



Full wwPDB EM Validation Report ⓘ

Mar 12, 2026 – 01:05 PM UTC

PDB ID : 8C2H / pdb_00008c2h
EMDB ID : EMD-16390
Title : Transmembrane domain of active state homomeric GluA1 AMPA receptor in tandem with TARP gamma 3
Authors : Zhang, D.; Ivica, J.; Krieger, J.M.; Ho, H.; Yamashita, K.; Cais, O.; Greger, I.
Deposited on : 2022-12-22
Resolution : 2.64 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:

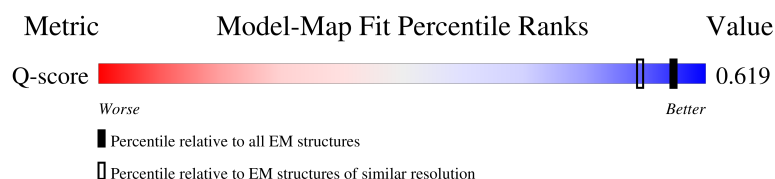
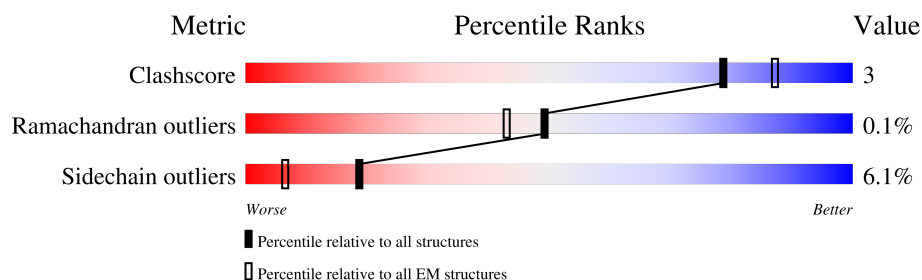
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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 2.64 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	8968 (2.14 - 3.14)

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	915	
1	B	915	
1	C	915	
1	D	915	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	E	314	14%50%45%
2	F	314	9%51%45%
2	G	314	11%52%45%
2	H	314	9%50%45%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 10071 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 1 flip isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	133	Total	C	N	O	S	4	0
			1037	697	157	176	7		
1	B	134	Total	C	N	O	S	6	0
			1071	720	161	183	7		
1	C	134	Total	C	N	O	S	4	0
			1043	700	158	178	7		
1	D	141	Total	C	N	O	S	5	0
			1120	751	172	189	8		

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	ASP	-	insertion	UNP P19490
A	-5	TYR	-	insertion	UNP P19490
A	-4	LYS	-	insertion	UNP P19490
A	-3	ASP	-	insertion	UNP P19490
A	-2	ASP	-	insertion	UNP P19490
A	-1	ASP	-	insertion	UNP P19490
A	0	ASP	-	insertion	UNP P19490
A	1	LYS	-	insertion	UNP P19490
B	-6	ASP	-	insertion	UNP P19490
B	-5	TYR	-	insertion	UNP P19490
B	-4	LYS	-	insertion	UNP P19490
B	-3	ASP	-	insertion	UNP P19490
B	-2	ASP	-	insertion	UNP P19490
B	-1	ASP	-	insertion	UNP P19490
B	0	ASP	-	insertion	UNP P19490
B	1	LYS	-	insertion	UNP P19490
C	-6	ASP	-	insertion	UNP P19490
C	-5	TYR	-	insertion	UNP P19490
C	-4	LYS	-	insertion	UNP P19490
C	-3	ASP	-	insertion	UNP P19490
C	-2	ASP	-	insertion	UNP P19490
C	-1	ASP	-	insertion	UNP P19490

Continued on next page...

