Integrative Structure Validation Report

October 09, 2025 - 04:43 PM PDT

The following software was used in the production of this report:

IHMValidation Version 3.0
Python-IHM Version 2.5
MolProbity Version 4.5.2
EMDB validation analysis Version 0.0.1.dev127
ChimeraX Version 1.9
Chimera Version 1.19
MapQ Version 1.8.1

PDB ID	9A3O | pdb_00009a3o
PDB-Dev ID	PDBDEV_00000209
Structure Title	CLOCK-BMAL1 bound to a nucleosome at SHL -6.2
Structure Authors	Michael, A.K.; Kempf, G.; Cavadini, S.; Thoma, N.
Deposited on	2023-04-26

This is a PDB-IHM Structure Validation Report.

We welcome your comments at helpdesk@pdb-ihm.org

A user guide is available at https://pdb-ihm.org/validation_help.html with specific help available everywhere you see the symbol.

List of references used to build this report is available here.

1. Overview

1.1. Summary

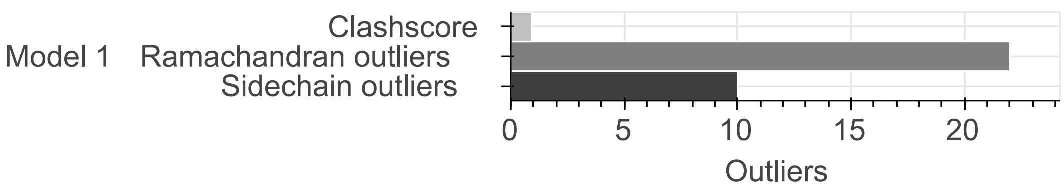
This entry consists of 1 model(s). A total of 5 dataset(s) were used to build this entry.

Name	Type	Count
3DEM volume	Experimental data	1
Crosslinking-MS data	Experimental data	1
Experimental model	Starting model	3

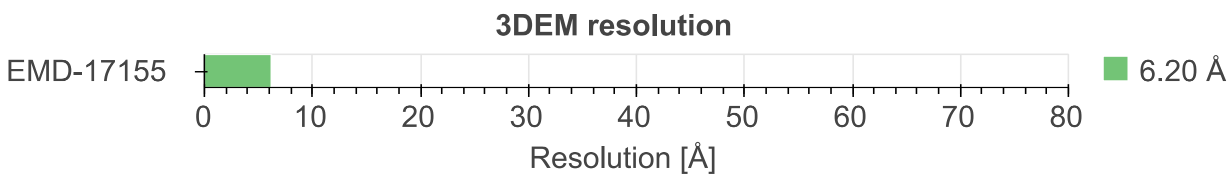
1.2. Overall quality

This validation report contains model quality assessments for all structures, data quality and fit to model assessments for SAS and crosslinking-MS datasets. Data quality and fit to model assessments for other datasets and model uncertainty are under development. Number of plots is limited to 256.

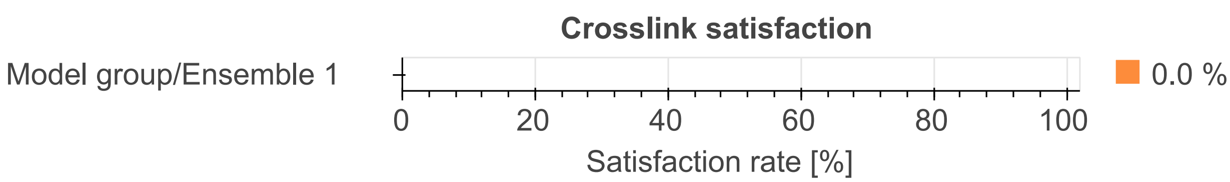
Model Quality: MolProbity Analysis

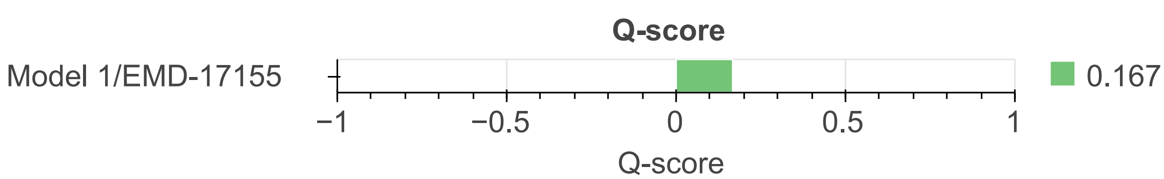


Data Quality



Fit to Data Used for Modeling





2. Model Details

2.1. Ensemble information

This entry consists of 0 distinct ensemble(s).

2.2. Representation

This entry has 1 representation(s).

ID	Model(s)	Entity ID	Molecule name	Chain(s) [auth]	Total residues	Rigid segments	Flexible segments	Model coverage/ Starting model coverage (%)	Scale
1	1	1	Histone H3.1	A	139	-	1-139	100.00 / 100.00	Atomic
				E					
		2	Histone H4	B	106	-	1-106	100.00 / 100.00	Atomic
				F					
		3	Histone H2A	C	133	-	1-133	100.00 / 100.00	Atomic
				G					
		4	Histone H2B	D	128	-	1-128	100.00 / 100.00	Atomic
				H					
		5	DNA (128-MER)	I	153	-	1-153	100.00 / 100.00	Atomic
		6	DNA (128-MER)	J	153	-	1-153	100.00 / 100.00	Atomic
		7	Circadian locomoter output cycles protein kaput	K [M]	375	-	1-84, 85-364, 365-375	100.00 / 100.00	Atomic
		8	Basic helix-loop-helix ARNT-like protein 1	L [N]	384	-	1-71, 72-376, 377-384	100.00 / 100.00	Atomic

2.3. Datasets used for modeling

There are 5 unique datasets used to build the models in this entry.

ID	Dataset type	Database name	Data access code
1	3DEM volume	EMDB	EMD-17155
2	Crosslinking-MS data	PRIDE	PXD033181
3	Experimental model	PDB	pdb_00006t93
4	Experimental model	PDB	pdb_00004f3l
5	Experimental model	PDB	pdb_00008osj

2.4. Methodology and software

This entry is a result of 1 distinct protocol(s).

Step number	Protocol ID	Method name	Method type	Method description	Number of computed models	Multi state modeling	Multi scale modeling
1	1	Manual fitting	Manual fitting	Not available	Not available	False	False
2	1	Rosetta Dock with crosslink filter and density scoring	Rosetta Dock	Not available	Not available	False	False

There are 2 software packages reported in this entry.

ID	Software name	Software version	Software classification	Software location
2	Coot	0.9.6	model building	https://www2.mrc-lmb.cam.ac.uk/personal/pemsley/coot/
1	Rosetta	Not available	protein docking and model building	https://www.rosettacommons.org/

3. Data quality ?

3.2. Crosslinking-MS

At the moment, data validation is only available for crosslinking-MS data deposited as a fully compliant dataset in the PRIDE Crosslinking database. Correspondence between crosslinking-MS and entry entities is established using pyHMMER. Only residue pairs that passed the reported threshold are used for the analysis. The values in the report have to be interpreted in the context of the experiment (i.e. only a minor fraction of in-situ or in-vivo dataset can be used for modeling).

Crosslinking-MS dataset is not available in the PRIDE Crosslinking database.

3.3. 3DEM ?

