



Full wwPDB EM Validation Report ⓘ

Jun 13, 2026 – 02:39 PM EDT

PDB ID : 9OC0 / pdb_00009oc0
EMDB ID : EMD-70305
Title : Ca²⁺-bound GluN1a/2B NMDAR (S3)
Authors : Steigerwald, R.; Furukawa, H.
Deposited on : 2025-04-23
Resolution : 2.97 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:

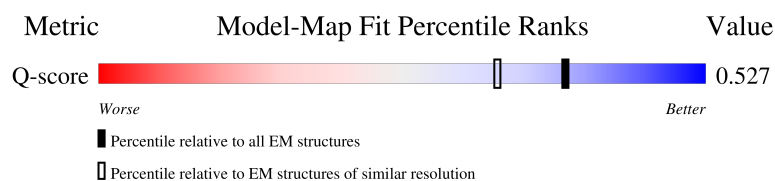
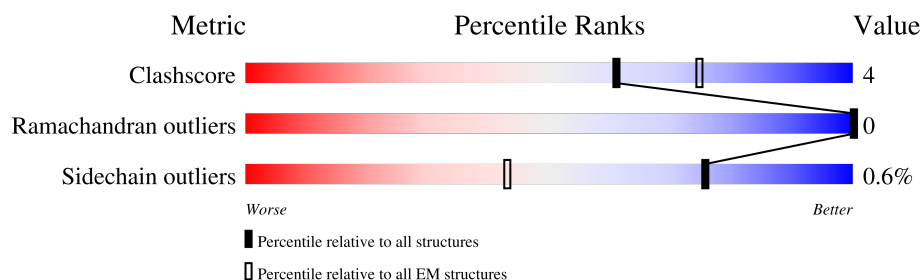
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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) : 2.49

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 2.97 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	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	13205 (2.47 - 3.47)

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	847	
1	C	847	
2	B	862	
2	D	862	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 3985 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 Glutamate receptor ionotropic, NMDA 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	124	Total	C	N	O	S	0	0
			881	587	138	150	6		
1	C	124	Total	C	N	O	S	0	0
			887	590	141	150	6		

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	22	SER	CYS	conflict	UNP P35439
A	61	GLN	ASN	conflict	UNP P35439
A	239	ASP	ASN	conflict	UNP P35439
A	350	GLN	ASN	conflict	UNP P35439
A	471	GLN	ASN	conflict	UNP P35439
A	491	GLN	ASN	conflict	UNP P35439
A	771	GLN	ASN	conflict	UNP P35439
A	844	ASN	ARG	conflict	UNP P35439
A	845	GLY	ARG	conflict	UNP P35439
A	846	ALA	LYS	conflict	UNP P35439
C	22	SER	CYS	conflict	UNP P35439
C	61	GLN	ASN	conflict	UNP P35439
C	239	ASP	ASN	conflict	UNP P35439
C	350	GLN	ASN	conflict	UNP P35439
C	471	GLN	ASN	conflict	UNP P35439
C	491	GLN	ASN	conflict	UNP P35439
C	771	GLN	ASN	conflict	UNP P35439
C	844	ASN	ARG	conflict	UNP P35439
C	845	GLY	ARG	conflict	UNP P35439
C	846	ALA	LYS	conflict	UNP P35439

- Molecule 2 is a protein called Glutamate receptor ionotropic, NMDA 2B.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	132	Total	C	N	O	S	0	0
			963	645	147	164	7		
2	D	132	Total	C	N	O	S	0	0
			966	647	147	164	8		

There are 74 discrepancies between the modelled and reference sequences:

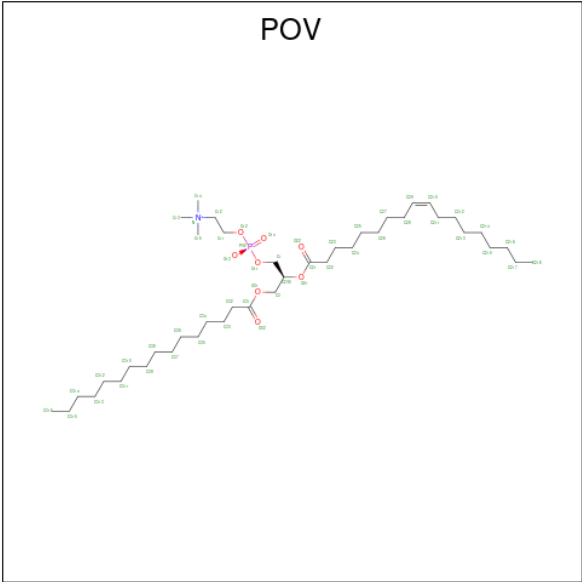
Chain	Residue	Modelled	Actual	Comment	Reference
B	-9	GLY	-	expression tag	UNP Q00960
B	-8	TRP	-	expression tag	UNP Q00960
B	-7	SER	-	expression tag	UNP Q00960
B	-6	HIS	-	expression tag	UNP Q00960
B	-5	PRO	-	expression tag	UNP Q00960
B	-4	GLN	-	expression tag	UNP Q00960
B	-3	PHE	-	expression tag	UNP Q00960
B	-2	GLU	-	expression tag	UNP Q00960
B	-1	LYS	-	expression tag	UNP Q00960
B	0	GLY	-	expression tag	UNP Q00960
B	1	GLY	-	expression tag	UNP Q00960
B	2	GLY	-	expression tag	UNP Q00960
B	3	SER	-	expression tag	UNP Q00960
B	4	GLY	-	expression tag	UNP Q00960
B	5	GLY	-	expression tag	UNP Q00960
B	6	GLY	-	expression tag	UNP Q00960
B	7	SER	-	expression tag	UNP Q00960
B	8	GLY	-	expression tag	UNP Q00960
B	9	GLY	-	expression tag	UNP Q00960
B	10	SER	-	expression tag	UNP Q00960
B	11	ALA	-	expression tag	UNP Q00960
B	12	TRP	-	expression tag	UNP Q00960
B	13	SER	-	expression tag	UNP Q00960
B	14	HIS	-	expression tag	UNP Q00960
B	15	PRO	-	expression tag	UNP Q00960
B	16	GLN	-	expression tag	UNP Q00960
B	17	PHE	-	expression tag	UNP Q00960
B	18	GLU	-	expression tag	UNP Q00960
B	19	LYS	-	expression tag	UNP Q00960
B	20	GLY	-	expression tag	UNP Q00960
B	21	ALA	-	expression tag	UNP Q00960
B	22	LEU	-	expression tag	UNP Q00960
B	23	VAL	-	expression tag	UNP Q00960
B	24	PRO	-	expression tag	UNP Q00960
B	25	ARG	-	expression tag	UNP Q00960

Continued on next page...

Continued from previous page...

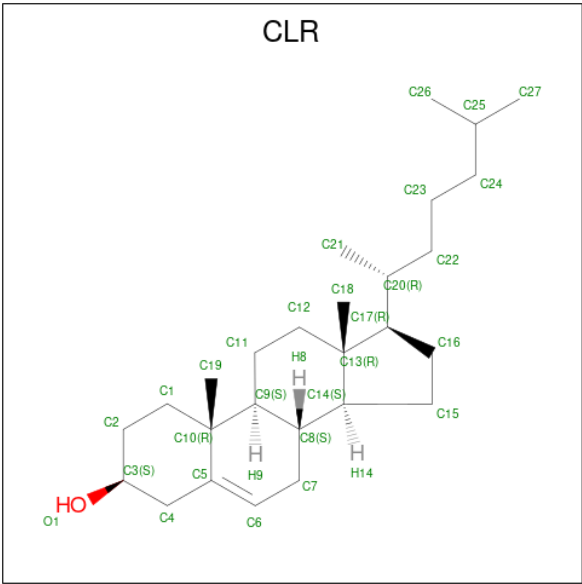
Chain	Residue	Modelled	Actual	Comment	Reference
B	26	GLY	-	expression tag	UNP Q00960
B	849	SER	CYS	conflict	UNP Q00960
D	-9	GLY	-	expression tag	UNP Q00960
D	-8	TRP	-	expression tag	UNP Q00960
D	-7	SER	-	expression tag	UNP Q00960
D	-6	HIS	-	expression tag	UNP Q00960
D	-5	PRO	-	expression tag	UNP Q00960
D	-4	GLN	-	expression tag	UNP Q00960
D	-3	PHE	-	expression tag	UNP Q00960
D	-2	GLU	-	expression tag	UNP Q00960
D	-1	LYS	-	expression tag	UNP Q00960
D	0	GLY	-	expression tag	UNP Q00960
D	1	GLY	-	expression tag	UNP Q00960
D	2	GLY	-	expression tag	UNP Q00960
D	3	SER	-	expression tag	UNP Q00960
D	4	GLY	-	expression tag	UNP Q00960
D	5	GLY	-	expression tag	UNP Q00960
D	6	GLY	-	expression tag	UNP Q00960
D	7	SER	-	expression tag	UNP Q00960
D	8	GLY	-	expression tag	UNP Q00960
D	9	GLY	-	expression tag	UNP Q00960
D	10	SER	-	expression tag	UNP Q00960
D	11	ALA	-	expression tag	UNP Q00960
D	12	TRP	-	expression tag	UNP Q00960
D	13	SER	-	expression tag	UNP Q00960
D	14	HIS	-	expression tag	UNP Q00960
D	15	PRO	-	expression tag	UNP Q00960
D	16	GLN	-	expression tag	UNP Q00960
D	17	PHE	-	expression tag	UNP Q00960
D	18	GLU	-	expression tag	UNP Q00960
D	19	LYS	-	expression tag	UNP Q00960
D	20	GLY	-	expression tag	UNP Q00960
D	21	ALA	-	expression tag	UNP Q00960
D	22	LEU	-	expression tag	UNP Q00960
D	23	VAL	-	expression tag	UNP Q00960
D	24	PRO	-	expression tag	UNP Q00960
D	25	ARG	-	expression tag	UNP Q00960
D	26	GLY	-	expression tag	UNP Q00960
D	849	SER	CYS	conflict	UNP Q00960

- Molecule 3 is (2S)-3-(hexadecanoyloxy)-2-[(9Z)-octadec-9-enoyloxy]propyl 2-(trimethylammonio)ethyl phosphate (CCD ID: POV) (formula: C₄₂H₈₂NO₈P).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			52	42	1	8	1	
3	A	1	Total	C	N	O	P	0
			52	42	1	8	1	
3	C	1	Total	C	N	O	P	0
			52	42	1	8	1	
3	C	1	Total	C	N	O	P	0
			52	42	1	8	1	

- Molecule 4 is CHOLESTEROL (CCD ID: CLR) (formula: C₂₇H₄₆O).