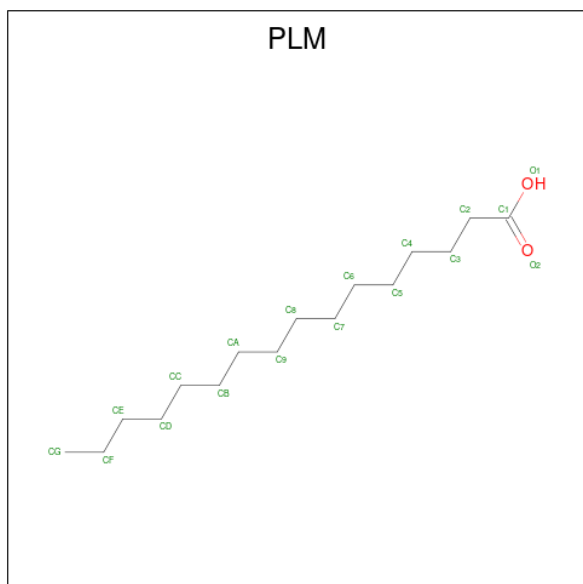
Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	0	ASP	-	insertion	UNP P19490
C	1	LYS	-	insertion	UNP P19490
D	-6	ASP	-	insertion	UNP P19490
D	-5	TYR	-	insertion	UNP P19490
D	-4	LYS	-	insertion	UNP P19490
D	-3	ASP	-	insertion	UNP P19490
D	-2	ASP	-	insertion	UNP P19490
D	-1	ASP	-	insertion	UNP P19490
D	0	ASP	-	insertion	UNP P19490
D	1	LYS	-	insertion	UNP P19490

- Molecule 2 is a protein called Voltage-dependent calcium channel gamma-3 subunit.

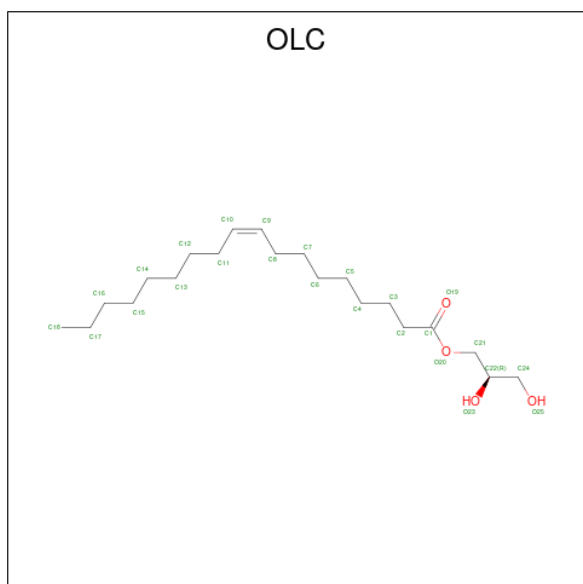
Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	174	Total	C	N	O	S	0	0
			1354	887	227	232	8		
2	F	174	Total	C	N	O	S	1	0
			1365	896	228	233	8		
2	G	174	Total	C	N	O	S	0	0
			1354	887	227	232	8		
2	H	174	Total	C	N	O	S	1	0
			1365	896	228	233	8		

- Molecule 3 is PALMITIC ACID (CCD ID: PLM) (formula: C₁₆H₃₂O₂).



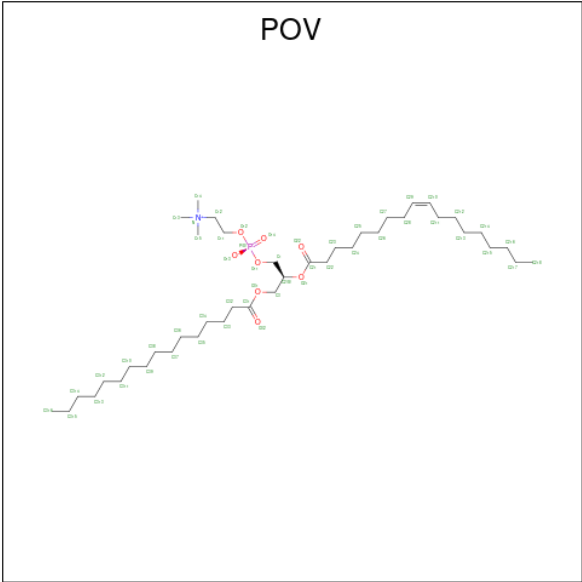
Mol	Chain	Residues	Atoms			AltConf
3	A	1	Total	C	O	0
			13	11	2	
3	B	1	Total	C	O	0
			14	12	2	
3	C	1	Total	C	O	0
			13	11	2	
3	D	1	Total	C	O	0
			14	12	2	
3	F	1	Total	C	O	0
			15	13	2	
3	H	1	Total	C	O	0
			15	13	2	

- Molecule 4 is (2R)-2,3-dihydroxypropyl (9Z)-octadec-9-enoate (CCD ID: OLC) (formula: $C_{21}H_{40}O_4$).



Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total	C	O	0
			25	21	4	
4	B	1	Total	C	O	0
			25	21	4	
4	C	1	Total	C	O	0
			25	21	4	
4	D	1	Total	C	O	0
			25	21	4	

- Molecule 5 is (2S)-3-(hexadecanoyloxy)-2-[(9Z)-octadec-9-enoyloxy]propyl 2-(trimethylamm onio)ethyl phosphate (CCD ID: POV) (formula: $C_{42}H_{82}NO_8P$).

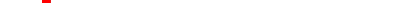


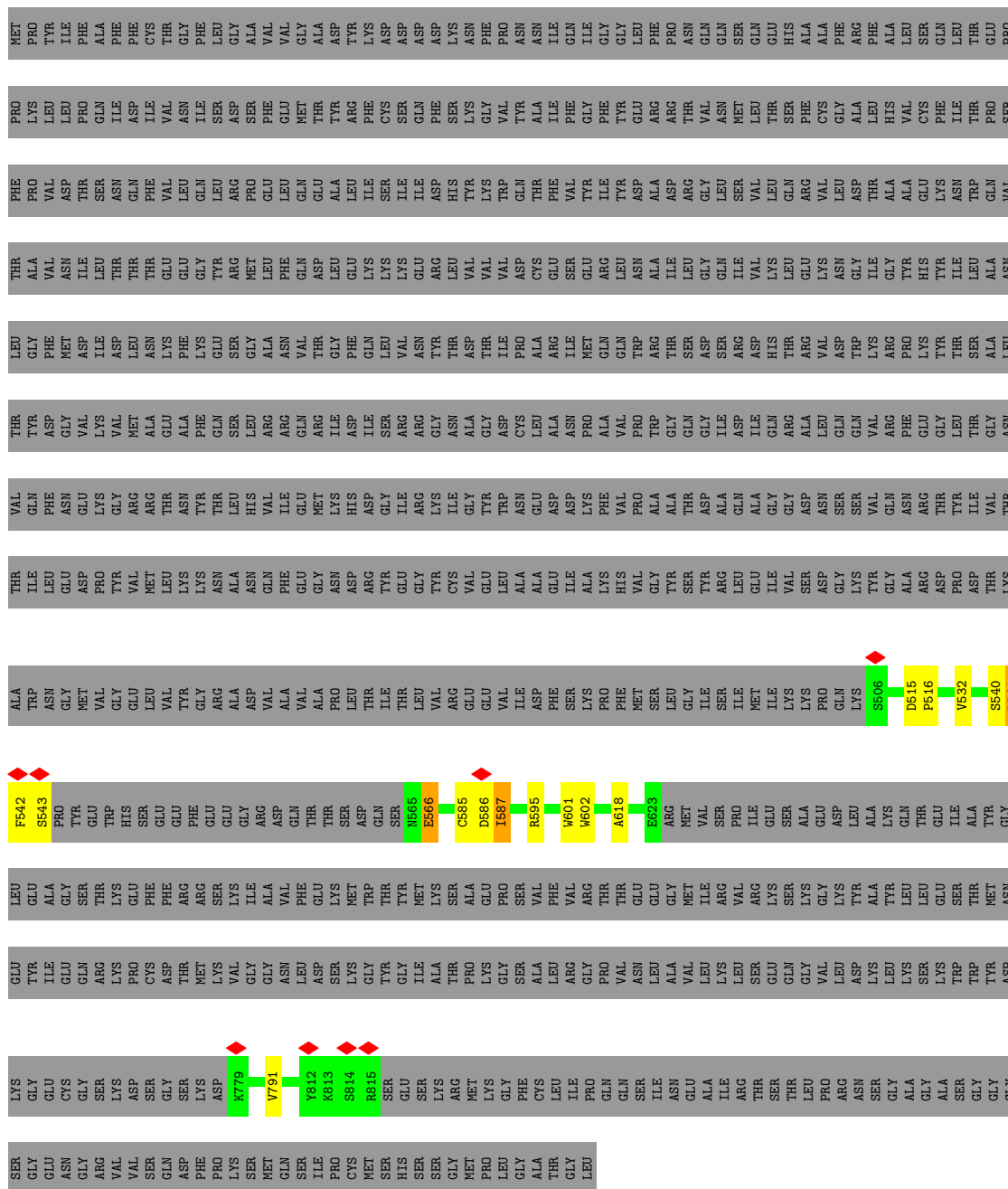
Mol	Chain	Residues	Atoms				AltConf
5	E	1	Total	C	O	P	0
			46	37	8	1	
5	G	1	Total	C	O	P	0
			46	37	8	1	

- Molecule 6 is water.