This section describes quality of the 3DEM datasets

EMD-17155

3.3.1. Experimental information ?

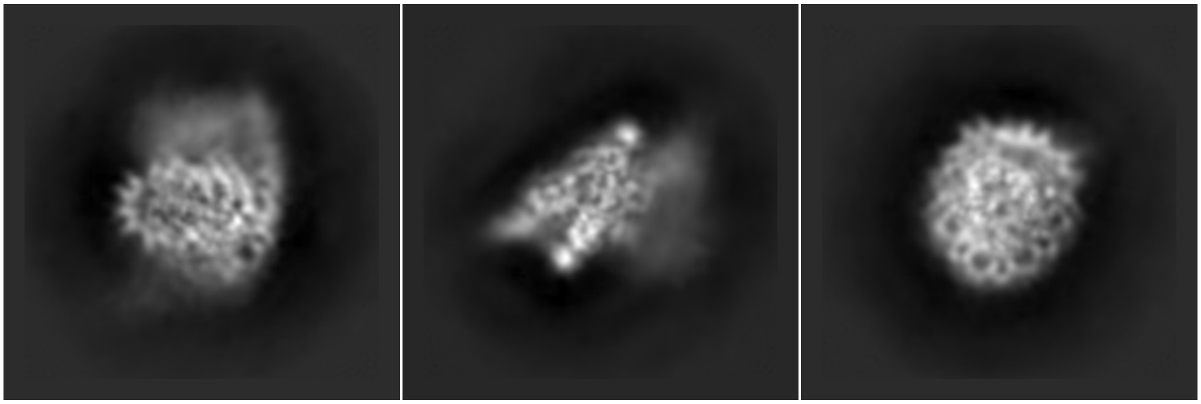
EM reconstruction method:	SINGLE PARTICLE
Resolution:	6.20 Å
Recommended level:	0.001
Estimated volume:	446.58 nm^3
Specimen preparation:	Preparation ID 1 Vitrification
Map-only validation report:	wwPDB validation report

3.3.2. Map visualisation ?

This section contains visualisations of the EMDB entry EMD-17155. 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.

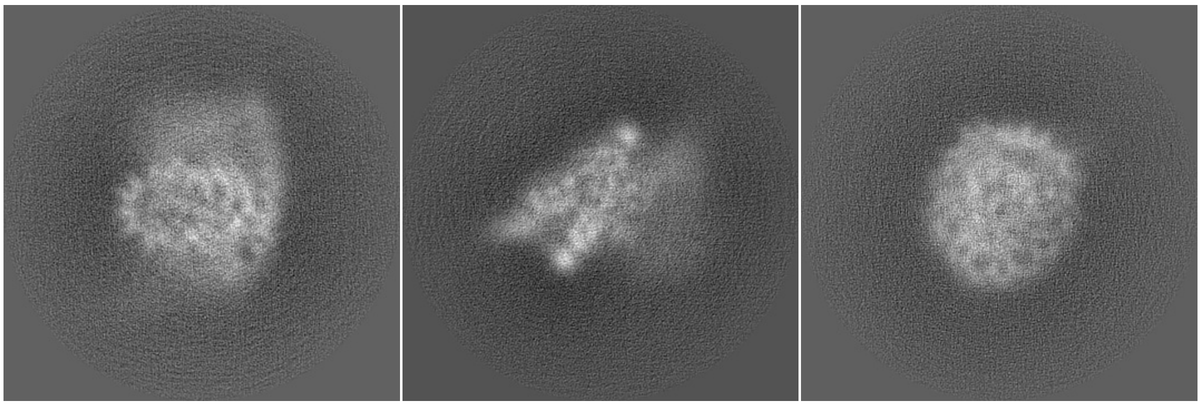
3.3.2.1. Orthogonal projections ?

