47:HIS:NE2	2.34	0.42
1:A:392:MET:N	1:A:392:MET:SD	2.93	0.42
1:C:19:LEU:HD21	1:C:41:LYS:HA	2.01	0.42
3:F:3:DT:H2''	3:F:4:DC:C6	2.54	0.42
1:A:118:ILE:O	1:A:124:VAL:HG13	2.20	0.41
1:C:254:TYR:HA	2:E:6:DG:OP1	2.19	0.41
1:A:259:LYS:HA	1:A:265:ARG:HD3	2.01	0.41
1:A:496:LYS:HE2	1:A:499:GLU:CD	2.46	0.41
1:A:531:ARG:C	1:A:532:PHE:CD1	2.99	0.41
1:A:138:PHE:CD2	1:C:149:MET:SD	3.13	0.41
1:A:146:GLU:O	1:A:149:MET:HE3	2.21	0.41
2:E:-28:DA:C6	2:E:-27:DG:C6	3.09	0.41
1:A:171:LEU:HD22	2:E:-4:DG:H5'	2.03	0.41
2:E:-8:DA:C2'	2:E:-7:DA:C8	3.03	0.41
1:C:104:ALA:O	1:C:108:VAL:HG23	2.20	0.41
1:C:357:LYS:O	1:C:357:LYS:HG3	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:298:ASN:HB3	1:B:43:GLN:CD	2.46	0.41
2:E:6:DG:H2'	2:E:7:DT:H72	2.03	0.41
1:A:532:PHE:CD1	1:B:40:PHE:HB2	2.56	0.40
1:A:175:GLY:O	1:A:283:ILE:HD11	2.20	0.40
1:C:80:LEU:HD23	1:C:85:TYR:HB2	2.02	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	533/620 (86%)	506 (95%)	25 (5%)	2 (0%)	30	68
1	B	54/620 (9%)	47 (87%)	6 (11%)	1 (2%)	6	32
1	C	533/620 (86%)	504 (95%)	28 (5%)	1 (0%)	44	78
1	D	54/620 (9%)	50 (93%)	4 (7%)	0	100	100
All	All	1174/2480 (47%)	1107 (94%)	63 (5%)	4 (0%)	38	73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	354	LYS
1	C	357	LYS
1	B	35	ASN
1	A	210	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	490/560 (88%)	487 (99%)	3 (1%)	84	88
1	B	51/560 (9%)	48 (94%)	3 (6%)	16	37
1	C	490/560 (88%)	481 (98%)	9 (2%)	54	71
1	D	51/560 (9%)	51 (100%)	0	100	100
All	All	1082/2240 (48%)	1067 (99%)	15 (1%)	62	75

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

Mol	Chain	Res	Type
1	A	392	MET
1	A	496	LYS
1	A	503	MET
1	B	24	SER
1	B	38	ASP
1	B	49	LEU
1	C	168	ILE
1	C	236	GLN
1	C	350	SER
1	C	352	THR
1	C	400	ASN
1	C	491	GLU
1	C	509	ILE
1	C	525	GLU
1	C	529	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	204	ASN
1	A	219	HIS
1	A	305	ASN
1	A	364	ASN
1	A	390	ASN
1	A	479	ASN
1	B	30	GLN
1	B	43	GLN
1	B	47	HIS
1	C	207	ASN

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Mol	Chain	Res	Type
1	C	291	GLN
1	C	298	ASN
1	C	347	HIS
1	C	390	ASN
1	C	489	HIS
1	C	498	ASN
1	C	514	GLN
1	D	35	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 2 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 ⓘ

There are no chain breaks in this entry.

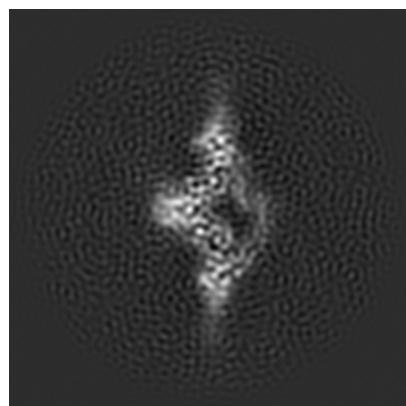
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-72632. These allow visual inspection of the internal detail of the map and identification of artifacts.

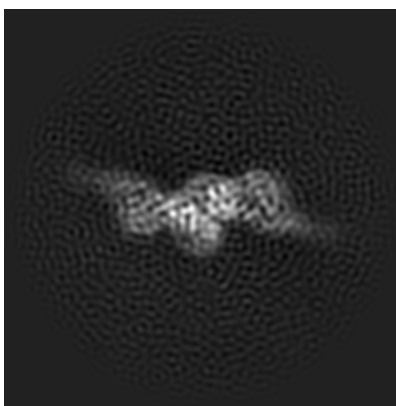
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