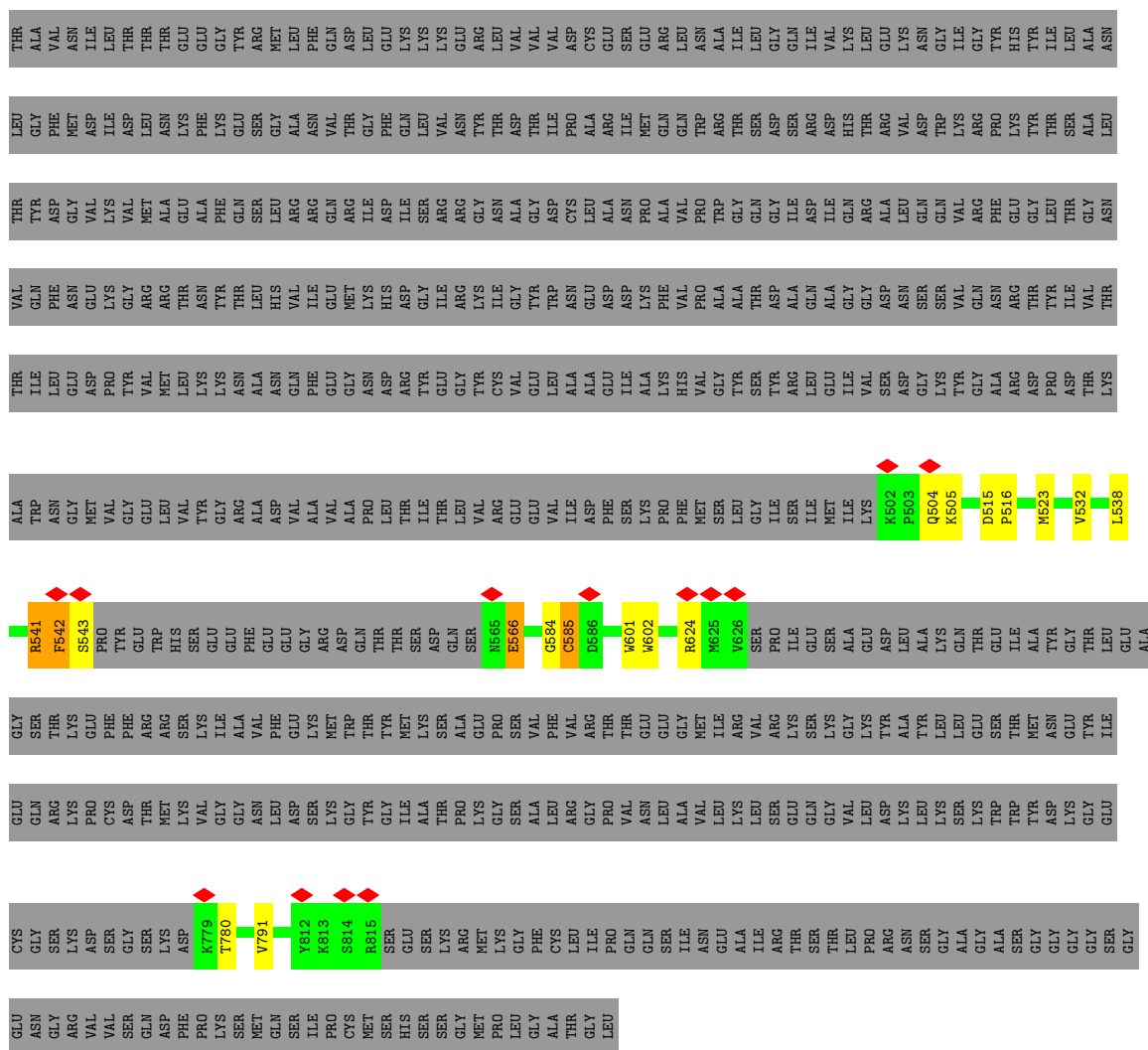
Mol	Chain	Residues	Atoms		AltConf
6	A	10	Total	O	0
			10	10	
6	B	20	Total	O	0
			20	20	
6	C	14	Total	O	0
			14	14	
6	D	21	Total	O	0
			21	21	
6	E	4	Total	O	0
			4	4	
6	F	6	Total	O	0
			6	6	
6	G	4	Total	O	0
			4	4	
6	H	7	Total	O	0
			7	7	