Primary map



X Y Z

Raw map

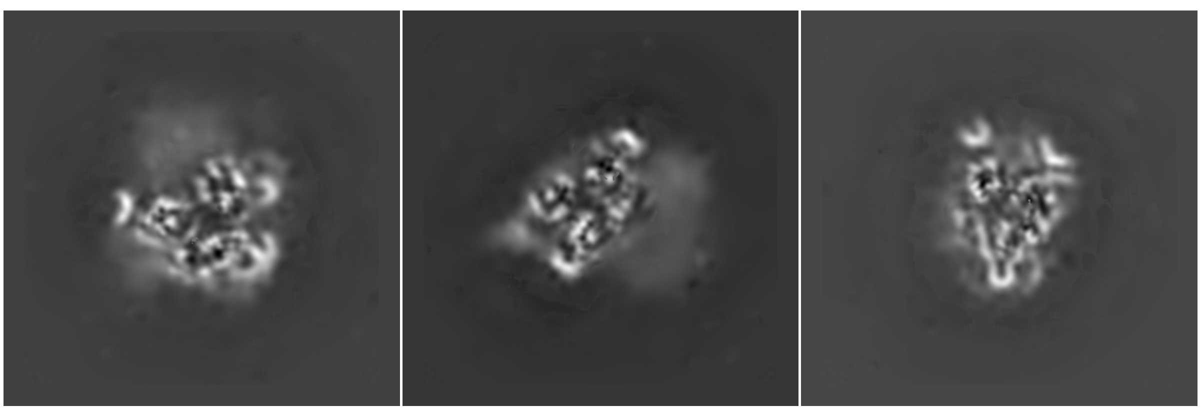


X Y Z

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

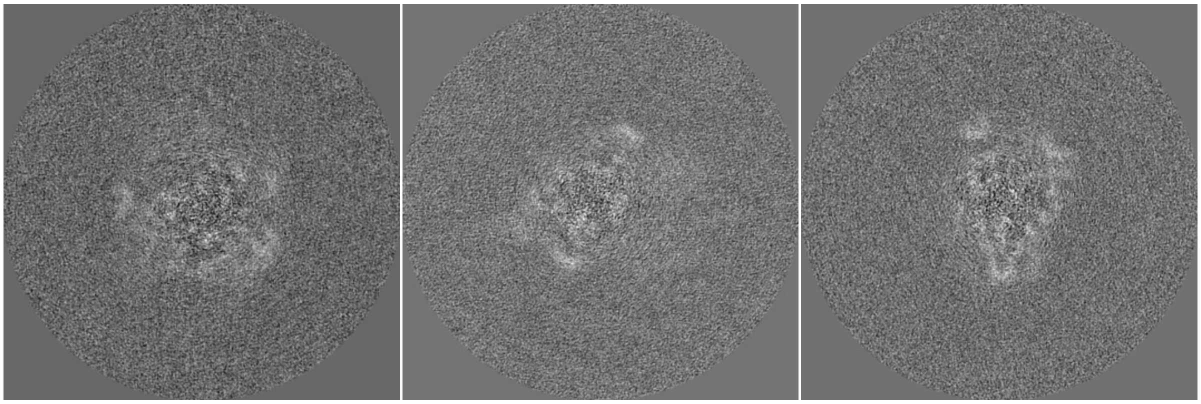
3.3.2.2. Central slices

Primary map



X Index: 178 **Y Index: 178** **Z Index: 178**

Raw map

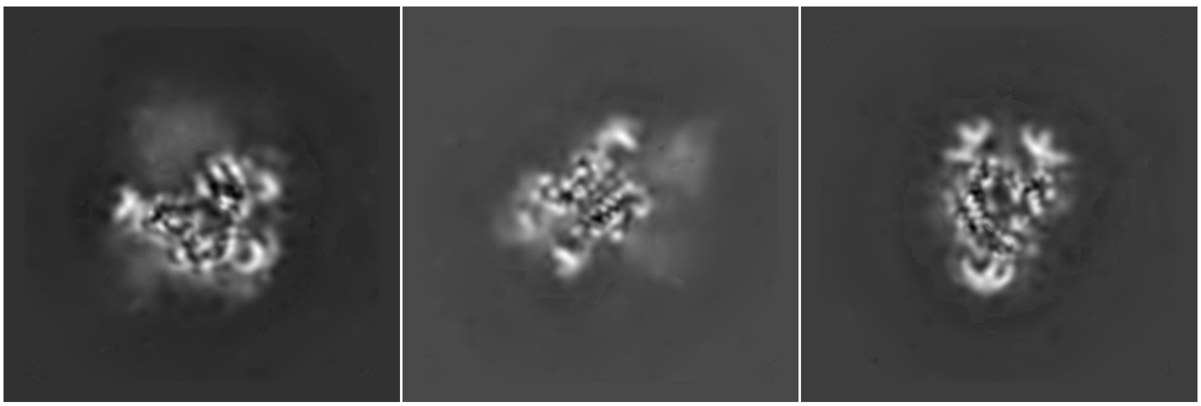


X Index: 178 **Y Index: 178** **Z Index: 178**

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

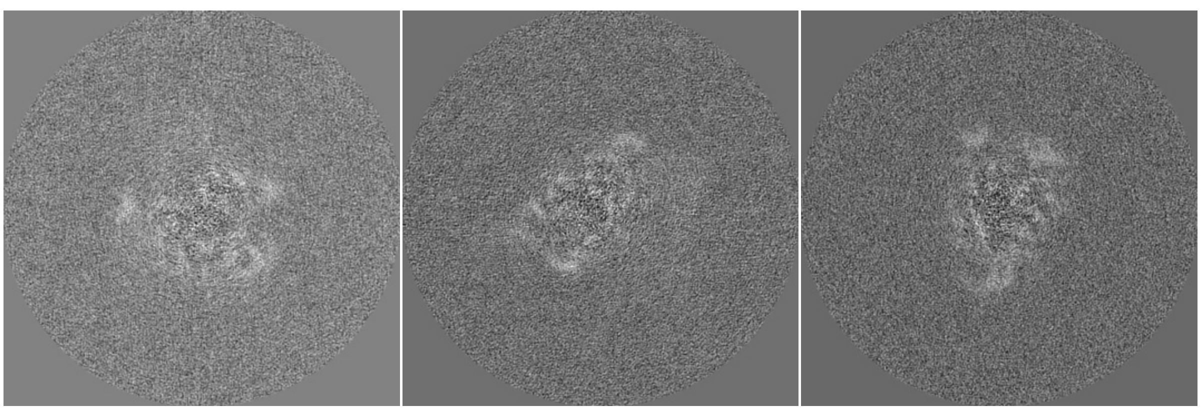
3.3.2.3. Largest variance slices

Primary map



X Index: 174 **Y Index: 203** **Z Index: 170**

Raw map

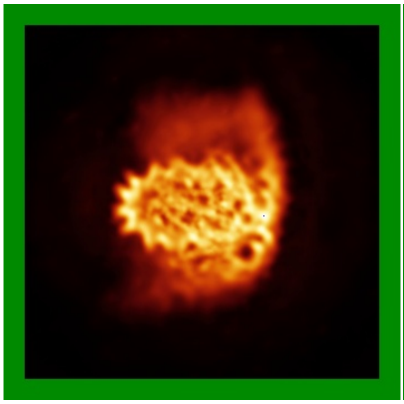
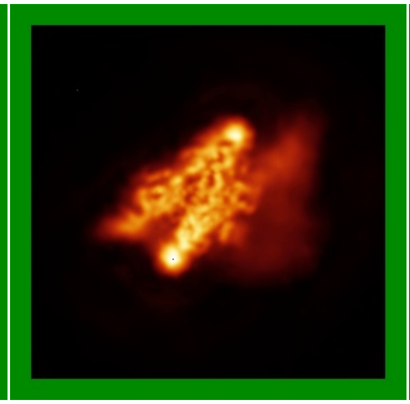
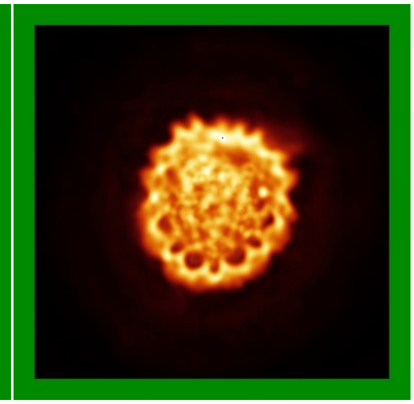


X Index: 176 **Y Index: 182** **Z Index: 174**

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

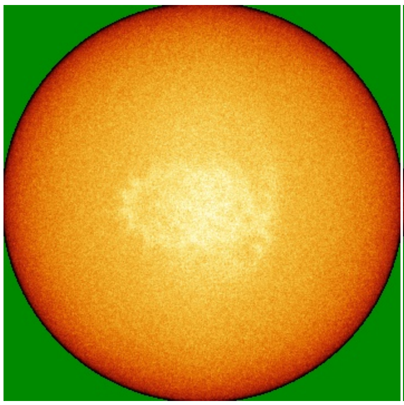
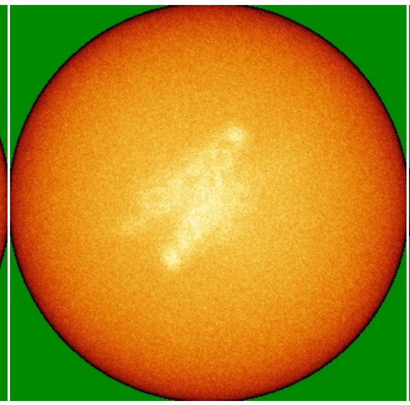
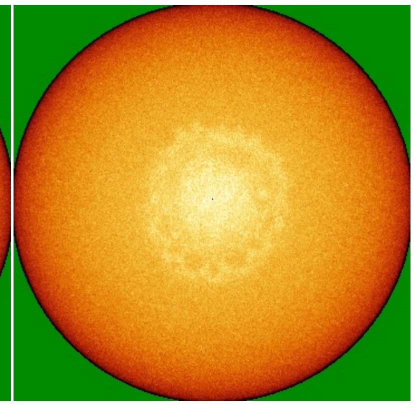
3.3.2.4 Orthogonal standard-deviation projections (false-color)

Primary map

X **Y** **Z**

Raw map

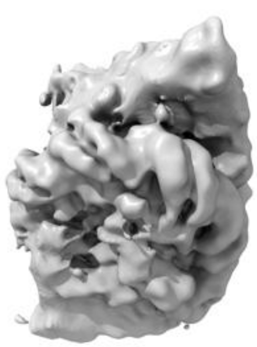
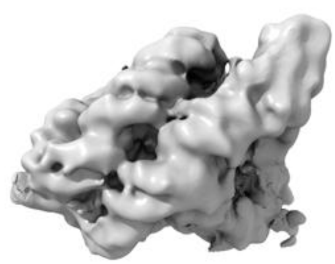
  

X **Y** **Z**

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.