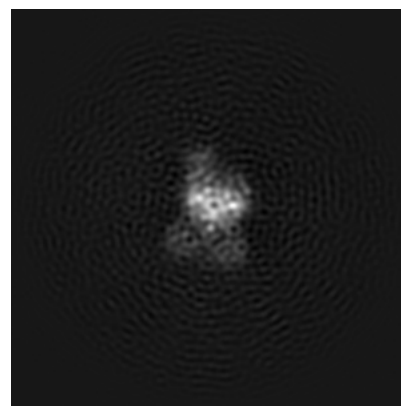
6.1.1 Primary map



X

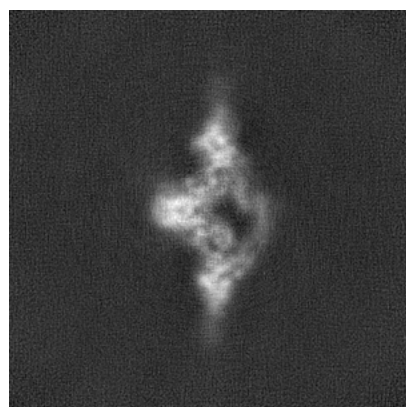


Y

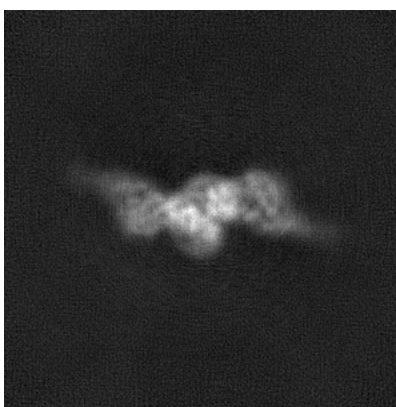


Z

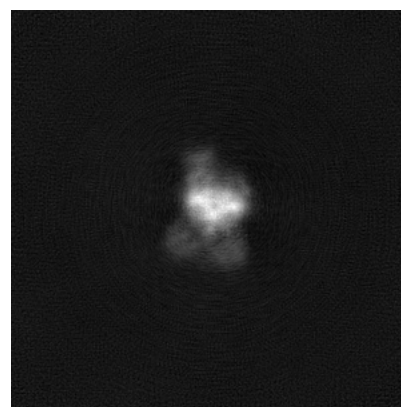
6.1.2 Raw map



X



Y

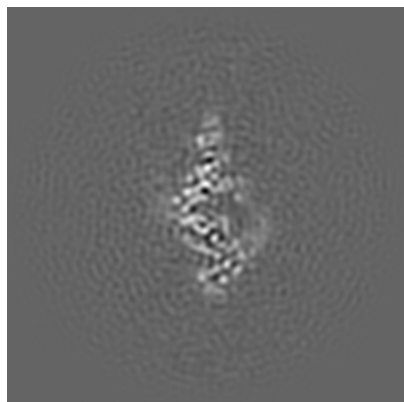


Z

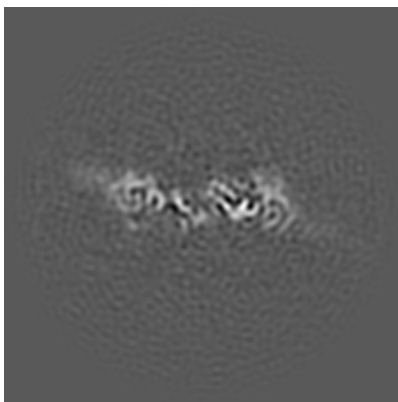
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