Mol	Chain	Residues	Atoms			AltConf
4	B	1	Total	C	O	0
			28	27	1	
4	D	1	Total	C	O	0
			28	27	1	

- Molecule 5 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
5	B	1	Total	Ca	0
			1	1	

- Molecule 6 is water.

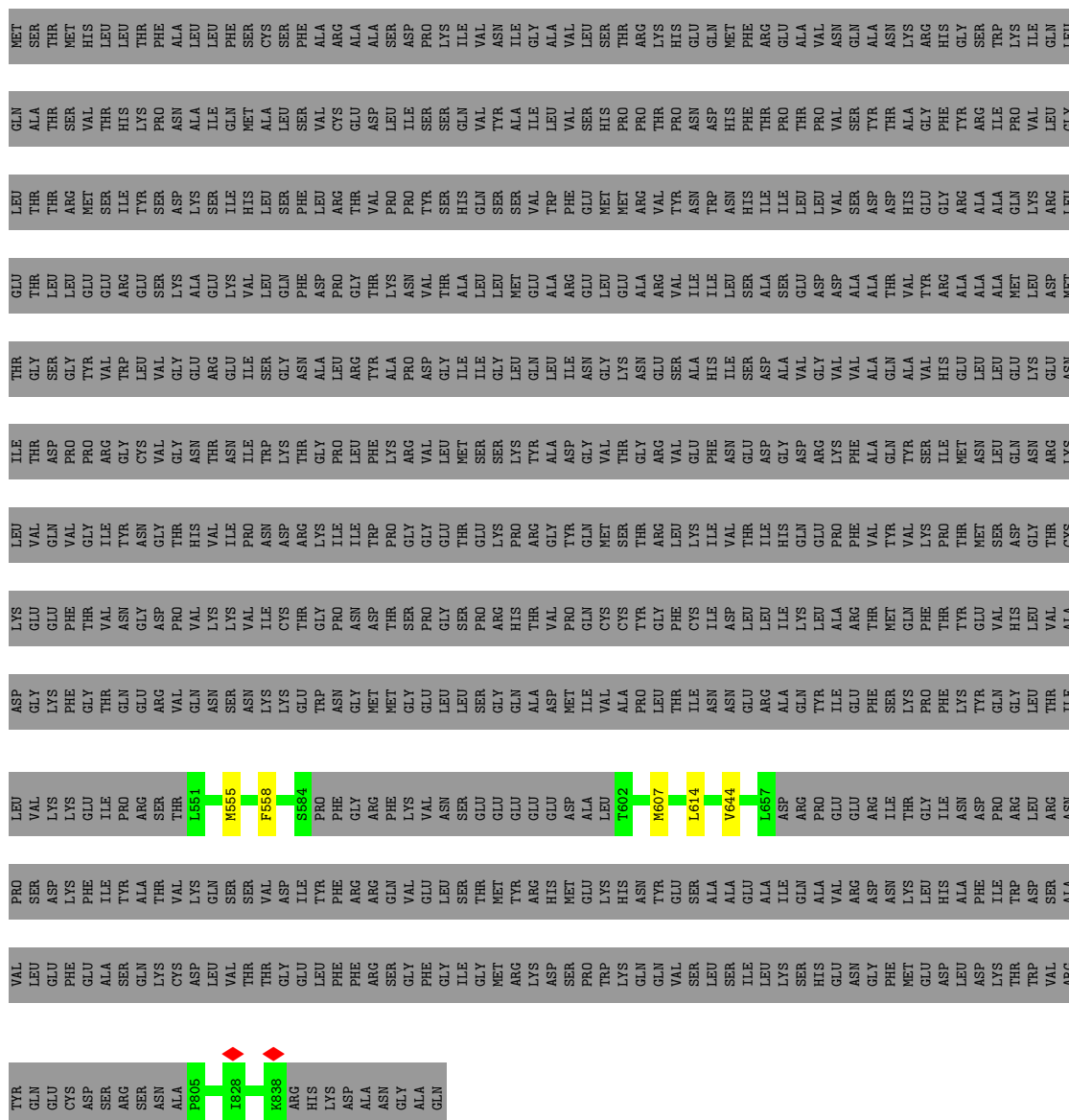
Mol	Chain	Residues	Atoms		AltConf
6	A	3	Total	O	0
			3	3	
6	B	9	Total	O	0
			9	9	
6	C	3	Total	O	0
			3	3	
6	D	8	Total	O	0
			8	8	

3 Residue-property plots

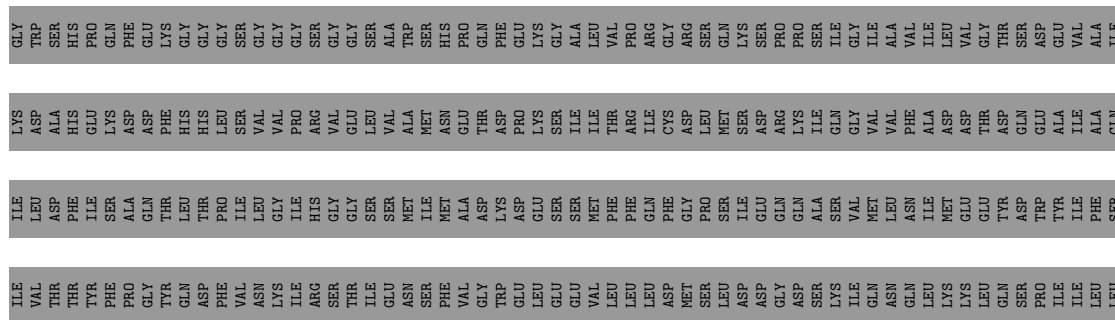
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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.

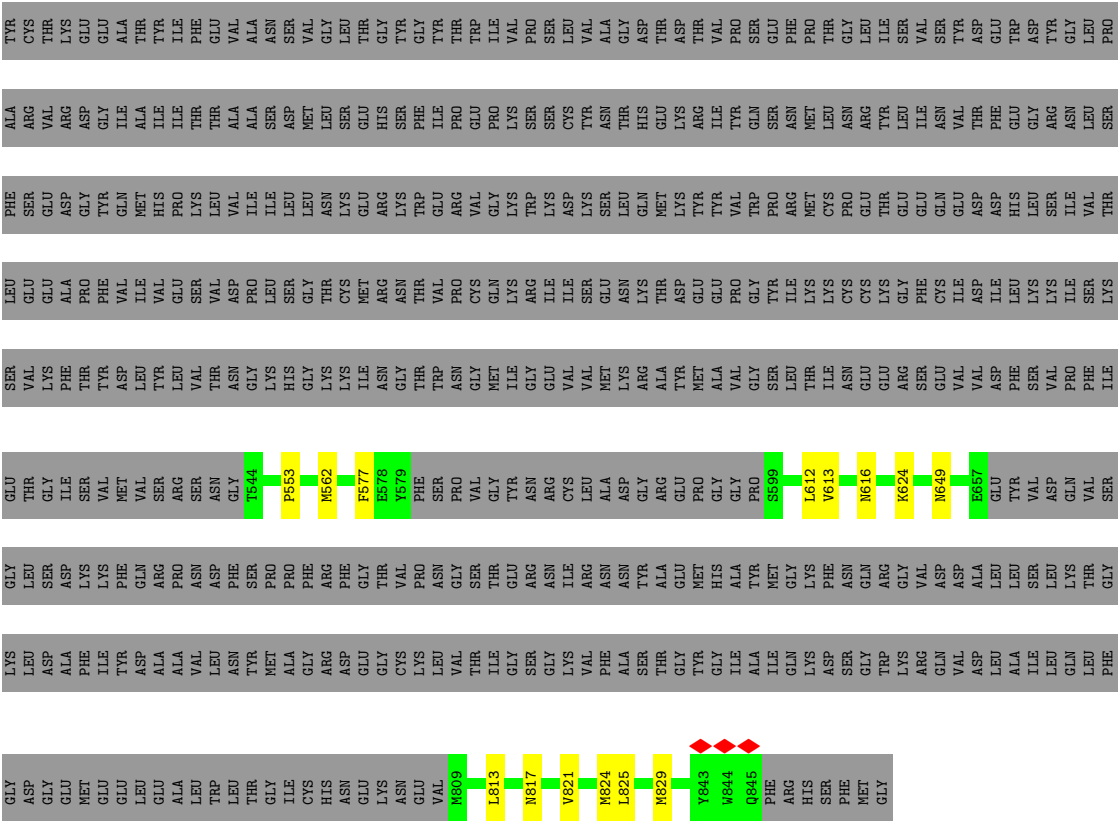
- Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain A:  14% 85%