3.3.2.5. Orthogonal surface views ?

Primary map

X **Y** **Z**

The images above show the 3D surface view of the map at the recommended contour level 0.001 . These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

Raw map

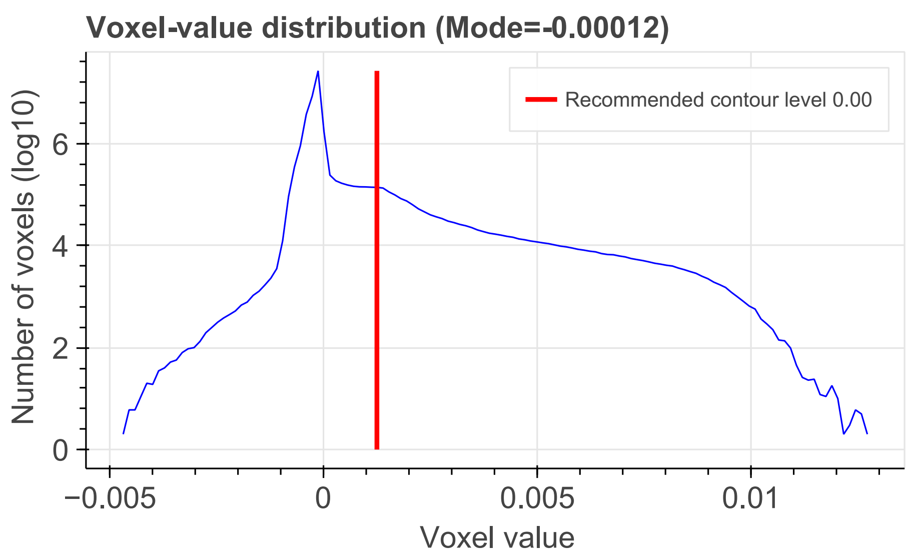
X **Y** **Z**

These images show the 3D surface of the raw map. The raw map's contour level 0.000 was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

3.3.3. Map analysis

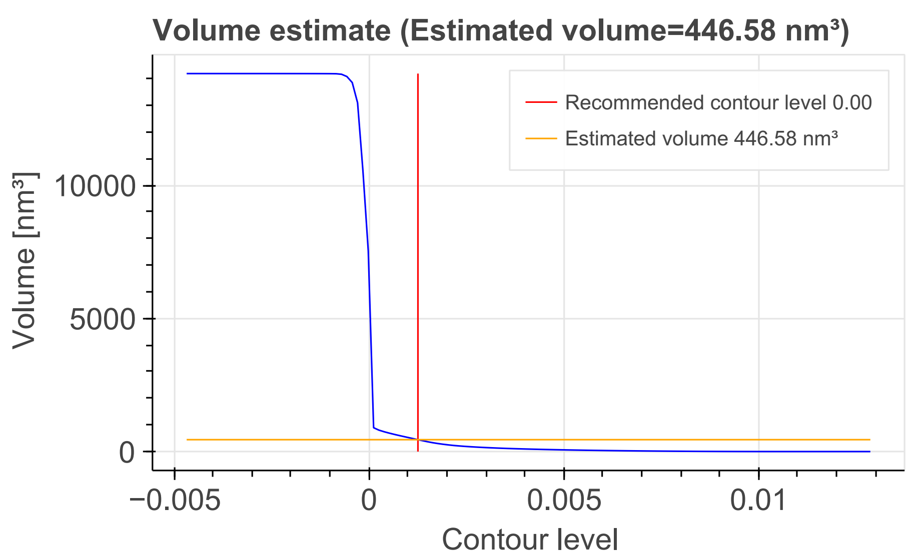
This section contains the results of statistical analysis of the map.

3.3.3.1. 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.

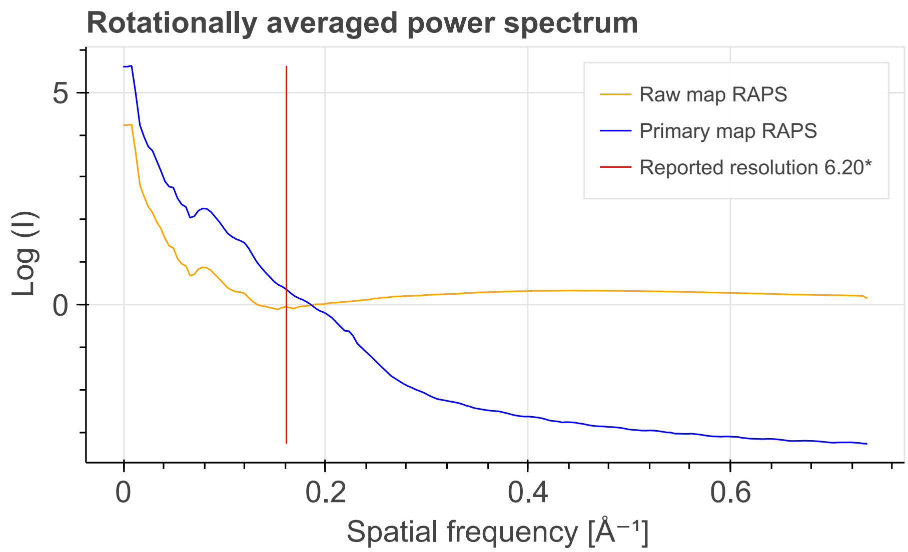
3.3.3.2. Volume estimate



The volume at the recommended contour level is 446.58 nm^3.

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.

3.3.3.3. Rotationally averaged power spectrum

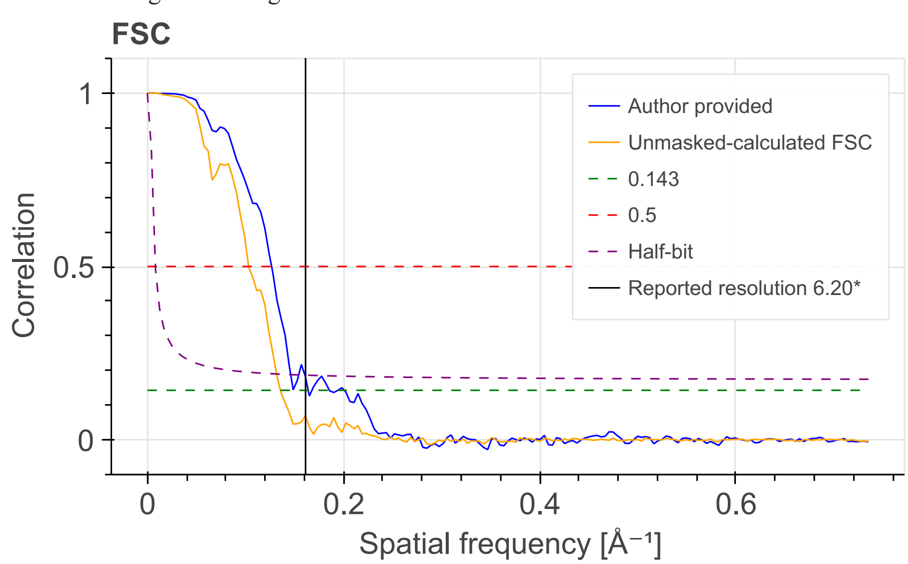


*Reported resolution corresponds to spatial frequency of 0.161 $Å^{-1}$

3.3.4. Fourier-Shell correlation

3.3.4.1. FSC

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.



*Reported resolution corresponds to spatial frequency of 0.161 $Å^{-1}$

3.3.4.2. Resolution estimates

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	**0.5**	**Half-bit**
Reported by author	6.20	-	-

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	**0.5**	**Half-bit**
Author-provided FSC curve	6.10	7.89	6.84
Unmasked-calculated*	7.37	9.69	7.59

*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 7.37 differs from the reported value 6.20 by more than 10%.

4. Model quality

For models with atomic structures, MolProbity analysis is performed. For models with coarse-grained or multi-scale structures, excluded volume analysis is performed.

4.1b. MolProbity Analysis

Excluded volume satisfaction for the models in the entry are listed below. The Analysed column shows the number of particle-partice or particle-atom pairs for which excluded volume was analysed.

Standard geometry: bond outliers

There are 131 bond length outliers in this entry (1.04% of 12558 assessed bonds). A summary is provided below. The output is limited to 100 rows.