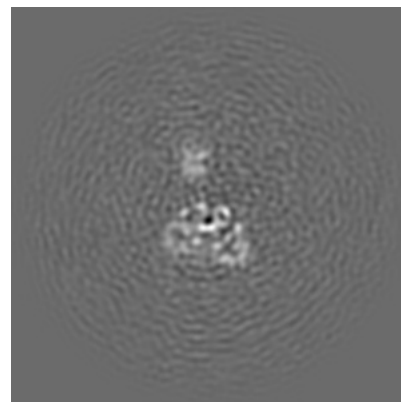
6.2.1 Primary map



X Index: 160

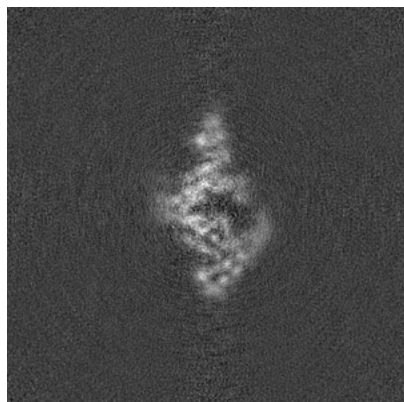


Y Index: 160

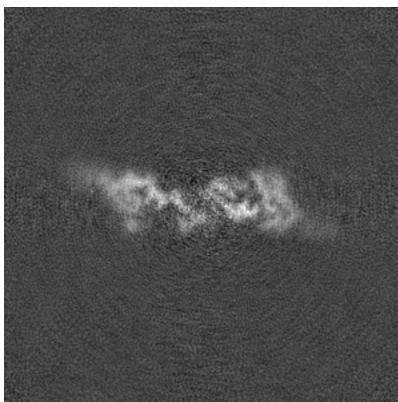


Z Index: 160

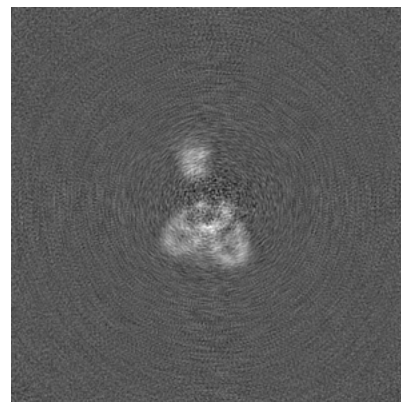
6.2.2 Raw map



X Index: 160



Y Index: 160

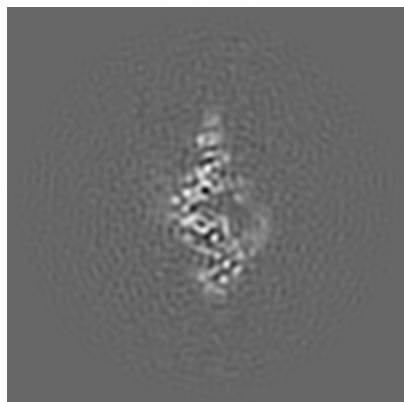


Z Index: 160

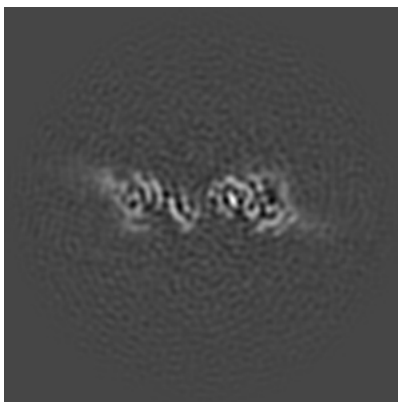
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

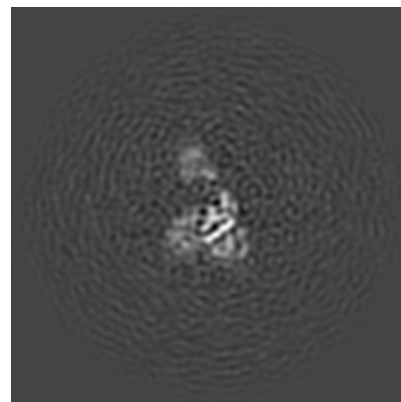
6.3.1 Primary map



X Index: 159

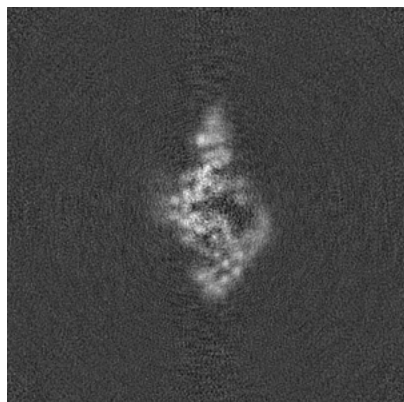


Y Index: 164

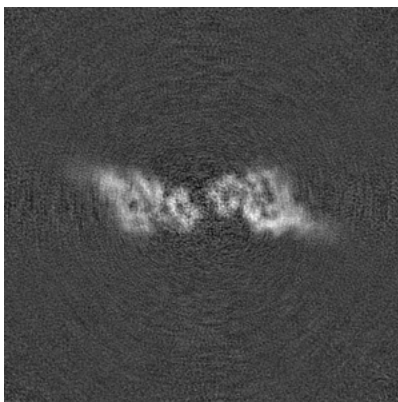


Z Index: 166

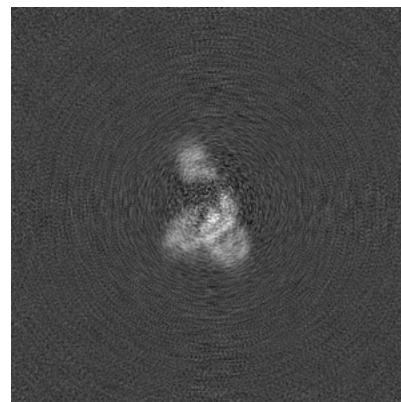
6.3.2 Raw map



X Index: 158



Y Index: 166

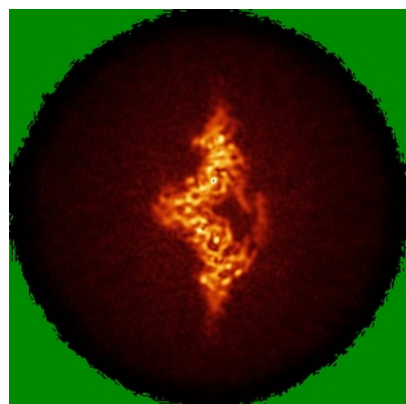


Z Index: 165

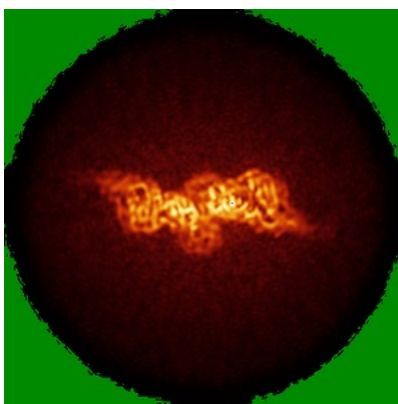
The images above show the largest variance slices of the map in three orthogonal directions.