Chain C: 14% 85%





● Molecule 2: Glutamate receptor ionotropic, NMDA 2B



GLY	LEU	LYS	GLY	GLY	THR	GLU
ASP	ASP	ASP	ASP	ASP	THR	THR
GLY	ALA	ALA	ALA	ASP	ILE	ILE
MET	PHE	PHE	PHE	LVS	SER	SER
GLU	ILE	ILE	ILE	LVS	VAL	VAL
GLU	TYR	TYR	TYR	PHE	MET	MET
LEU	ASP	ASP	ASP	GLN	VAL	VAL
GLU	ALA	ALA	ALA	ARG	ARG	ARG
GLU	ALA	ALA	ALA	PRO	SER	SER
LEU	VAL	VAL	VAL	ASN	ASN	ASN
TRP	LEU	LEU	LEU	ASP	ASN	ASN
LEU	ASN	ASN	ASN	PHE	GLY	GLY
THR	TYR	TYR	TYR	SER	ILE	ILE
GLY	MET	MET	MET	PRO	GLY	GLY
ILE	ALA	ALA	ALA	PHE	ILE	ILE
CYS	GLY	GLY	GLY	PRO	PRO	PRO
HIS	ARG	ARG	ARG	ARG	ASN	ASN
ASN	ASP	ASP	ASP	GLY	GLY	GLY
GLN	GLU	GLU	GLU	THR	THR	THR
ASN	GLY	GLY	GLY	VAL	VAL	VAL
ASN	CYS	CYS	CYS	VAL	TYR	TYR
GLU	LVS	LVS	LVS	PRO	ARG	ARG
VAL	LEU	LEU	LEU	ASN	ASN	ASN
VAL	VAL	VAL	VAL	GLY	LEU	LEU
M809	THR	THR	THR	SER	CYS	CYS
L813	ILE	ILE	ILE	ILE	ARG	ARG
N817	GLY	GLY	GLY	SER	ASN	ASN
N821	GLY	GLY	GLY	GLY	ARG	ARG
M824	VAL	VAL	VAL	ILE	ASN	ASN
M825	PHE	PHE	PHE	ARG	ALA	ALA
L825	ALA	ALA	ALA	ASN	ASN	ASN
M829	SER	SER	SER	TYR	ASP	ASP
Q843	THR	THR	THR	ALA	GLY	GLY
M844	GLY	GLY	GLY	GLU	ARG	ARG
Q845	ILE	ILE	ILE	VAL	GLU	GLU
PHE	ILE	ILE	ILE	MET	PRO	PRO
ARG	GLN	GLN	GLN	GLY	S899	S899
HIS	LVS	LVS	LVS	LVS	L612	L612
SER	ASP	ASP	ASP	PHE	V613	V613
PHE	SER	SER	SER	ASN	N616	N616
MET	GLY	GLY	GLY	GLN	K624	K624
GLY	TRP	TRP	TRP	ARG	N649	N649
	LVS	LVS	LVS	ARG	S857	S857
	GLY	GLY	GLY	GLY	GLU	GLU
	VAL	VAL	VAL	LEU	TYR	TYR
	ASP	ASP	ASP	ALA	VAL	VAL
	LEU	LEU	LEU	LEU	SER	SER
	ILE	ILE	ILE	LEU	GLN	GLN
	GLN	GLN	GLN	THR	LVS	LVS
	PHE	PHE	PHE	THR	THR	THR
				GLY	SER	SER

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	61249	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	58.4	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.685	Depositor
Minimum map value	-0.410	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.012	Depositor
Recommended contour level	0.066	Depositor
Map size (Å)	369.59998, 369.59998, 369.59998	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84, 0.84, 0.84	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: POV, CA, CLR

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	0.24	0/901	0.34	0/1230
1	C	0.24	0/907	0.35	0/1237
2	B	0.11	0/986	0.26	0/1350
2	D	0.11	0/989	0.26	0/1353
All	All	0.18	0/3783	0.30	0/5170

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	881	0	849	5	0
1	C	887	0	860	7	0
2	B	963	0	932	8	0
2	D	966	0	939	8	0
3	A	104	0	164	8	0
3	C	104	0	164	8	0
4	B	28	0	46	2	0
4	D	28	0	46	2	0
5	B	1	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	3	0	0	0	0
6	B	9	0	0	0	0
6	C	3	0	0	0	0
6	D	8	0	0	0	0
All	All	3985	0	4000	35	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 (35) 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)
3:A:902:POV:H23	3:A:902:POV:H34	1.68	0.76
1:A:555:MET:HE2	3:A:902:POV:H218	1.72	0.69
3:C:902:POV:H34	3:C:902:POV:H23	1.85	0.58
2:D:553:PRO:HB3	2:D:649:ASN:HB3	1.86	0.57
2:B:553:PRO:HB3	2:B:649:ASN:HB3	1.86	0.56
1:C:615:LEU:HD11	3:C:902:POV:H210	1.87	0.56
2:D:824:MET:HG3	4:D:901:CLR:H221	1.88	0.55
2:B:824:MET:HG3	4:B:901:CLR:H221	1.88	0.54
2:B:813:LEU:HA	2:B:817:ASN:HD21	1.74	0.53
2:B:577:PHE:HE1	2:B:624:LYS:H	1.55	0.53
2:D:813:LEU:HA	2:D:817:ASN:HD21	1.74	0.52
2:D:577:PHE:HE1	2:D:624:LYS:H	1.55	0.52
1:C:607:MET:HE2	3:C:902:POV:H35A	1.92	0.51
2:B:825:LEU:HG	2:B:829:MET:HE3	1.94	0.50
1:C:555:MET:HE1	3:C:901:POV:H33	1.93	0.49
2:D:825:LEU:HG	2:D:829:MET:HE3	1.94	0.49
1:C:614:LEU:HG	3:C:901:POV:H213	1.96	0.47
1:A:614:LEU:HG	3:A:901:POV:H213	1.96	0.47
2:B:612:LEU:HD23	2:B:616:ASN:HD22	1.80	0.47
2:D:612:LEU:HD23	2:D:616:ASN:HD22	1.80	0.46
1:C:558:PHE:HE1	2:D:813:LEU:HD12	1.81	0.46
1:A:607:MET:HE2	3:A:902:POV:H35A	1.97	0.46
1:A:558:PHE:HE1	2:B:813:LEU:HD12	1.81	0.45
3:A:902:POV:H22A	3:A:902:POV:H2	1.41	0.45
2:D:562:MET:HE1	2:D:613:VAL:HG11	2.00	0.44
2:B:562:MET:HE1	2:B:613:VAL:HG11	2.00	0.44
3:A:901:POV:H36A	3:A:902:POV:H21G	1.98	0.44
3:C:902:POV:H2	3:C:902:POV:H22A	1.68	0.43
1:A:644:VAL:HG22	3:A:901:POV:H21F	2.00	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:901:POV:H14B	3:C:901:POV:H11A	1.82	0.43
3:A:901:POV:H28	3:A:902:POV:H21H	2.01	0.43
1:C:644:VAL:HG22	3:C:901:POV:H21F	2.02	0.41
4:B:901:CLR:H211	4:B:901:CLR:H232	1.93	0.40
1:C:641:MET:HE3	1:C:641:MET:HB3	2.01	0.40
4:D:901:CLR:H211	4:D:901:CLR:H232	1.93	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	118/847 (14%)	115 (98%)	3 (2%)	0	100	100
1	C	118/847 (14%)	115 (98%)	3 (2%)	0	100	100
2	B	126/862 (15%)	119 (94%)	7 (6%)	0	100	100
2	D	126/862 (15%)	119 (94%)	7 (6%)	0	100	100
All	All	488/3418 (14%)	468 (96%)	20 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	82/728 (11%)	82 (100%)	0	100	100
1	C	83/728 (11%)	83 (100%)	0	100	100
2	B	95/745 (13%)	94 (99%)	1 (1%)	65	82
2	D	96/745 (13%)	95 (99%)	1 (1%)	68	83
All	All	356/2946 (12%)	354 (99%)	2 (1%)	76	88

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	821	VAL
2	D	821	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	649	ASN
2	D	649	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 7 ligands modelled in this entry, 1 is monoatomic - leaving 6 for Mogul analysis.

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	POV	A	901	-	51,51,51	0.50	0	57,59,59	0.45	0
4	CLR	B	901	-	31,31,31	0.37	0	48,48,48	0.51	0
3	POV	A	902	-	51,51,51	0.50	0	57,59,59	0.51	0
3	POV	C	901	-	51,51,51	0.50	0	57,59,59	0.46	0
4	CLR	D	901	-	31,31,31	0.37	0	48,48,48	0.51	0
3	POV	C	902	-	51,51,51	0.50	0	57,59,59	0.46	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	POV	A	901	-	-	18/55/55/55	-
4	CLR	B	901	-	-	4/10/68/68	0/4/4/4
3	POV	A	902	-	-	14/55/55/55	-
3	POV	C	901	-	-	18/55/55/55	-
4	CLR	D	901	-	-	4/10/68/68	0/4/4/4
3	POV	C	902	-	-	17/55/55/55	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (75) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	901	POV	C11-O12-P-O11
3	A	901	POV	C11-O12-P-O14
3	A	901	POV	O12-C11-C12-N
3	A	902	POV	C11-O12-P-O14
3	A	902	POV	C22-C21-O21-C2
3	A	902	POV	O22-C21-O21-C2
3	C	901	POV	C11-O12-P-O14
3	C	901	POV	O12-C11-C12-N
3	C	902	POV	C11-O12-P-O13
3	C	902	POV	O12-C11-C12-N

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	C	902	POV	C12-C11-O12-P
3	C	902	POV	C22-C21-O21-C2
3	C	902	POV	O22-C21-O21-C2
3	C	902	POV	C24-C25-C26-C27
4	B	901	CLR	C20-C22-C23-C24
4	D	901	CLR	C20-C22-C23-C24
3	A	901	POV	C21-C22-C23-C24
4	B	901	CLR	C22-C23-C24-C25
4	D	901	CLR	C22-C23-C24-C25
3	C	901	POV	C21-C22-C23-C24
3	A	901	POV	C311-C312-C313-C314
3	A	901	POV	O21-C2-C3-O31
3	C	902	POV	O21-C2-C3-O31
3	A	901	POV	C39-C310-C311-C312
3	C	902	POV	C1-C2-C3-O31
3	A	902	POV	C21-C22-C23-C24
3	A	902	POV	O21-C2-C3-O31
3	C	902	POV	C211-C212-C213-C214
3	A	901	POV	C311-C310-C39-C38
3	C	901	POV	C39-C310-C311-C312
3	A	901	POV	C1-C2-C3-O31
3	C	901	POV	O21-C2-C3-O31
3	C	901	POV	C31-C32-C33-C34
3	A	901	POV	C25-C26-C27-C28
3	A	901	POV	C32-C33-C34-C35
3	C	901	POV	C25-C26-C27-C28
3	C	901	POV	C211-C212-C213-C214
3	C	901	POV	C29-C210-C211-C212
3	A	901	POV	C211-C212-C213-C214
3	A	902	POV	C1-C2-C3-O31
3	A	902	POV	C11-O12-P-O11
3	A	901	POV	C29-C210-C211-C212
3	A	901	POV	C27-C28-C29-C210
3	C	901	POV	C27-C28-C29-C210
3	A	902	POV	C210-C211-C212-C213
4	D	901	CLR	C23-C24-C25-C27
4	B	901	CLR	C23-C24-C25-C27
3	C	901	POV	C214-C215-C216-C217
3	C	902	POV	O11-C1-C2-O21
3	A	901	POV	C214-C215-C216-C217
3	A	901	POV	C212-C213-C214-C215
3	C	901	POV	O31-C31-C32-C33