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
L	235	PRO	N-CD	249.41	4.96	1.47	1	1
K	252	PRO	N-CD	248.67	4.95	1.47	1	1
K	162	PRO	N-CD	232.44	4.73	1.47	1	1
K	5	PRO	N-CD	217.92	4.52	1.47	1	1
A	20	PRO	N-CD	208.64	4.39	1.47	1	1
L	180	PRO	N-CD	208.49	4.39	1.47	1	1
E	20	PRO	N-CD	205.21	4.35	1.47	1	1
D	12	PRO	N-CD	183.51	4.04	1.47	1	1
H	12	PRO	N-CD	182.20	4.02	1.47	1	1
J	107	DC	C1'-N1	122.83	5.17	1.49	1	1
I	119	DC	C1'-N1	122.51	5.17	1.49	1	1
J	57	DC	C1'-N1	122.43	5.16	1.49	1	1
J	5	DC	C1'-N1	122.22	5.16	1.49	1	1
I	115	DT	C1'-N1	122.19	5.16	1.49	1	1
I	108	DT	C1'-N1	121.94	5.15	1.49	1	1
J	99	DT	C1'-N1	121.87	5.15	1.49	1	1
I	60	DT	C1'-N1	121.81	5.14	1.49	1	1
J	88	DC	C1'-N1	121.80	5.14	1.49	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
J	66	DC	C1'-N1	121.72	5.14	1.49	1	1
I	15	DC	C1'-N1	121.70	5.14	1.49	1	1
I	128	DC	C1'-N1	121.68	5.14	1.49	1	1
I	56	DC	C1'-N1	121.65	5.14	1.49	1	1
J	117	DC	C1'-N1	121.62	5.14	1.49	1	1
I	92	DT	C1'-N1	121.58	5.14	1.49	1	1
I	54	DC	C1'-N1	121.57	5.14	1.49	1	1
I	85	DC	C1'-N1	121.55	5.14	1.49	1	1
I	126	DC	C1'-N1	121.54	5.14	1.49	1	1
I	38	DT	C1'-N1	121.52	5.14	1.49	1	1
J	19	DC	C1'-N1	121.51	5.14	1.49	1	1
I	34	DT	C1'-N1	121.48	5.13	1.49	1	1
J	29	DC	C1'-N1	121.41	5.13	1.49	1	1
J	45	DT	C1'-N1	121.40	5.13	1.49	1	1
J	30	DC	C1'-N1	121.35	5.13	1.49	1	1
J	86	DT	C1'-N1	121.34	5.13	1.49	1	1
J	102	DT	C1'-N1	121.31	5.13	1.49	1	1
I	98	DC	C1'-N1	121.26	5.13	1.49	1	1
J	96	DC	C1'-N1	121.23	5.13	1.49	1	1
J	48	DT	C1'-N1	121.14	5.12	1.49	1	1
I	96	DC	C1'-N1	120.54	5.11	1.49	1	1
J	16	DT	C1'-N1	120.49	5.10	1.49	1	1
J	108	DT	C1'-N1	120.33	5.10	1.49	1	1
I	78	DT	C1'-N1	120.31	5.10	1.49	1	1
I	45	DC	C1'-N1	120.23	5.10	1.49	1	1
I	35	DT	C1'-N1	120.20	5.10	1.49	1	1
I	95	DC	C1'-N1	120.14	5.09	1.49	1	1
J	78	DC	C1'-N1	120.02	5.09	1.49	1	1
J	53	DT	C1'-N1	119.96	5.09	1.49	1	1
I	3	DC	C1'-N1	119.89	5.09	1.49	1	1
J	118	DC	C1'-N1	119.83	5.09	1.49	1	1
J	68	DC	C1'-N1	119.83	5.08	1.49	1	1
J	25	DC	C1'-N1	119.80	5.08	1.49	1	1
I	17	DT	C1'-N1	119.69	5.08	1.49	1	1
I	13	DC	C1'-N1	119.66	5.08	1.49	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
J	54	DT	C1'-N1	119.63	5.08	1.49	1	1
J	27	DT	C1'-N1	119.63	5.08	1.49	1	1
J	23	DC	C1'-N1	119.54	5.08	1.49	1	1
I	20	DT	C1'-N1	119.54	5.08	1.49	1	1
I	2	DT	C1'-N1	119.52	5.08	1.49	1	1
J	111	DC	C1'-N1	119.49	5.07	1.49	1	1
J	122	DT	C1'-N1	119.49	5.07	1.49	1	1
J	80	DC	C1'-N1	119.42	5.07	1.49	1	1
J	60	DT	C1'-N1	119.39	5.07	1.49	1	1
I	39	DC	C1'-N1	119.38	5.07	1.49	1	1
I	71	DT	C1'-N1	119.34	5.07	1.49	1	1
J	50	DC	C1'-N1	119.30	5.07	1.49	1	1
J	110	DT	C1'-N1	119.28	5.07	1.49	1	1
J	38	DT	C1'-N1	119.26	5.07	1.49	1	1
I	50	DC	C1'-N1	119.25	5.07	1.49	1	1
J	18	DT	C1'-N1	119.19	5.07	1.49	1	1
J	52	DC	C1'-N1	119.18	5.07	1.49	1	1
I	29	DC	C1'-N1	119.17	5.07	1.49	1	1
I	89	DT	C1'-N1	119.12	5.06	1.49	1	1
I	121	DC	C1'-N1	119.10	5.06	1.49	1	1
J	92	DT	C1'-N1	118.99	5.06	1.49	1	1
I	80	DT	C1'-N1	118.99	5.06	1.49	1	1
L	264	HIS	CG-CD2	15.08	1.52	1.35	1	1
E	82	PHE	CG-CD1	7.06	1.53	1.38	1	1
A	82	PHE	CG-CD1	7.01	1.53	1.38	1	1
K	102	PHE	CG-CD1	6.91	1.53	1.38	1	1
L	104	PHE	CG-CD1	6.86	1.53	1.38	1	1
L	104	PHE	CG-CD2	6.81	1.53	1.38	1	1
K	137	PHE	CG-CD1	6.81	1.53	1.38	1	1
K	190	TYR	CG-CD1	6.76	1.53	1.39	1	1
D	46	TYR	CG-CD1	6.61	1.53	1.39	1	1
K	80	TRP	CG-CD1	6.59	1.53	1.36	1	1
K	102	PHE	CG-CD2	6.59	1.52	1.38	1	1
K	137	PHE	CG-CD2	6.56	1.52	1.38	1	1
L	209	PHE	CG-CD2	6.47	1.52	1.38	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
H	46	TYR	CG-CD1	6.45	1.52	1.39	1	1
K	190	TYR	CG-CD2	6.42	1.52	1.39	1	1
D	46	TYR	CG-CD2	6.27	1.52	1.39	1	1
E	82	PHE	CG-CD2	6.20	1.51	1.38	1	1
L	209	PHE	CG-CD1	6.18	1.51	1.38	1	1
A	82	PHE	CG-CD2	6.17	1.51	1.38	1	1
H	46	TYR	CG-CD2	6.15	1.52	1.39	1	1
B	53	LEU	CG-CD2	5.20	1.35	1.52	1	1
F	53	LEU	CG-CD2	5.16	1.35	1.52	1	1
L	53	LEU	CG-CD2	5.15	1.35	1.52	1	1
K	54	LEU	CG-CD2	5.09	1.35	1.52	1	1
E	69	LEU	CG-CD2	5.02	1.36	1.52	1	1

Standard geometry: angle outliers

There are 993 bond angle outliers in this entry (5.65% of 17562 assessed bonds). A summary is provided below. The output is limited to 100 rows.