- Molecule 1: Glutamate receptor 1 flip isoform

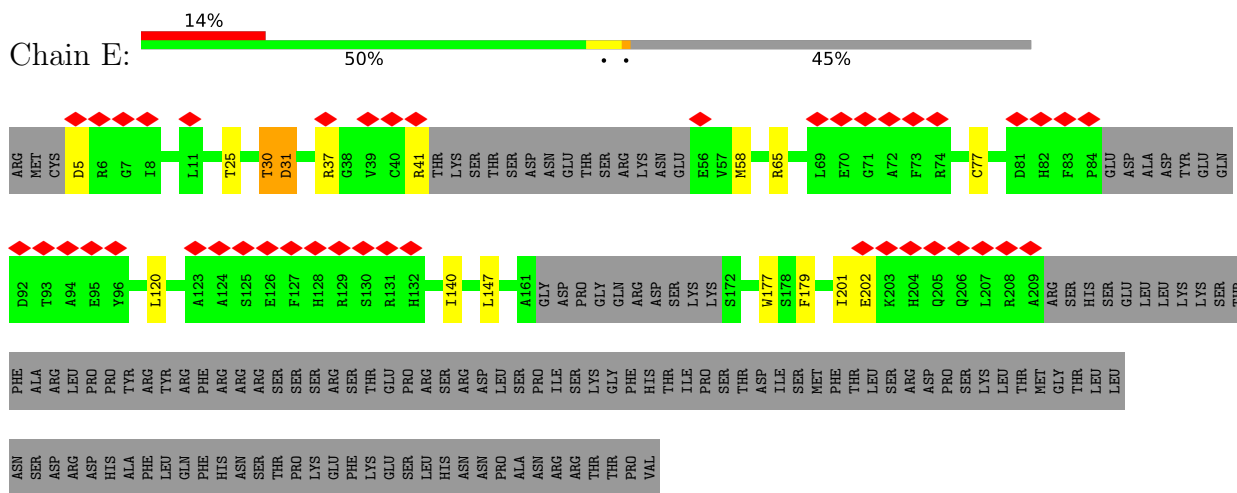
Chain B:  13% 85%



- Molecule 1: Glutamate receptor 1 flip isoform

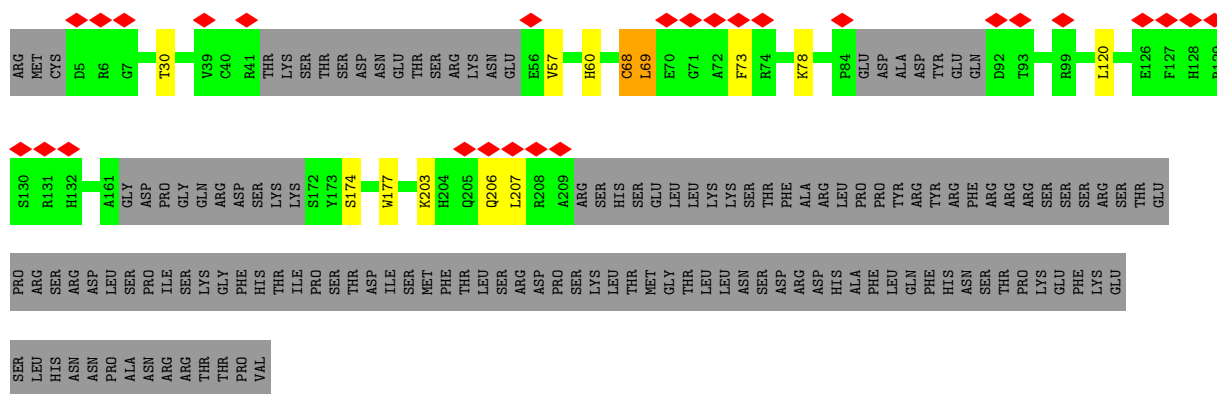


- Molecule 2: Voltage-dependent calcium channel gamma-3 subunit



- Molecule 2: Voltage-dependent calcium channel gamma-3 subunit





• Molecule 2: Voltage-dependent calcium channel gamma-3 subunit



• Molecule 2: Voltage-dependent calcium channel gamma-3 subunit



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	247485	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	1400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.078	Depositor
Minimum map value	-0.041	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.012	Depositor
Map size (Å)	252.756, 252.756, 252.756	wwPDB
Map dimensions	306, 306, 306	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.826, 0.826, 0.826	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.63	0/1064	1.03	1/1448 (0.1%)
1	B	0.63	0/1099	0.95	0/1493
1	C	0.62	0/1070	0.99	0/1456
1	D	0.61	0/1149	1.00	0/1558
2	E	0.54	0/1386	1.01	0/1874
2	F	0.56	0/1398	1.03	1/1890 (0.1%)
2	G	0.54	0/1386	1.02	0/1874
2	H	0.57	0/1398	1.03	1/1890 (0.1%)
All	All	0.58	0/9950	1.01	3/13483 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	541	ARG	CB-CA-C	-7.45	101.14	111.95
2	F	69	LEU	N-CA-CB	-6.88	101.10	110.67
2	H	132	HIS	CA-CB-CG	5.65	119.45	113.80

There are no chirality outliers.

There are no planarity outliers.

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	1037	0	1011	12	0
1	B	1071	0	1053	12	0
1	C	1043	0	1016	13	0
1	D	1120	0	1110	11	0
2	E	1354	0	1346	8	0
2	F	1365	0	1354	3	0