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

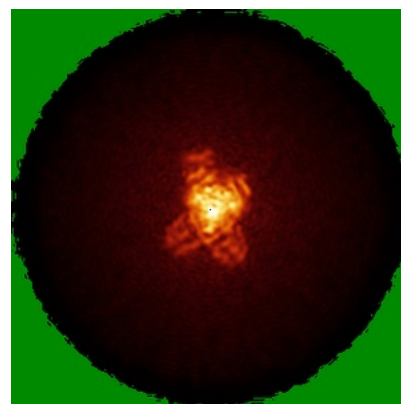
6.4.1 Primary map



X

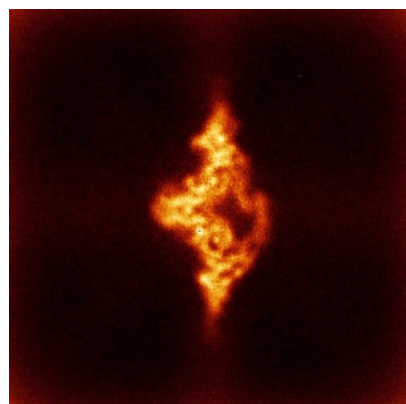


Y

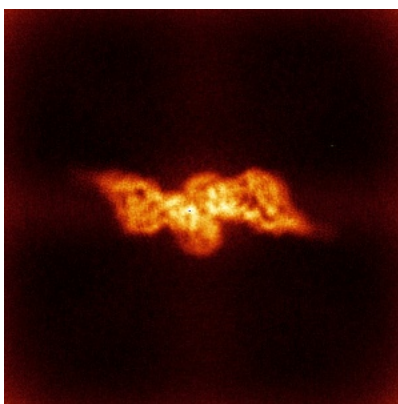


Z

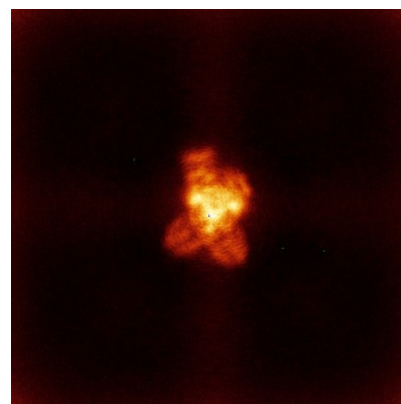
6.4.2 Raw map



X



Y

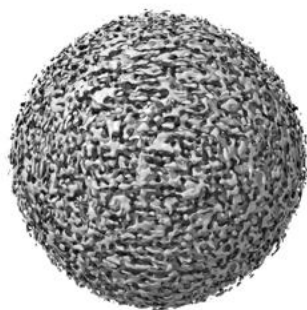


Z

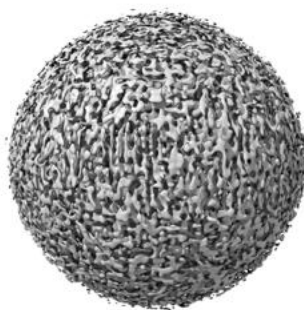
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

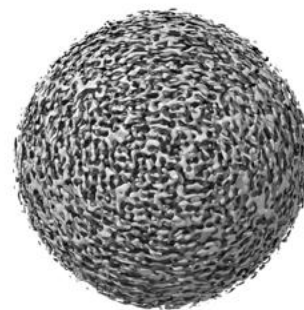
6.5.1 Primary map



X



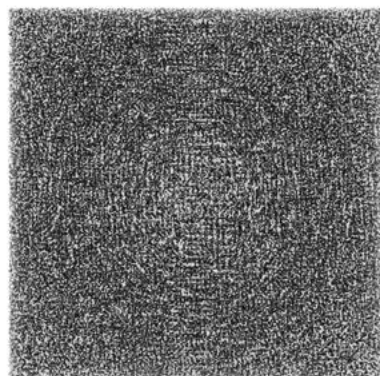
Y



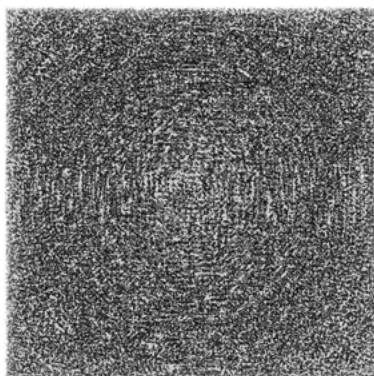
Z

The images above show the 3D surface view of the map at the recommended contour level 0.006. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

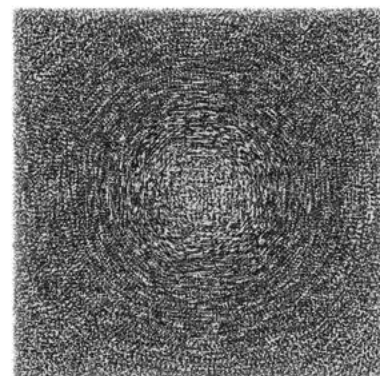
6.5.2 Raw map



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.