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
L	180	PRO	CA-N-CD	62.31	24.76	112.00	1	1
K	5	PRO	N-CD-CG	57.24	17.34	103.20	1	1
L	235	PRO	CA-N-CD	54.05	36.33	112.00	1	1
K	252	PRO	CA-N-CD	53.70	36.82	112.00	1	1
A	20	PRO	N-CD-CG	51.38	26.13	103.20	1	1
K	162	PRO	N-CD-CG	50.08	28.09	103.20	1	1
E	20	PRO	N-CD-CG	49.88	28.39	103.20	1	1
J	66	DC	C1'-N1-C2	48.04	47.64	119.70	1	1
J	96	DC	C1'-N1-C2	48.02	47.67	119.70	1	1
I	54	DC	C1'-N1-C2	47.99	47.72	119.70	1	1
J	117	DC	C1'-N1-C2	47.98	47.73	119.70	1	1
I	85	DC	C1'-N1-C2	47.98	47.73	119.70	1	1
I	126	DC	C1'-N1-C2	47.98	47.74	119.70	1	1
I	15	DC	C1'-N1-C2	47.96	47.77	119.70	1	1
J	19	DC	C1'-N1-C2	47.91	47.83	119.70	1	1
J	5	DC	C1'-N1-C2	47.91	47.84	119.70	1	1
J	86	DT	C1'-N1-C2	47.89	47.52	119.35	1	1
I	119	DC	C1'-N1-C2	47.88	47.89	119.70	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
I	128	DC	C1'-N1-C2	47.87	47.90	119.70	1	1
J	88	DC	C1'-N1-C2	47.86	47.90	119.70	1	1
J	29	DC	C1'-N1-C2	47.85	47.93	119.70	1	1
J	30	DC	C1'-N1-C2	47.84	47.94	119.70	1	1
J	107	DC	C1'-N1-C2	47.83	47.96	119.70	1	1
I	56	DC	C1'-N1-C2	47.82	47.97	119.70	1	1
I	98	DC	C1'-N1-C2	47.81	47.98	119.70	1	1
I	115	DT	C1'-N1-C2	47.80	47.64	119.35	1	1
J	45	DT	C1'-N1-C2	47.79	47.66	119.35	1	1
I	34	DT	C1'-N1-C2	47.78	47.69	119.35	1	1
J	57	DC	C1'-N1-C2	47.76	48.05	119.70	1	1
J	102	DT	C1'-N1-C2	47.74	47.74	119.35	1	1
I	108	DT	C1'-N1-C2	47.63	47.90	119.35	1	1
J	48	DT	C1'-N1-C2	47.62	47.92	119.35	1	1
I	38	DT	C1'-N1-C2	47.61	47.94	119.35	1	1
I	92	DT	C1'-N1-C2	47.59	47.96	119.35	1	1
I	60	DT	C1'-N1-C2	47.54	48.04	119.35	1	1
J	99	DT	C1'-N1-C2	47.54	48.04	119.35	1	1
D	12	PRO	CA-N-CD	46.73	46.58	112.00	1	1
H	12	PRO	CA-N-CD	46.55	46.83	112.00	1	1
I	29	DC	C1'-N1-C2	46.45	50.02	119.70	1	1
I	121	DC	C1'-N1-C2	46.39	50.12	119.70	1	1
J	52	DC	C1'-N1-C2	46.31	50.24	119.70	1	1
I	39	DC	C1'-N1-C2	46.28	50.29	119.70	1	1
I	50	DC	C1'-N1-C2	46.26	50.32	119.70	1	1
J	50	DC	C1'-N1-C2	46.22	50.36	119.70	1	1
J	80	DC	C1'-N1-C2	46.22	50.37	119.70	1	1
J	38	DT	C1'-N1-C2	46.22	50.03	119.35	1	1
J	118	DC	C1'-N1-C2	46.21	50.39	119.70	1	1
I	13	DC	C1'-N1-C2	46.17	50.44	119.70	1	1
J	122	DT	C1'-N1-C2	46.14	50.14	119.35	1	1
I	3	DC	C1'-N1-C2	46.14	50.50	119.70	1	1
J	92	DT	C1'-N1-C2	46.13	50.16	119.35	1	1
I	89	DT	C1'-N1-C2	46.13	50.16	119.35	1	1
I	2	DT	C1'-N1-C2	46.10	50.19	119.35	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
I	71	DT	C1'-N1-C2	46.08	50.24	119.35	1	1
J	111	DC	C1'-N1-C2	46.05	50.62	119.70	1	1
J	60	DT	C1'-N1-C2	46.04	50.28	119.35	1	1
J	78	DC	C1'-N1-C2	46.03	50.65	119.70	1	1
I	45	DC	C1'-N1-C2	46.03	50.66	119.70	1	1
I	80	DT	C1'-N1-C2	46.01	50.34	119.35	1	1
J	68	DC	C1'-N1-C2	46.00	50.70	119.70	1	1
J	18	DT	C1'-N1-C2	45.96	50.42	119.35	1	1
J	27	DT	C1'-N1-C2	45.93	50.46	119.35	1	1
J	23	DC	C1'-N1-C2	45.92	50.83	119.70	1	1
J	110	DT	C1'-N1-C2	45.88	50.53	119.35	1	1
I	17	DT	C1'-N1-C2	45.87	50.54	119.35	1	1
K	162	PRO	CA-N-CD	45.83	47.84	112.00	1	1
I	20	DT	C1'-N1-C2	45.81	50.63	119.35	1	1
J	25	DC	C1'-N1-C2	45.78	51.03	119.70	1	1
I	95	DC	C1'-N1-C2	45.74	51.08	119.70	1	1
I	78	DT	C1'-N1-C2	45.74	50.74	119.35	1	1
I	96	DC	C1'-N1-C2	45.73	51.11	119.70	1	1
J	108	DT	C1'-N1-C2	45.70	50.80	119.35	1	1
J	16	DT	C1'-N1-C2	45.66	50.85	119.35	1	1
I	35	DT	C1'-N1-C2	45.66	50.86	119.35	1	1
J	53	DT	C1'-N1-C2	45.60	50.95	119.35	1	1
L	235	PRO	N-CD-CG	45.55	34.87	103.20	1	1
J	54	DT	C1'-N1-C2	45.52	51.08	119.35	1	1
K	252	PRO	N-CD-CG	45.43	35.06	103.20	1	1
K	5	PRO	CA-N-CD	39.92	56.12	112.00	1	1
D	12	PRO	N-CD-CG	39.54	43.89	103.20	1	1
H	12	PRO	N-CD-CG	38.95	44.77	103.20	1	1
A	20	PRO	CA-N-CD	36.58	60.79	112.00	1	1
E	20	PRO	CA-N-CD	35.41	62.42	112.00	1	1
J	107	DC	C1'-N1-C6	33.31	69.74	119.70	1	1
J	57	DC	C1'-N1-C6	33.18	69.94	119.70	1	1
I	119	DC	C1'-N1-C6	33.07	70.09	119.70	1	1
J	5	DC	C1'-N1-C6	32.92	70.31	119.70	1	1
J	88	DC	C1'-N1-C6	32.86	70.42	119.70	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
I	60	DT	C1'-N1-C6	32.81	70.14	119.35	1	1
I	56	DC	C1'-N1-C6	32.75	70.58	119.70	1	1
J	19	DC	C1'-N1-C6	32.70	70.65	119.70	1	1
J	66	DC	C1'-N1-C6	32.70	70.65	119.70	1	1
I	15	DC	C1'-N1-C6	32.70	70.66	119.70	1	1
I	54	DC	C1'-N1-C6	32.69	70.66	119.70	1	1
I	126	DC	C1'-N1-C6	32.68	70.68	119.70	1	1
I	98	DC	C1'-N1-C6	32.67	70.69	119.70	1	1
I	108	DT	C1'-N1-C6	32.67	70.34	119.35	1	1
I	115	DT	C1'-N1-C6	32.66	70.36	119.35	1	1
J	117	DC	C1'-N1-C6	32.65	70.72	119.70	1	1
I	128	DC	C1'-N1-C6	32.64	70.74	119.70	1	1

Too-close contacts

The following all-atom clashscore is based on a MolProbity analysis. All-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The table below contains clashscores for all atomic models in this entry.