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	A	902	POV	C29-C210-C211-C212
3	C	901	POV	C37-C38-C39-C310
3	C	901	POV	C34-C35-C36-C37
3	C	902	POV	O31-C31-C32-C33
3	A	902	POV	C27-C28-C29-C210
3	C	902	POV	C32-C31-O31-C3
3	C	902	POV	C29-C210-C211-C212
3	C	901	POV	C212-C213-C214-C215
3	A	901	POV	C34-C35-C36-C37
3	C	902	POV	O32-C31-O31-C3
3	A	901	POV	C2-C1-O11-P
3	C	901	POV	C1-C2-C3-O31
4	B	901	CLR	C23-C24-C25-C26
4	D	901	CLR	C23-C24-C25-C26
3	C	902	POV	O21-C21-C22-C23
3	A	902	POV	C32-C31-O31-C3
3	C	901	POV	C33-C34-C35-C36
3	A	902	POV	O32-C31-O31-C3
3	C	902	POV	O22-C21-C22-C23
3	A	902	POV	O21-C21-C22-C23
3	C	902	POV	C27-C28-C29-C210
3	C	901	POV	C2-C1-O11-P
3	A	902	POV	O31-C31-C32-C33

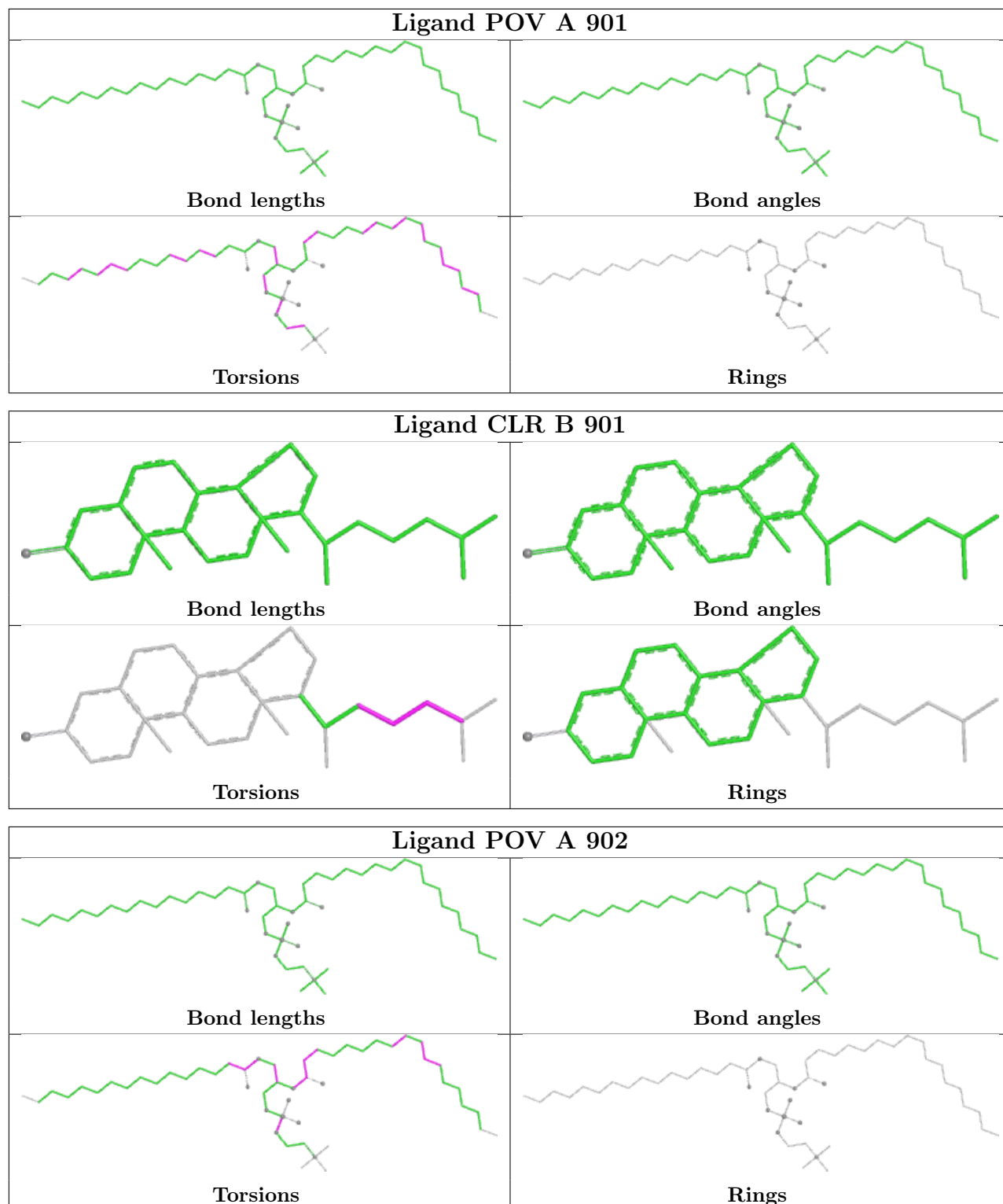
There are no ring outliers.

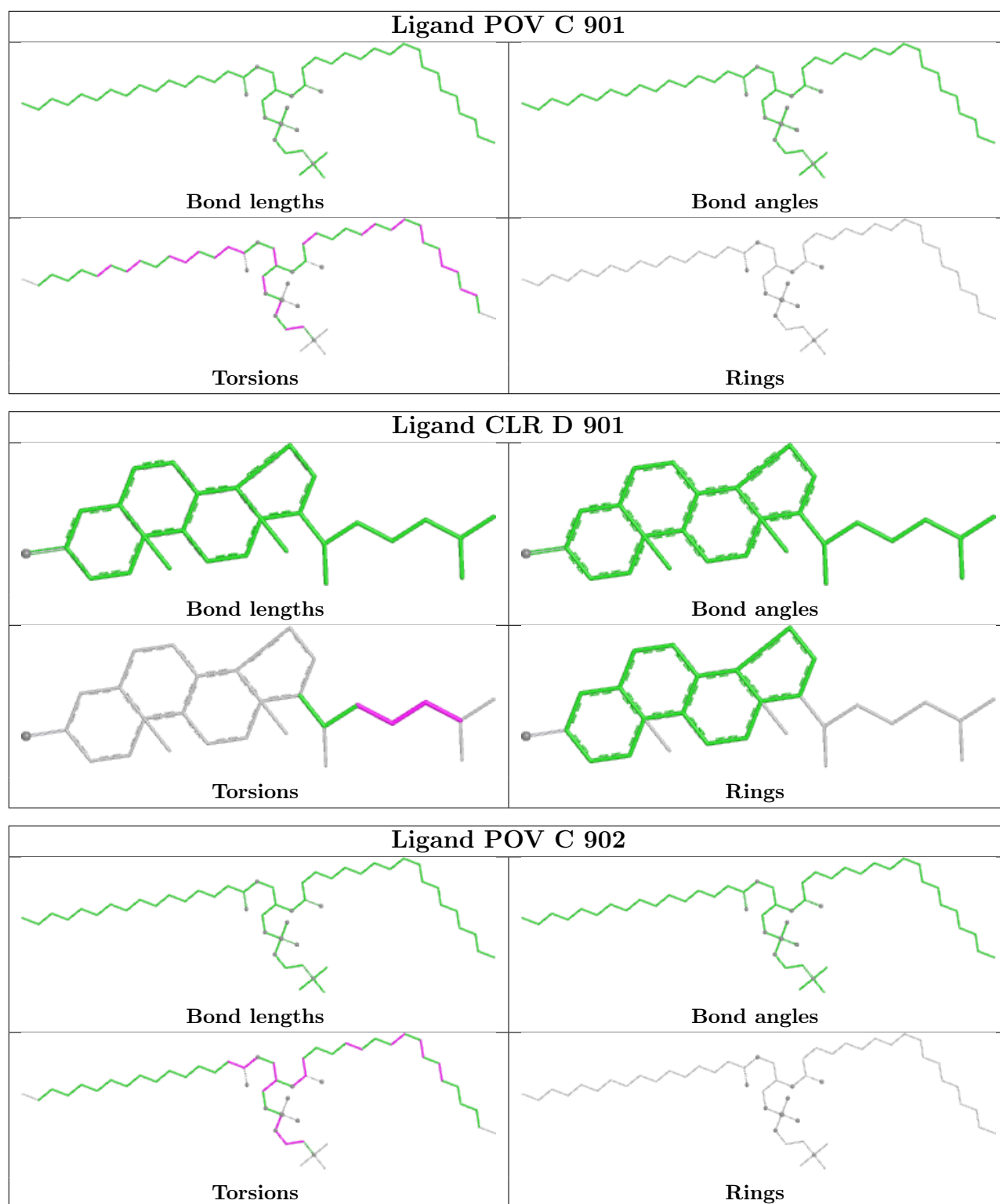
6 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	901	POV	4	0
4	B	901	CLR	2	0
3	A	902	POV	6	0
3	C	901	POV	4	0
4	D	901	CLR	2	0
3	C	902	POV	4	0

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 than 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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

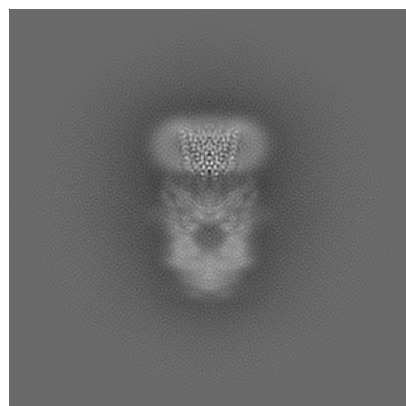
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-70305. These allow visual inspection of the internal detail of the map and identification of artifacts.