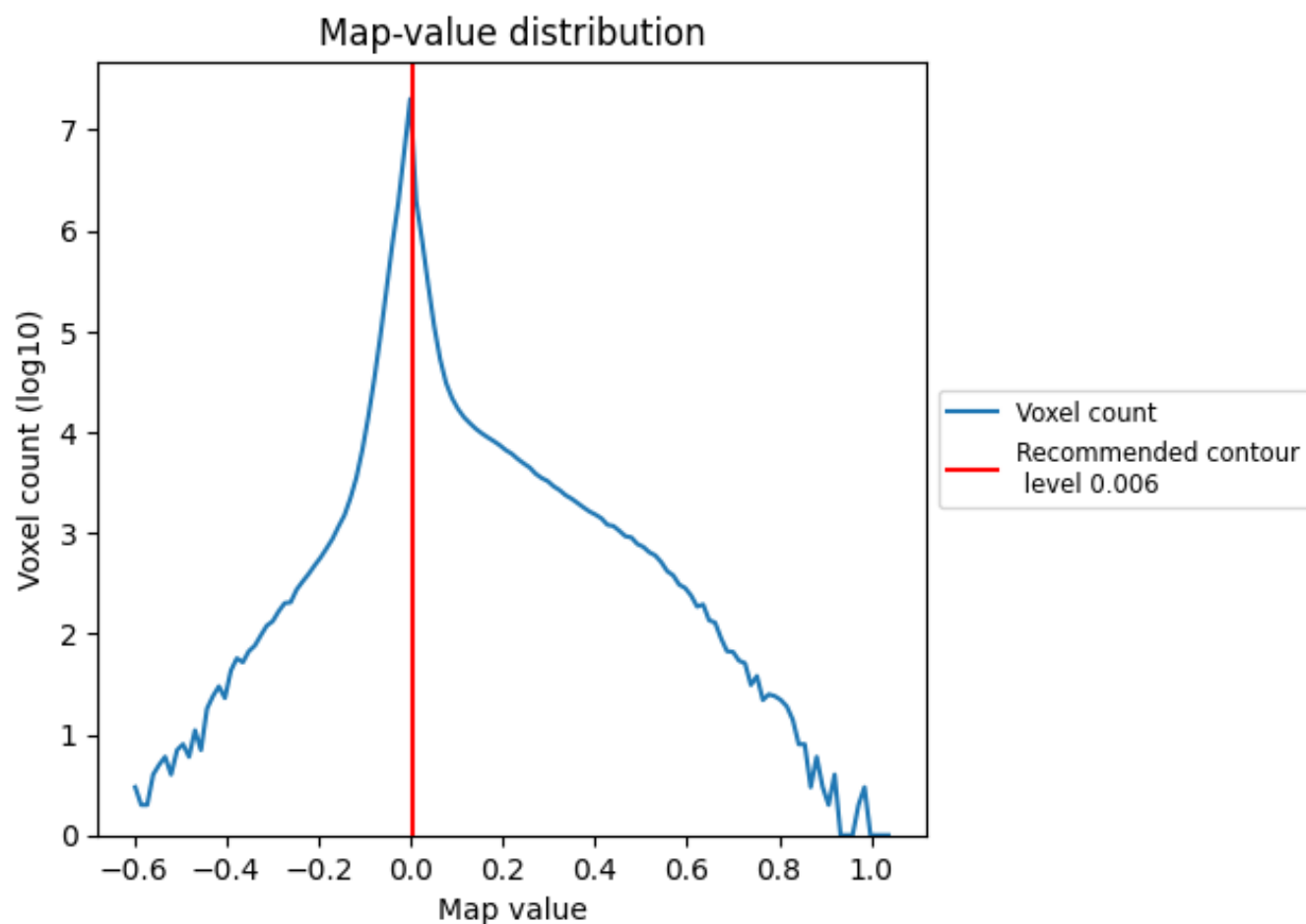
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

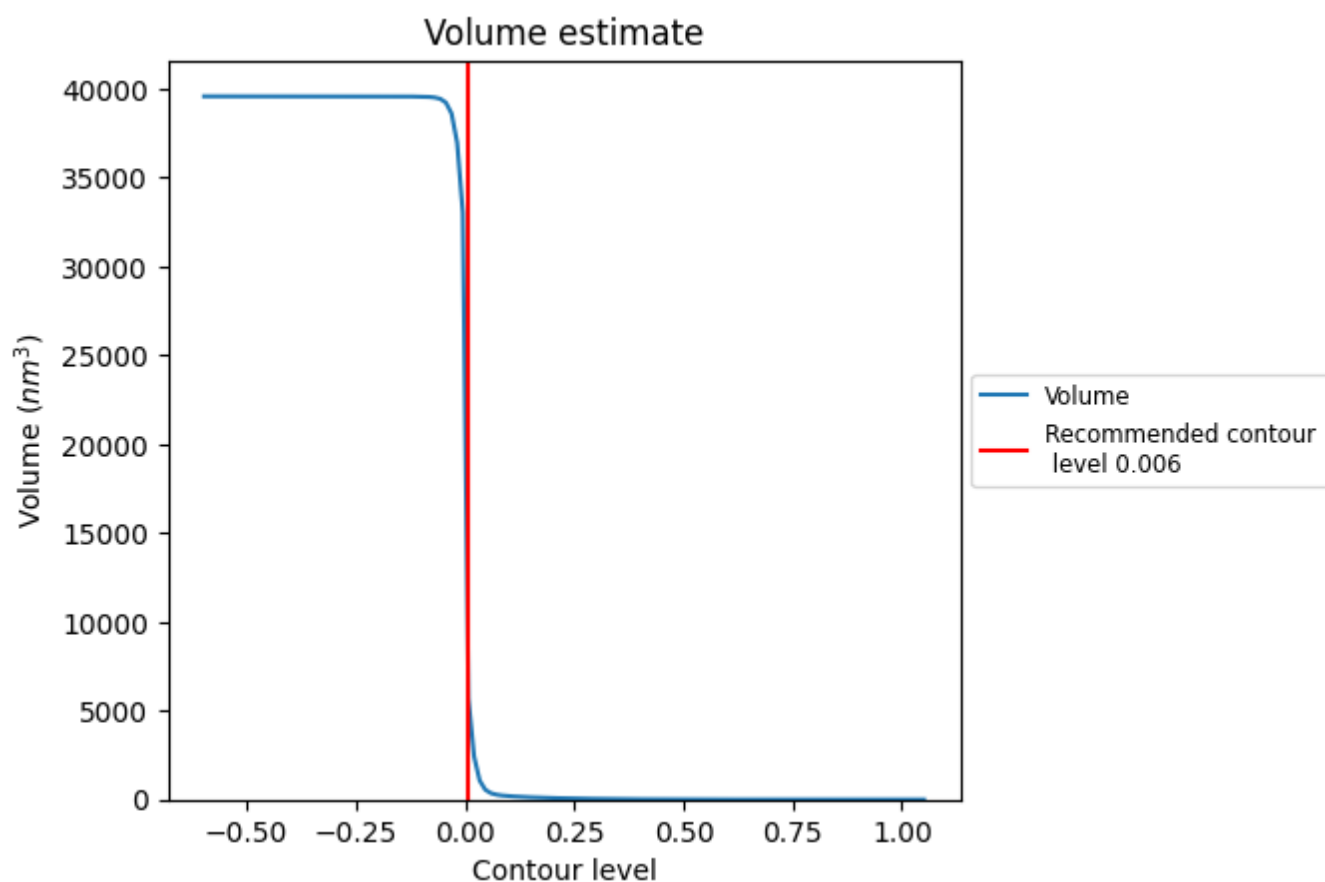
This section contains the results of statistical analysis of the map.