Model ID	Clash score	Number of clashes
1	0.92	21

There are 21 clashes. The table below contains the detailed list of all clashes based on a MolProbity analysis. Bad clashes are >= 0.4 Angstrom.

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
I:118:DT:H3	J:11:DG:H1	0.94	1	1
I:117:DG:H1	J:12:DT:H3	0.90	1	1
I:47:DG:H1	J:82:DT:H3	0.89	1	1
K:56:LYS:O	K:60:PHE:CG	0.61	1	1
J:103:DA:H2"	J:104:DG:C5'	0.53	1	1
K:226:GLU:N	K:227:ASP:CD	0.52	1	1
K:56:LYS:HG2	K:60:PHE:NE2	0.50	1	1
K:227:ASP:N	K:228:ARG:CD	0.49	1	1
G:30:PRO:N	G:31:VAL:CD	0.48	1	1
I:115:DT:H2"	I:116:DA:C8	0.46	1	1
D:82:SER:NZ	K:216:THR:OE2	0.46	1	1
K:278:GLY:O	L:130:ASP:NH1	0.42	1	1
C:30:PRO:N	C:31:VAL:CD	0.42	1	1
F:9:LYS:N	F:10:GLY:CD	0.41	1	1

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
J:103:DA:H2"	J:104:DG:H5"	0.41	1	1
I:126:DC:C2	J:4:DA:C2	0.41	1	1
I:85:DC:C2	J:45:DT:C2	0.41	1	1
K:101:PHE:NE2	K:155:LEU:O	0.41	1	1
B:9:LYS:N	B:10:GLY:CD	0.41	1	1
F:30:ILE:N	F:30:ILE:OE1	0.40	1	1
J:103:DA:H2"	J:104:DG:H5'	0.40	1	1

Torsion angles: Protein backbone ?

In the following table, Ramachandran outliers are listed. The Analysed column shows the number of residues for which the backbone conformation was analysed.

Model ID	Analysed	Favored	Allowed	Outliers
1	1290	1228	40	22

There are 22 unique backbone outliers. Detailed list of outliers are tabulated below.

Chain	Res	Type	Models (Total)
A	34	PRO	1
B	72	ASP	1
B	77	THR	1
D	14	PRO	1
D	54	PRO	1
E	34	PRO	1
F	77	THR	1
H	14	PRO	1
H	53	HIS	1
H	54	PRO	1
K	82	PRO	1
K	239	THR	1
K	240	PRO	1
K	274	PRO	1
L	69	LEU	1
L	83	PRO	1
L	159	PRO	1
L	175	ASP	1
L	199	ARG	1
L	200	PRO	1

Chain	Res	Type	Models (Total)
L	247	PRO	1
L	269	PRO	1

Torsion angles : Protein sidechains

In the following table, sidechain rotameric outliers are listed. The Analysed column shows the number of residues for which the sidechain conformation was analysed.

Model ID	Analysed	Favored	Allowed	Outliers
1	130	113	7	10

There are 10 unique sidechain outliers. Detailed list of outliers are tabulated below.

Chain	Res	Type	Models (Total)
A	20	PRO	1
D	12	PRO	1
E	20	PRO	1
H	12	PRO	1
K	5	PRO	1
K	162	PRO	1
K	252	PRO	1
L	180	PRO	1
L	235	PRO	1
L	254	LEU	1

5. Fit to Data Used for Modeling Assessment

5.2. Crosslinking-MS

5.2.1. Restraint types

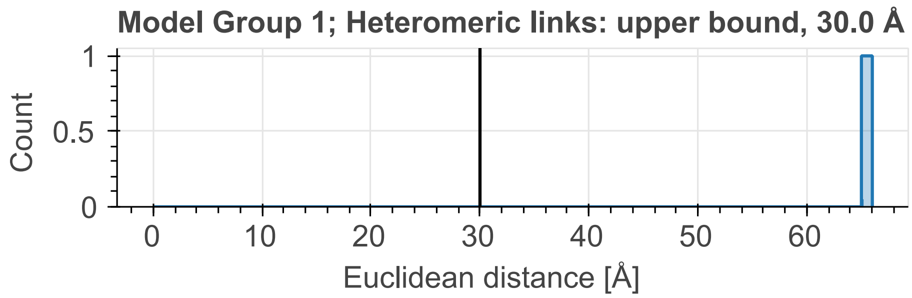
This table summarizes information about crosslinker(s) used for data generation, and how crosslinking information was translated into actual modeling restraints. Restraints assigned "by-residue" are interpreted as between CA atoms. Restraints between coarse-grained beads are indicated as "coarse-grained". Restraint group represents a set of crosslinking restraints applied collectively in the modeling.

There are 1 crosslinking restraints combined in 1 restraint groups.

Linker	Residue 1	Atom 1	Residue 2	Atom 2	Restraint type	Distance, Å	Count
DSSO	SER	CA	SER	CA	upper bound	30.00	1

Distograms of individual restraints

Distograms (i.e., histogram plots of distances) provide an overview of distributions of distances between residues for which chemical crosslinks were identified. The shift of the distogram relative to the threshold value may indicate a poor model. Restraints with identical thresholds are grouped into one plot. Only the best distance per restraint per model group/ensemble is plotted. Inter- and intramolecular (including self-links) restraints are also grouped into one plot. Distance for a restraint between coarse-grained beads is calculated as a minimal distance between shells; if beads intersect, the distance will be reported as 0.0. A bead with the highest available resolution for a given residue is used for the assessment.



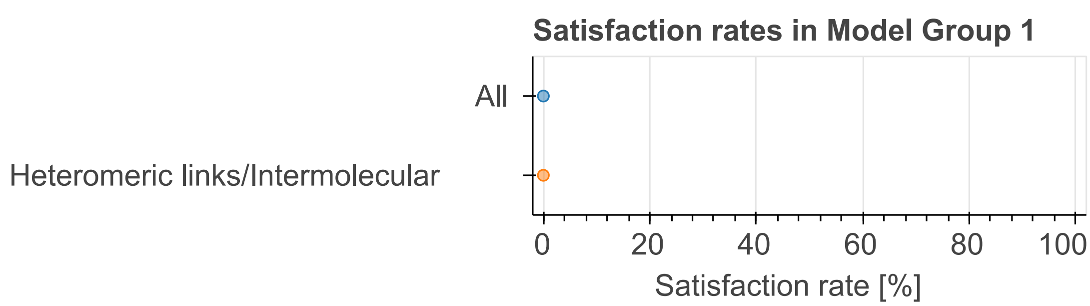
5.2.2. Satisfaction of restraints

Satisfaction of restraints is calculated on a restraint group (a set of crosslinking restraints applied collectively in the modeling) level. Satisfaction of a restraint group depends on satisfaction of individual restraints in the group and the conditionality (all/any). A restraint group is considered satisfied, if the condition was met in at least one model of the model group/ensemble. The number of measured restraints can be smaller than the total number of restraint groups if crosslinks involve non-modeled residues. Only deposited models are used for validation right now.

State group	State	Model group	# of Deposited models/Total	Restraint group type	Satisfied (%)	Violated (%)	Count (Total=1)
1	1	1	1/1	All	0.00	100.00	1
				Heteromeric links/ Intermolecular	0.00	100.00	1

Per-model satisfaction rates in ensembles

Every point represents one model in a model group/ensemble. Where possible, boxplots with quartile marks are also plotted.