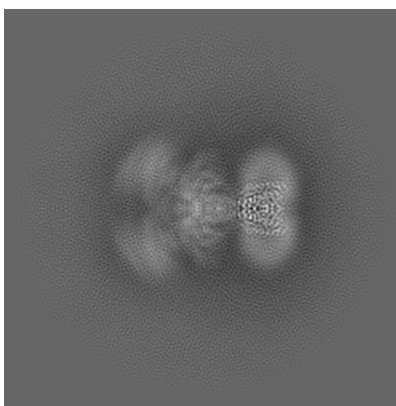
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

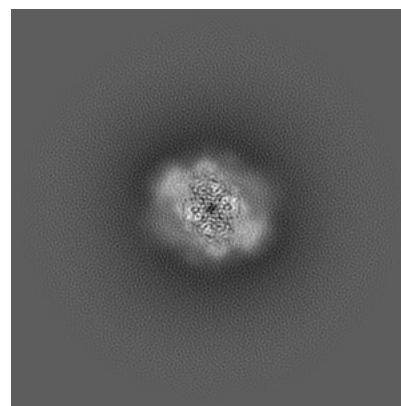
6.1.1 Primary map



X

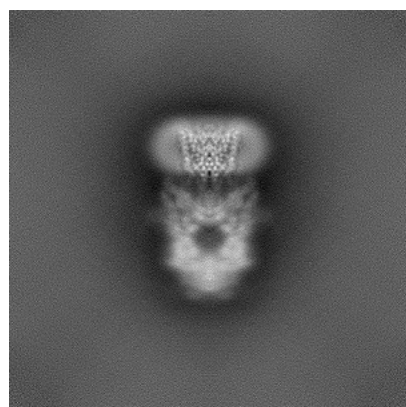


Y

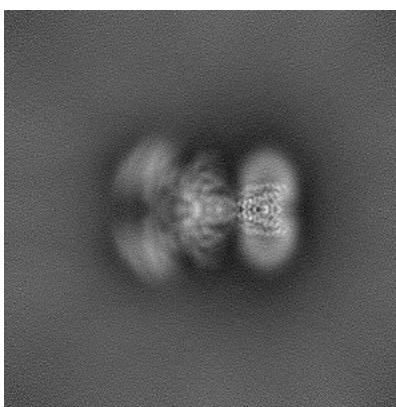


Z

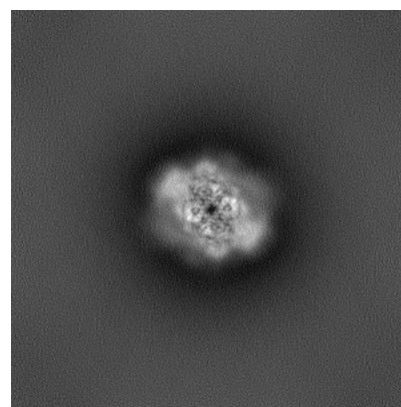
6.1.2 Raw map



X



Y

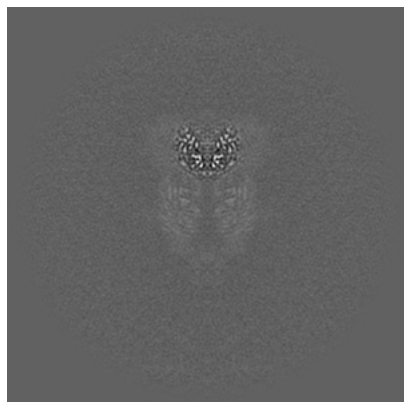


Z

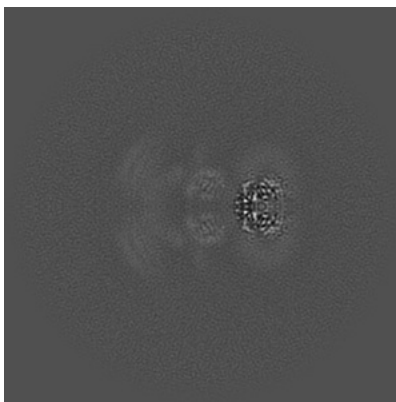
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

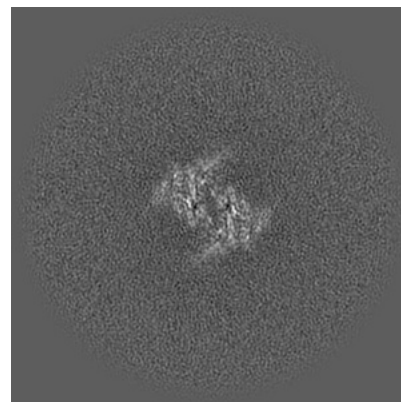
6.2.1 Primary map



X Index: 220

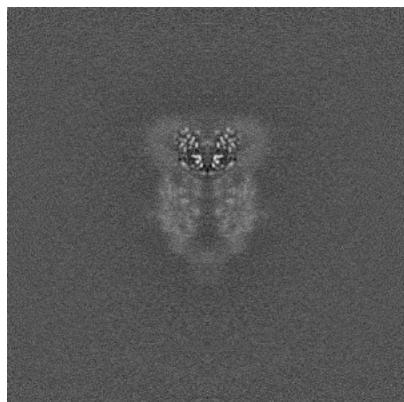


Y Index: 220

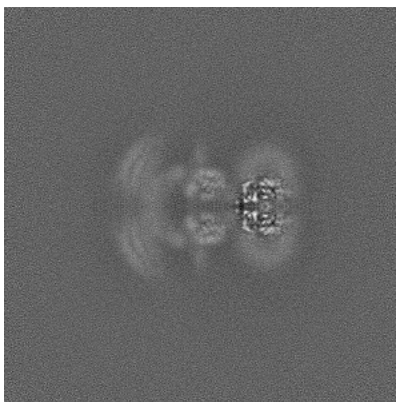


Z Index: 220

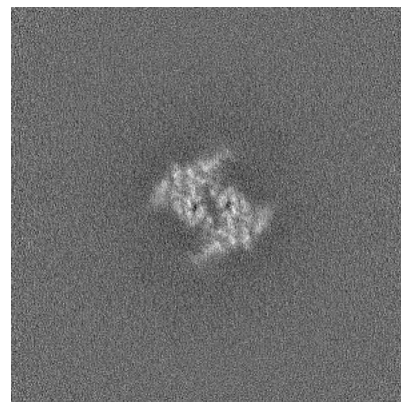
6.2.2 Raw map



X Index: 220



Y Index: 220

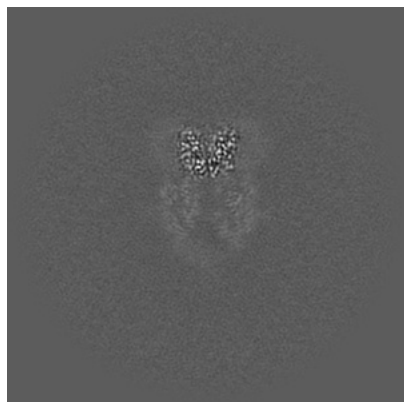


Z Index: 220

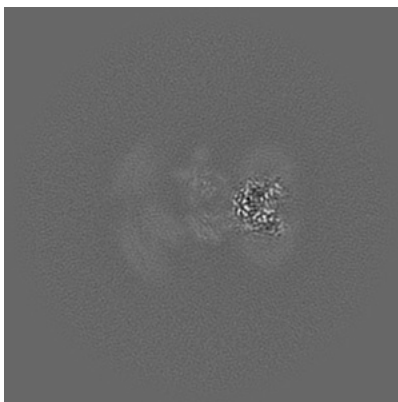
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

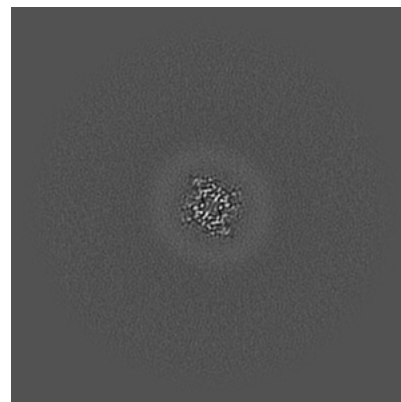
6.3.1 Primary map



X Index: 217

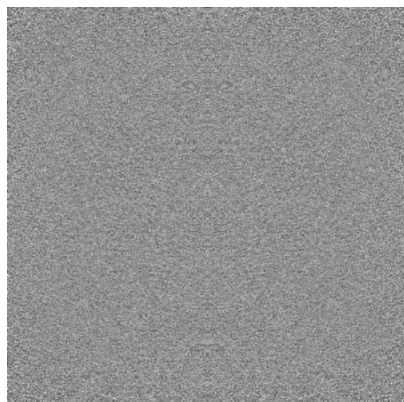


Y Index: 214

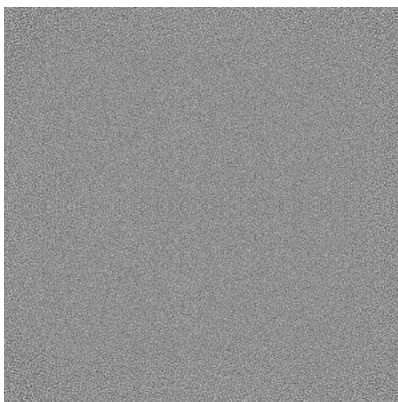


Z Index: 286

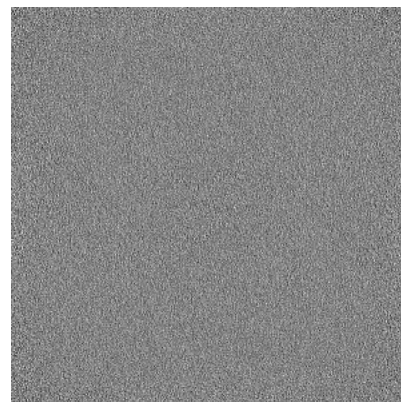
6.3.2 Raw map



X Index: 0



Y Index: 0

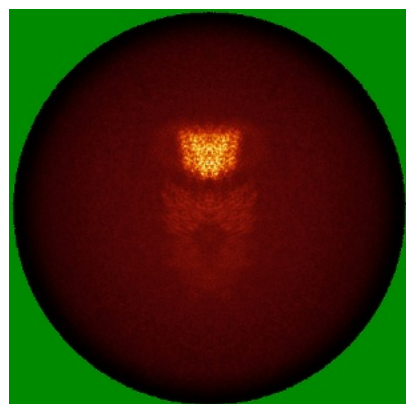


Z Index: 0

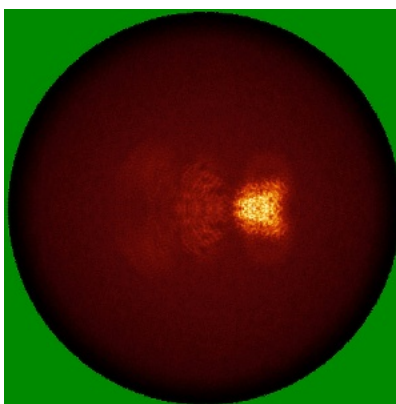
The images above show the largest variance slices of the map in three orthogonal directions.