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.

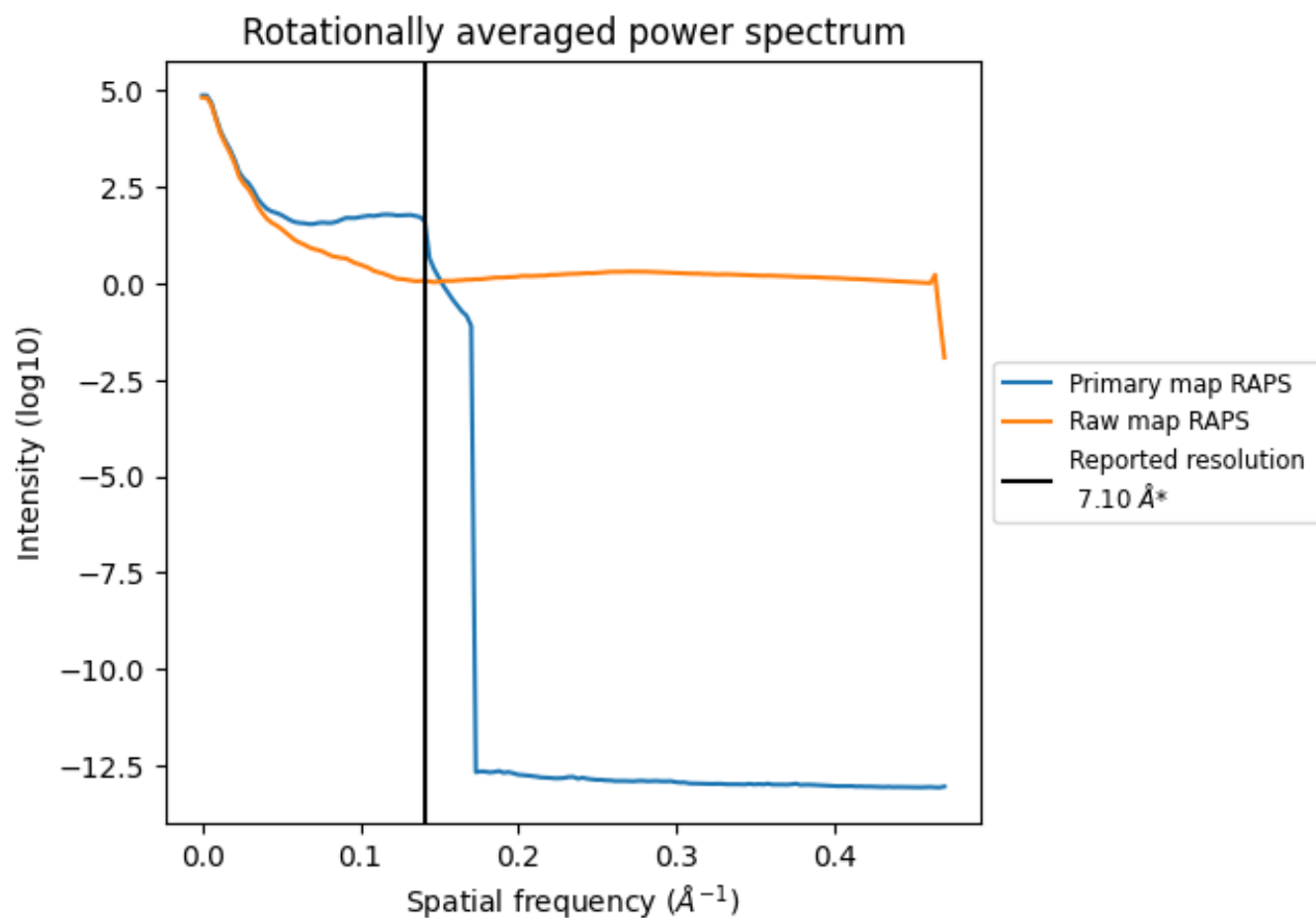
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 9316 nm^3 ; this corresponds to an approximate mass of 8415 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