5.3. 3DEM

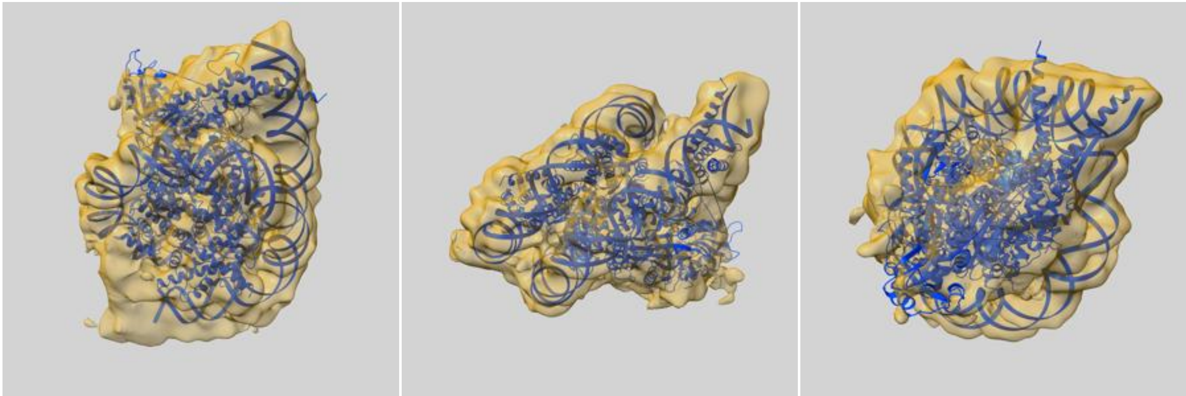
This section describes fit of models to the 3DEM data. Only results for the representative model, selected as a first model with the largest number of asymmetric units.

EMD-17155

5.3.1. Map-model fit

Only results for the representative Model 1 are shown.

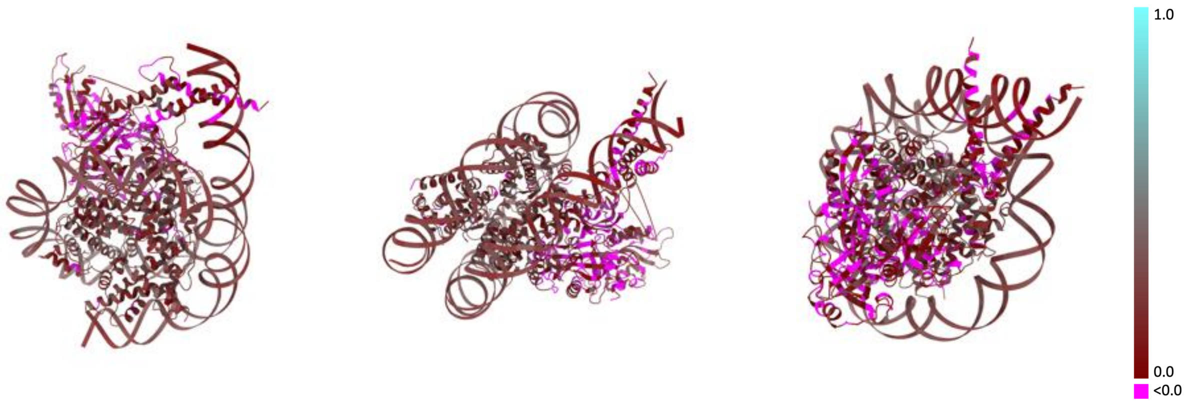
5.3.1.1 Map-model overlay



X **Y** **Z**

The images above show the 3D surface view of the map at the recommended contour level 0.001 at 50% transparency in yellow overlaid with a ribbon representation of the model colored in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

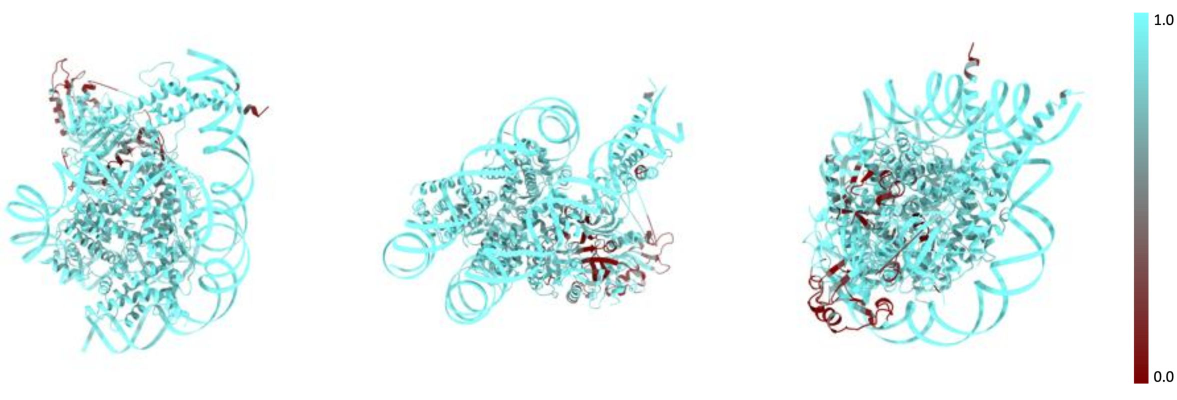
5.3.1.2. Q-score mapped to coordinate model



X **Y** **Z**

The images above show the model with each residue colored 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.

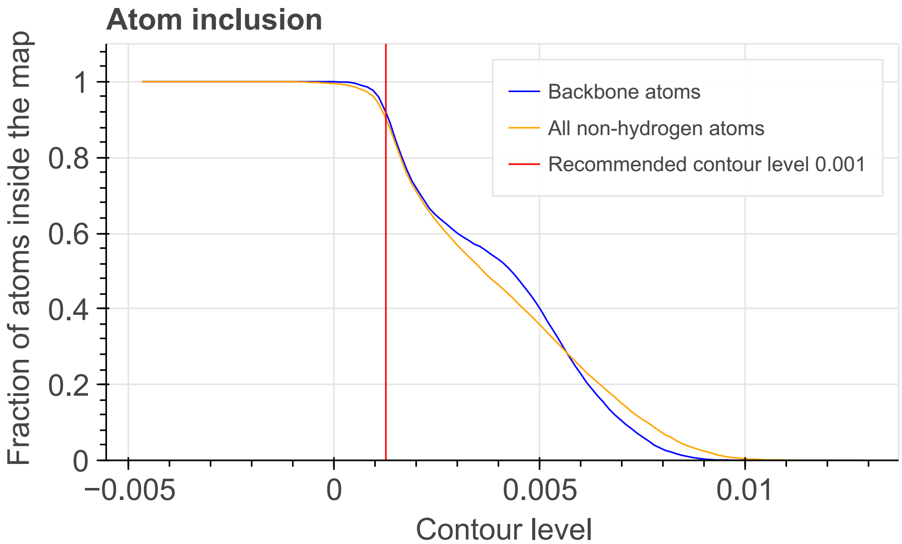
5.3.1.3. Atom inclusion mapped to coordinate model



X **Y** **Z**

The images above show the model with each residue colored according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level 0.001 .

5.3.1.4. Atom inclusion



At the recommended contour level, 92% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.

5.3.1.5. Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.001) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.903	0.167
A	0.940	0.222
B	0.946	0.247
C	0.917	0.200
D	0.928	0.213
E	0.945	0.208
F	0.929	0.236
G	0.942	0.210
H	0.956	0.206
I	1.000	0.241
J	0.995	0.240
K	0.684	0.037
L	0.846	0.027

6. Fit to Data Used for Validation Assessment

Validation for this section is under development.

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