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

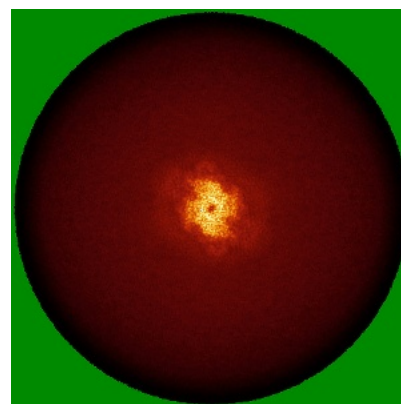
6.4.1 Primary map



X

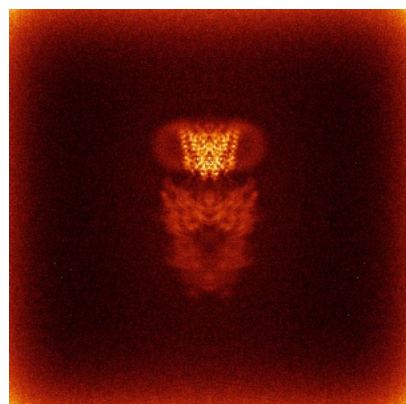


Y

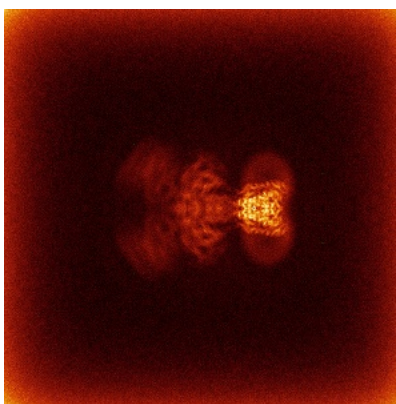


Z

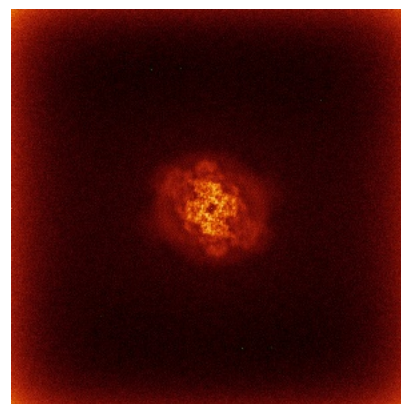
6.4.2 Raw map



X



Y

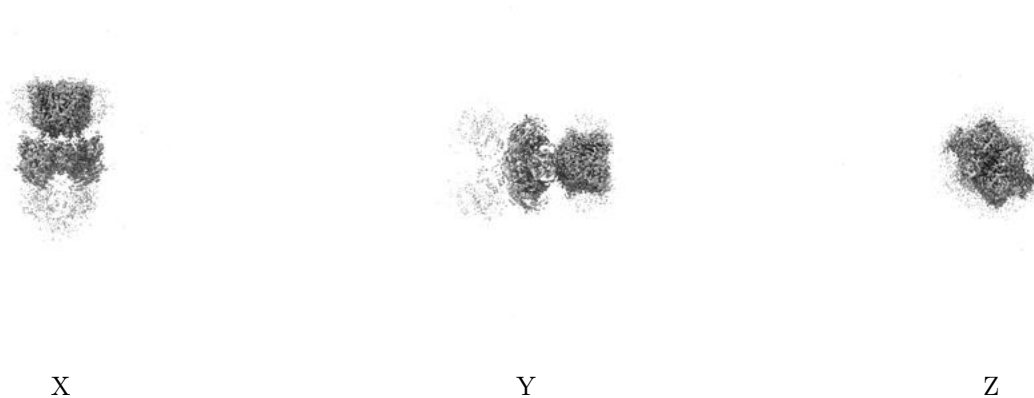


Z

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

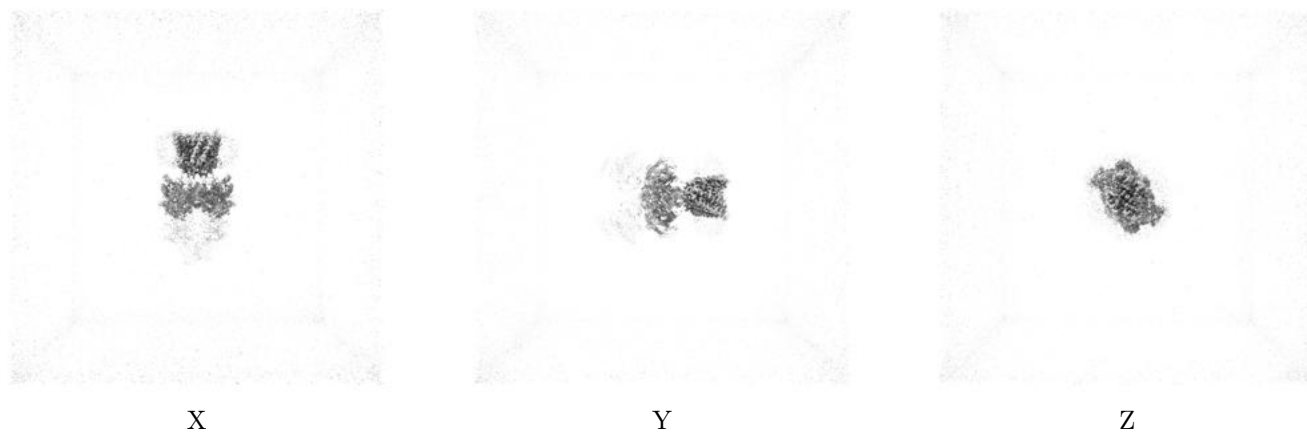
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.066. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

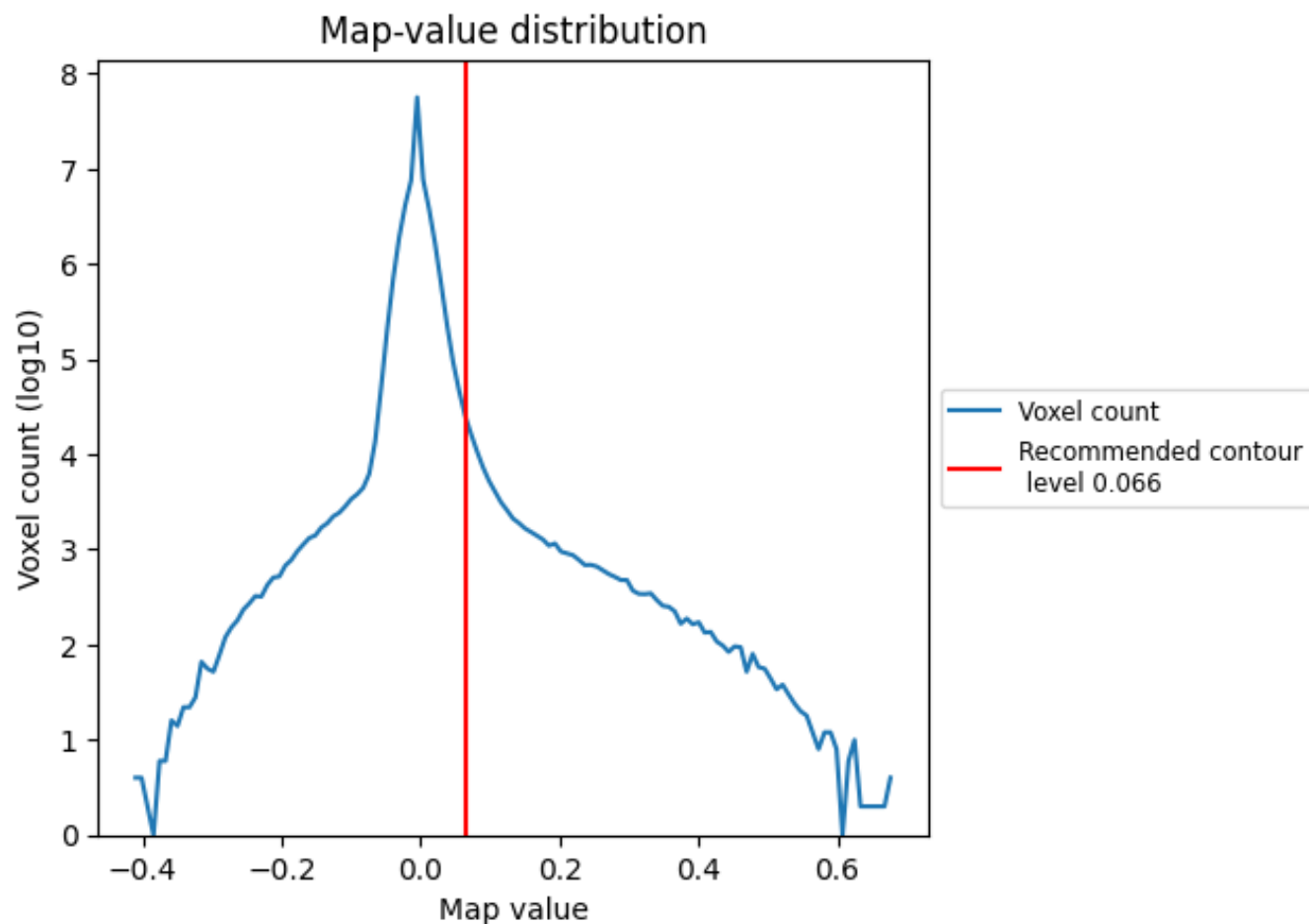
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