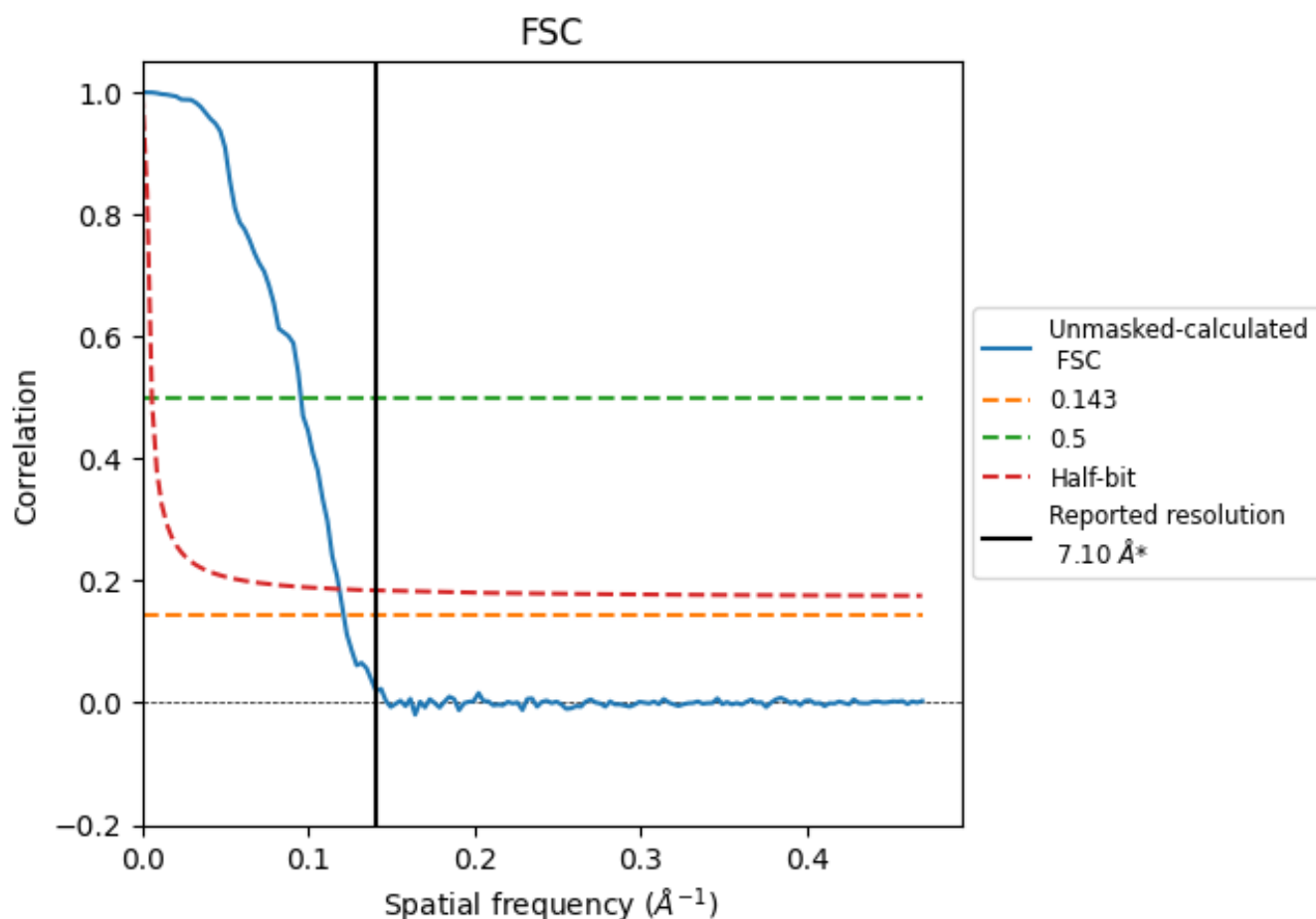


*Reported resolution corresponds to spatial frequency of 0.141 Å⁻¹

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 0.141 Å⁻¹

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.10	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	8.24	10.46	8.43

*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 8.24 differs from the reported value 7.1 by more than 10 %

9 Map-model fit [i](#)

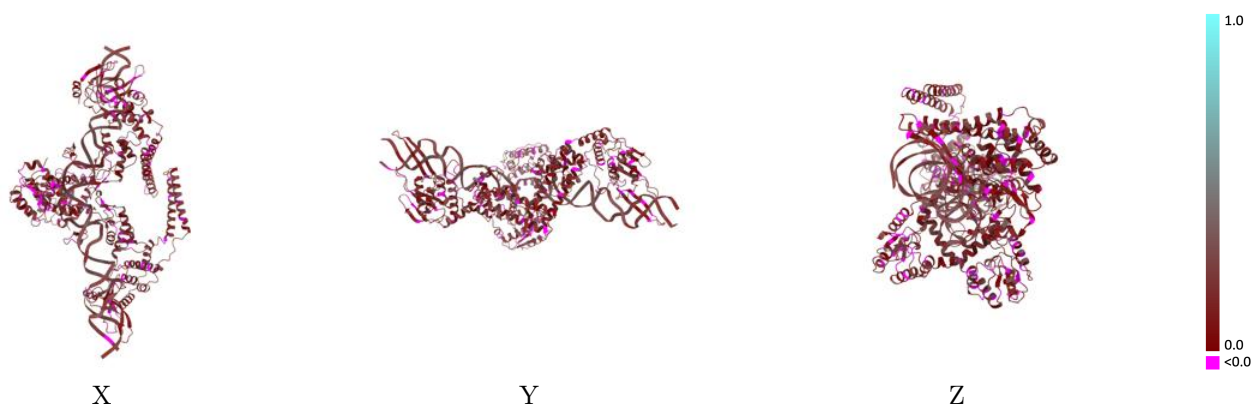
This section contains information regarding the fit between EMDB map EMD-72632 and PDB model 9Y6V. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