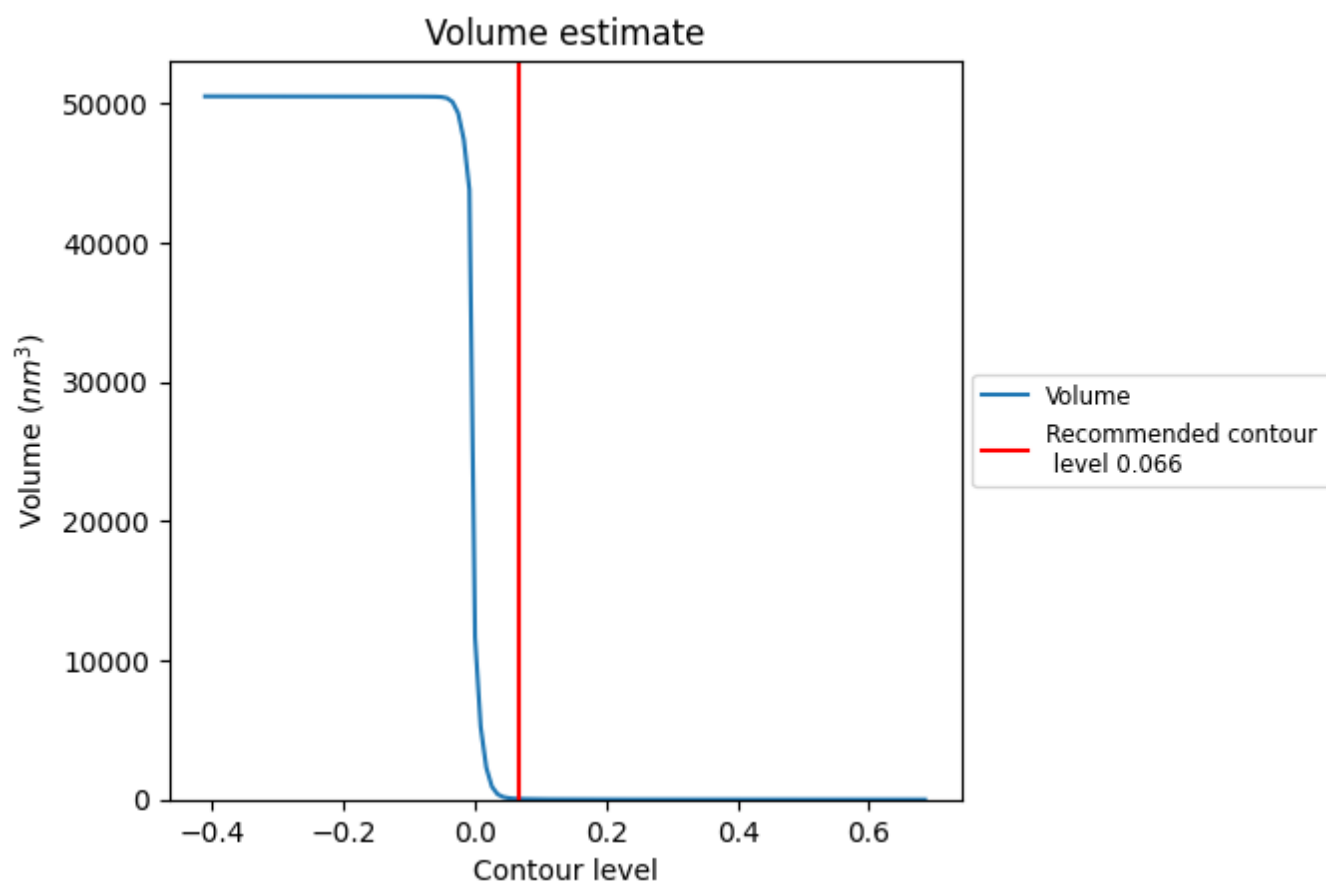
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

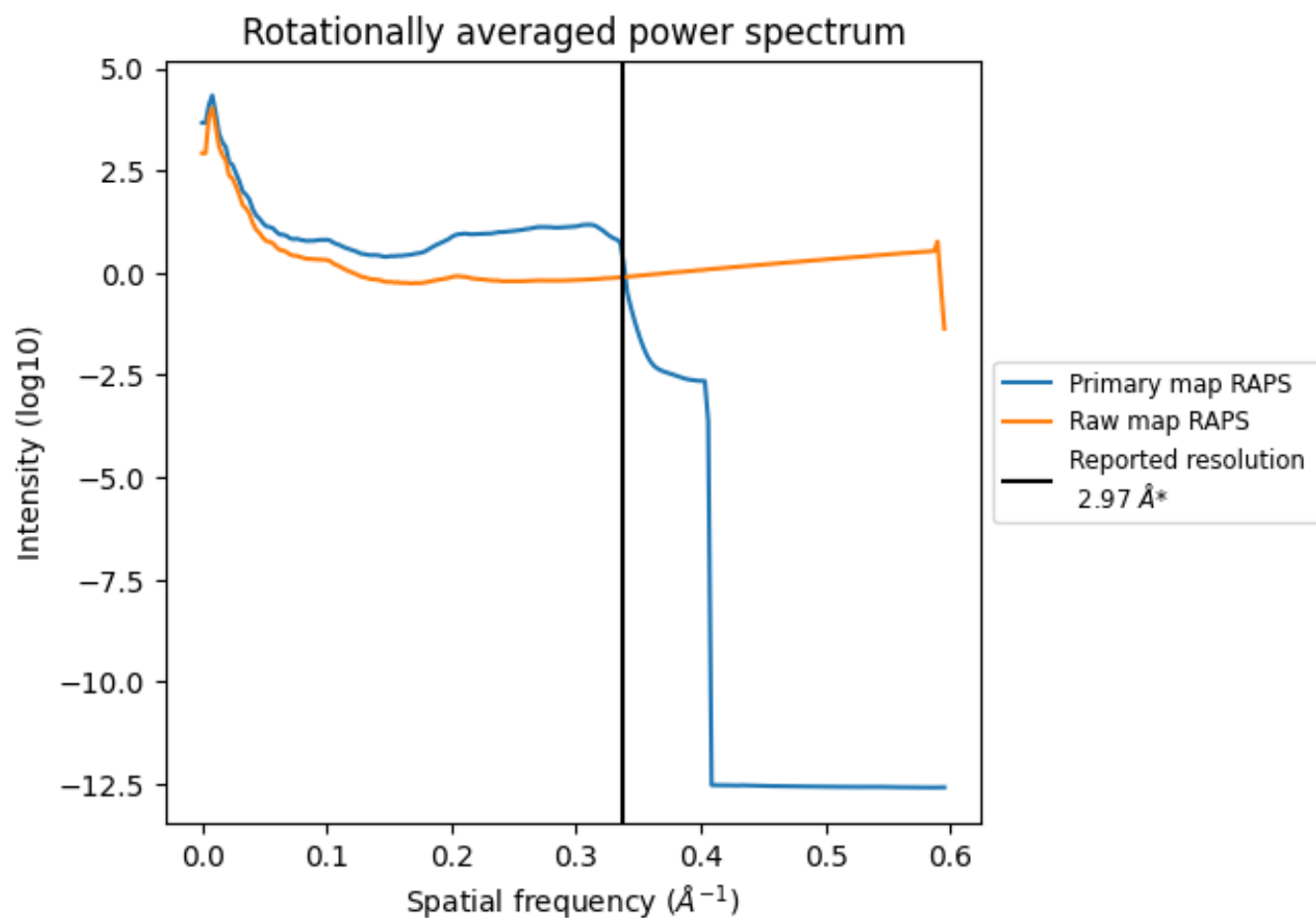
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 56 nm³; this corresponds to an approximate mass of 51 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 ⓘ

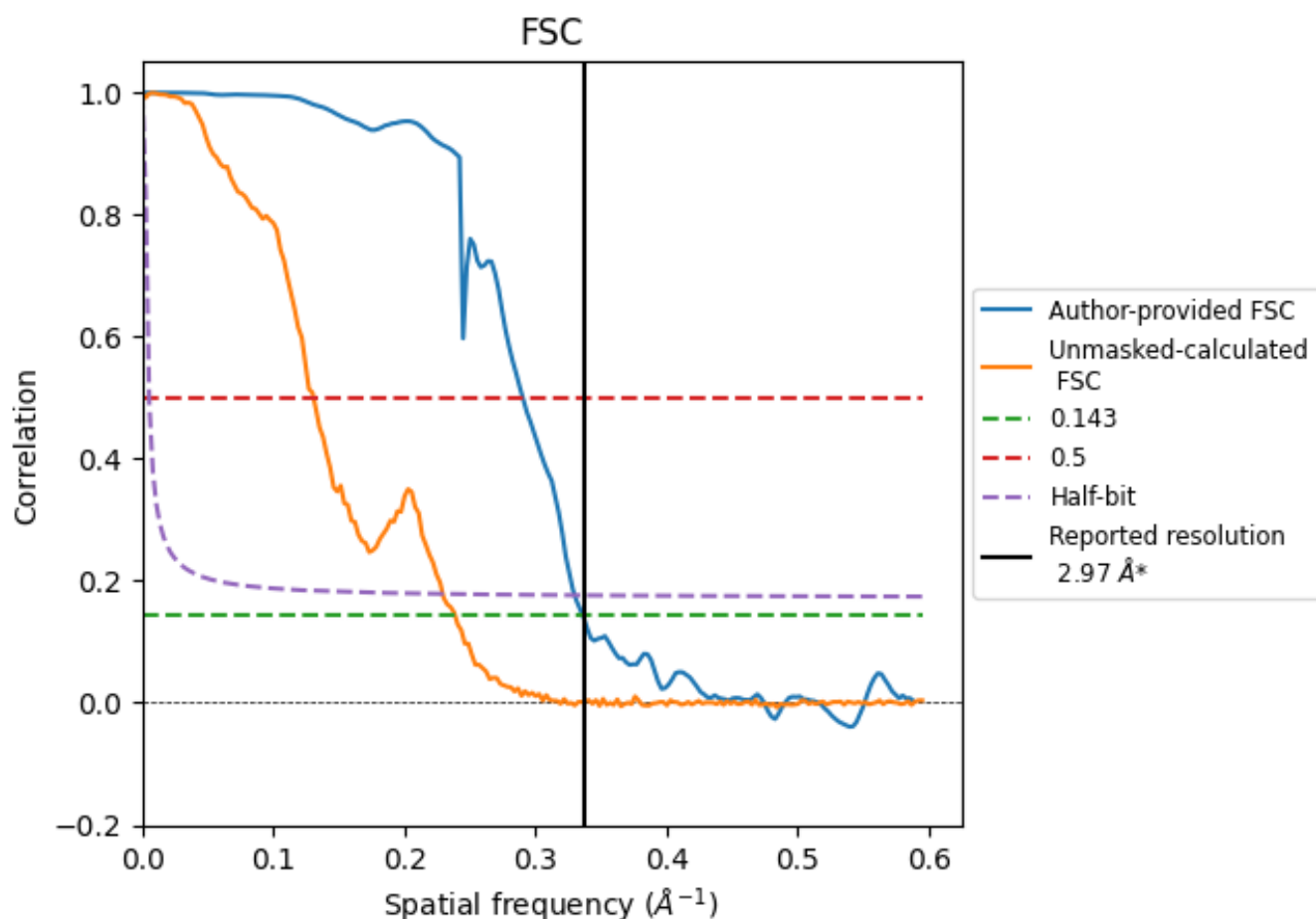


*Reported resolution corresponds to spatial frequency of 0.337 Å⁻¹

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 0.337 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

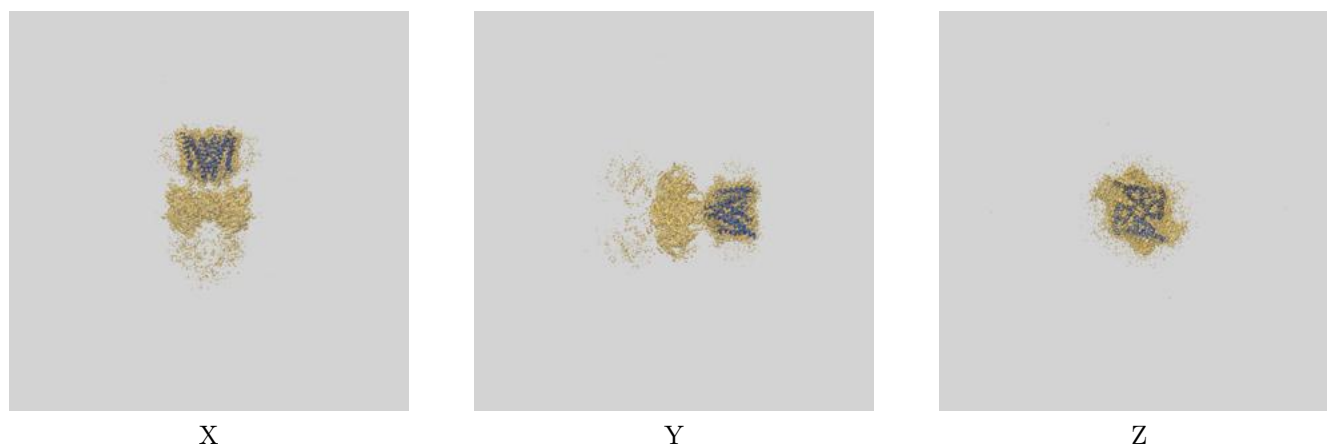
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.97	-	-
Author-provided FSC curve	2.97	3.44	3.03
Unmasked-calculated*	4.19	7.65	4.36

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.19 differs from the reported value 2.97 by more than 10 %

9 Map-model fit [i](#)

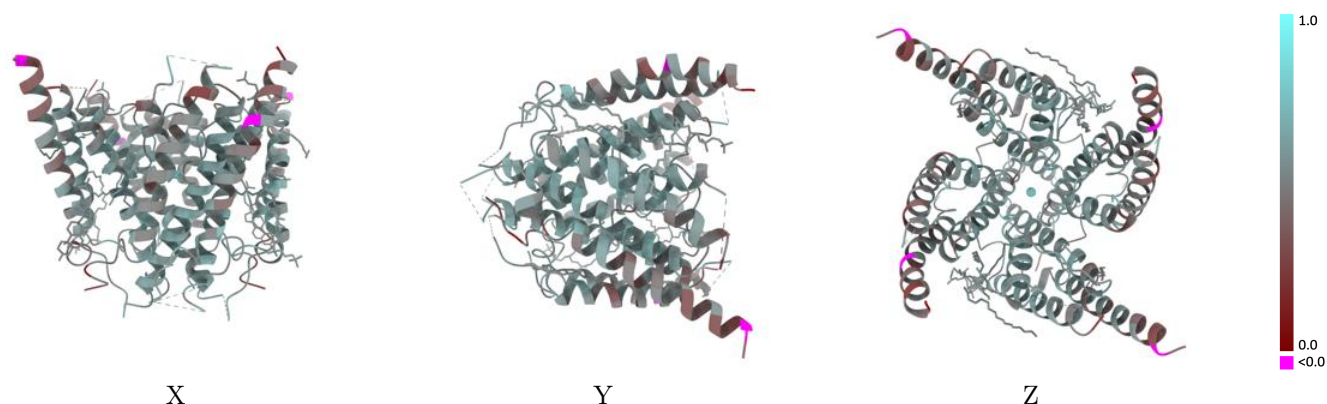
This section contains information regarding the fit between EMDB map EMD-70305 and PDB model 9OC0. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



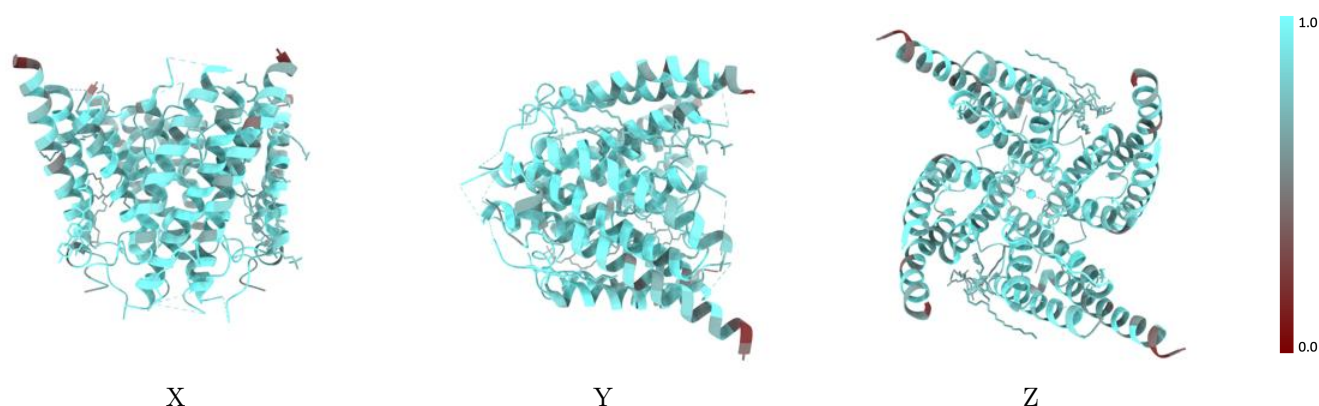
The images above show the 3D surface view of the map at the recommended contour level 0.066 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



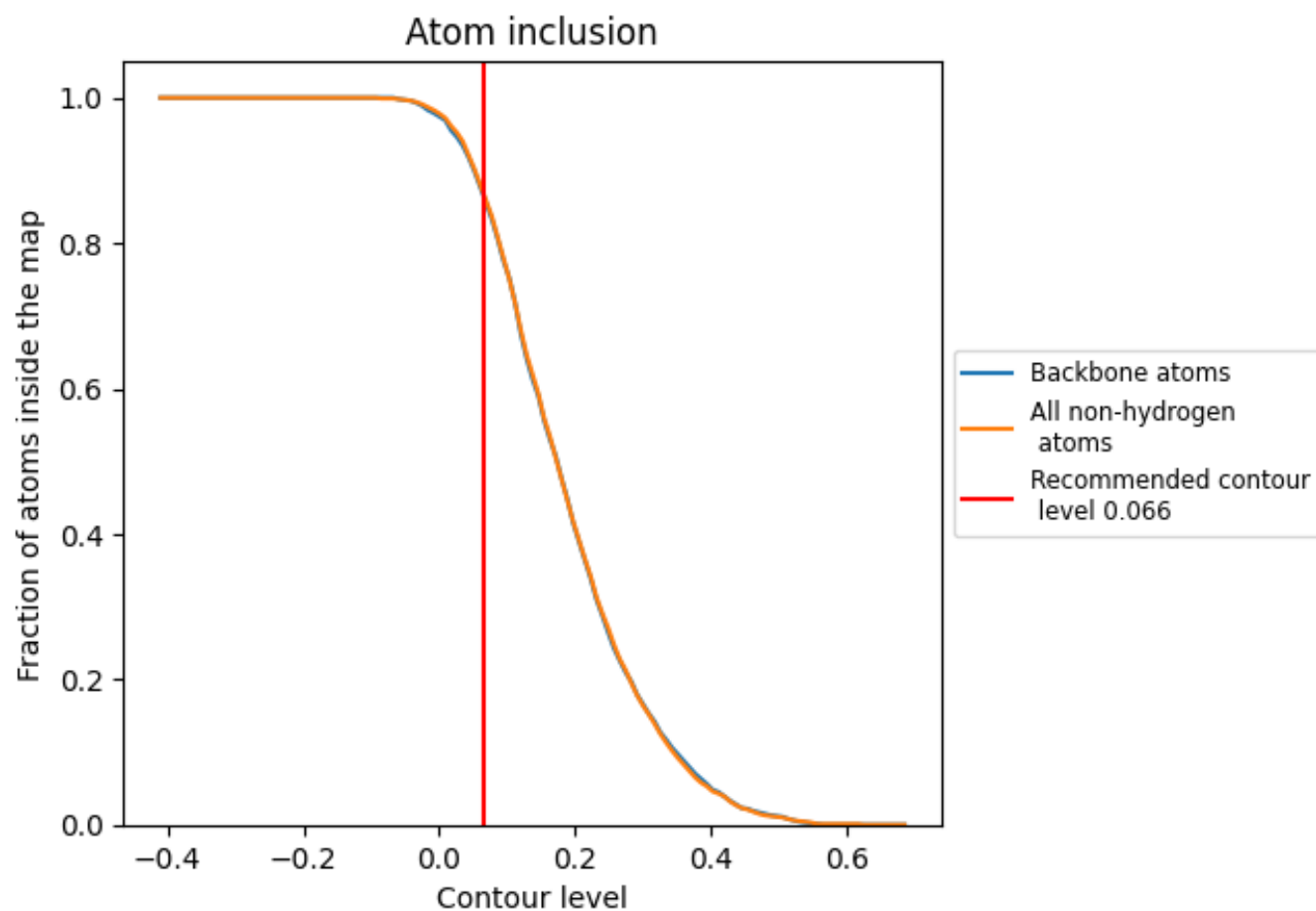
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.066).

9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 87% 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 (0.066) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8660	0.5270
A	0.8770	0.5400
B	0.8570	0.5160
C	0.8770	0.5380
D	0.8600	0.5130