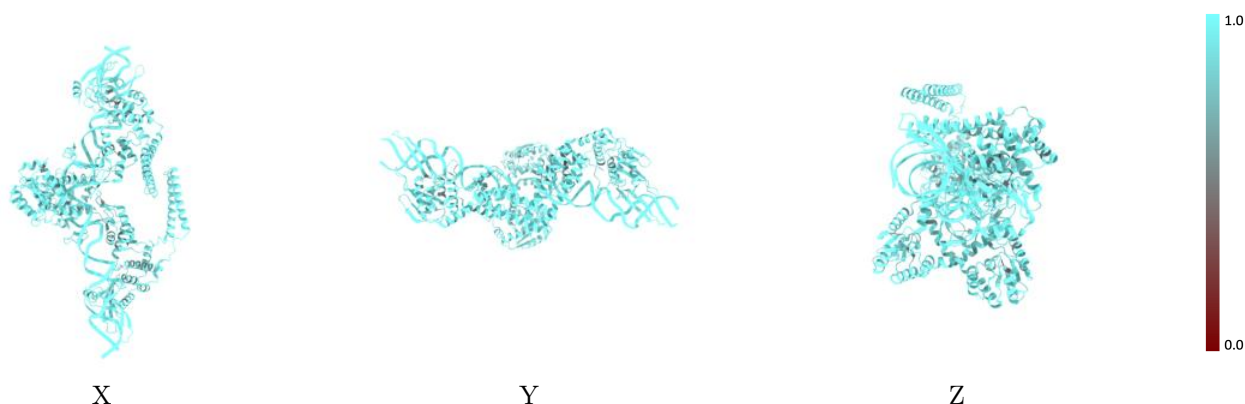
The images above show the 3D surface view of the map at the recommended contour level 0.006 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



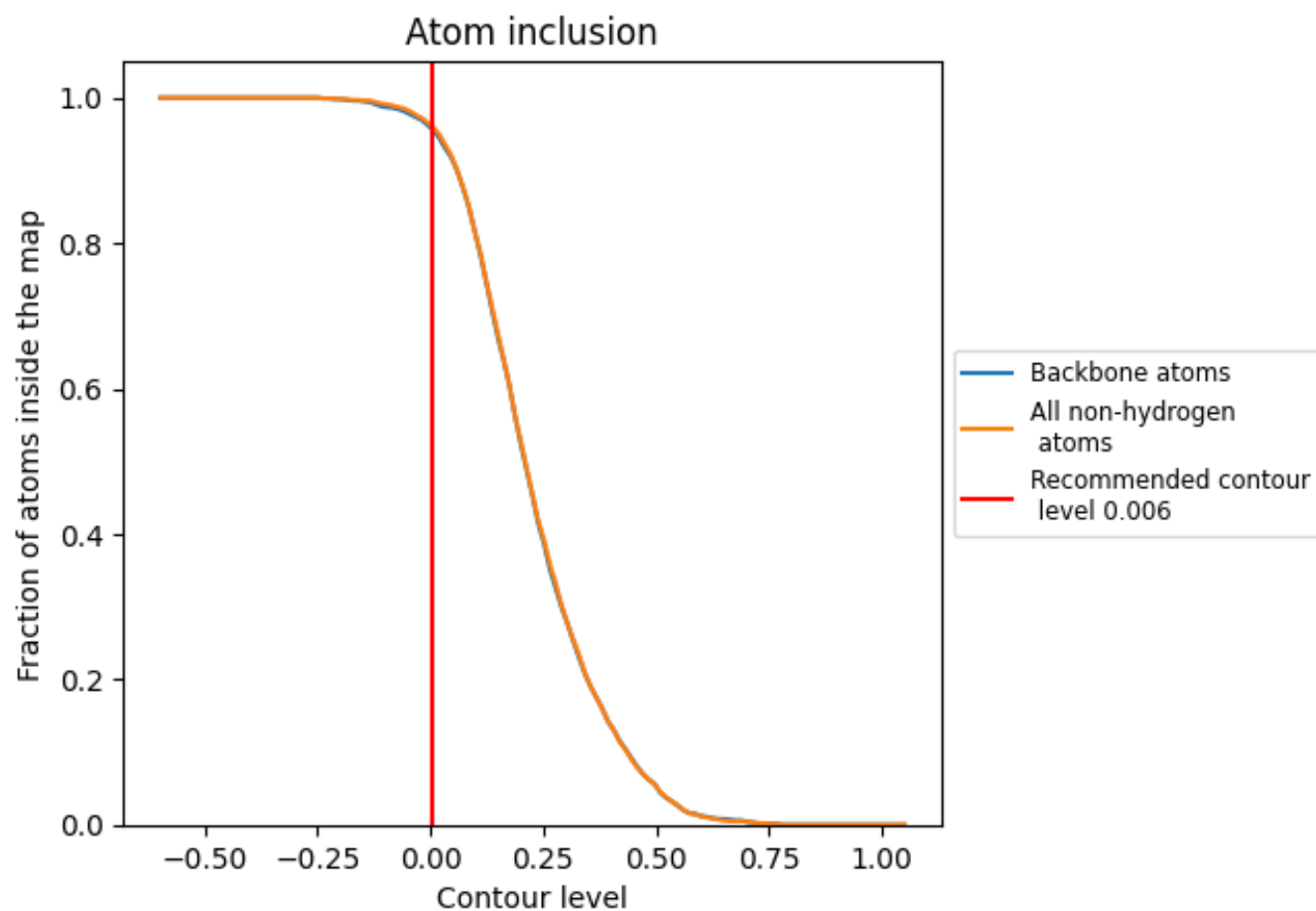
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.006).

9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 96% 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 (0.006) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9600	0.1680
A	0.9550	0.1450
B	0.9400	0.1320
C	0.9550	0.1480
D	0.9400	0.1280
E	0.9990	0.2650
F	0.9980	0.2660

1.0

0.0

<0.0