2	G	1354	0	1346	4	0
2	H	1365	0	1354	6	0
3	A	13	0	18	0	0
3	B	14	0	20	0	0
3	C	13	0	18	0	0
3	D	14	0	20	0	0
3	F	15	0	22	0	0
3	H	15	0	22	0	0
4	A	25	0	40	0	0
4	B	25	0	40	0	0
4	C	25	0	40	0	0
4	D	25	0	40	0	0
5	E	46	0	69	0	0
5	G	46	0	69	0	0
6	A	10	0	0	0	0
6	B	20	0	0	2	0
6	C	14	0	0	1	0
6	D	21	0	0	0	0
6	E	4	0	0	0	0
6	F	6	0	0	0	0
6	G	4	0	0	0	0
6	H	7	0	0	1	0
All	All	10071	0	10008	56	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (56) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:541:ARG:NH1	1:A:566:GLU:HB2	2.13	0.64
2:G:30:THR:HG21	2:G:177:TRP:CH2	2.35	0.61
2:E:30:THR:HG21	2:E:177:TRP:CH2	2.36	0.61
2:F:60:HIS:HD2	2:F:69:LEU:HD13	1.67	0.60
1:B:586[A]:ASP:O	1:B:587[A]:ILE:HG23	2.02	0.60
1:B:541:ARG:NH1	1:B:566:GLU:OE1	2.35	0.59

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:82:HIS:ND1	6:H:1701:HOH:O	2.32	0.59
2:H:30:THR:HG21	2:H:177:TRP:HH2	1.67	0.59
1:A:586[B]:ASP:OD2	1:A:586[B]:ASP:N	2.35	0.59
1:D:541:ARG:NH1	1:D:566:GLU:OE1	2.35	0.59
2:F:30:THR:HG21	2:F:177:TRP:HH2	1.68	0.58
2:F:68:CYS:SG	2:F:73:PHE:O	2.62	0.57
2:H:68:CYS:SG	2:H:73:PHE:O	2.63	0.56
1:D:541:ARG:HG2	2:E:201:ILE:HD11	1.89	0.55
1:C:510:VAL:HG13	1:C:511:PHE:CD1	2.42	0.54
1:A:541:ARG:HH11	1:A:566:GLU:HB2	1.72	0.54
1:D:584[B]:GLY:O	1:D:585[B]:CYS:HB3	2.08	0.54
1:A:510:VAL:HG13	1:A:511:PHE:CD1	2.43	0.53
1:B:540:SER:C	1:B:542:PHE:H	2.15	0.53
1:A:607:ILE:HG21	1:B:791:VAL:HG21	1.90	0.53
1:B:618:ALA:N	6:B:1501:HOH:O	2.42	0.51
1:C:607:ILE:HG21	1:D:791:VAL:HG21	1.92	0.50
1:B:602:TRP:CG	1:C:583[B]:GLN:HG3	2.47	0.50
2:H:66:THR:HG23	2:H:78:LYS:HG3	1.94	0.49
1:A:583[B]:GLN:HG3	1:D:602:TRP:CG	2.48	0.49
1:D:532:VAL:HG21	1:D:601:TRP:CE3	2.48	0.49
1:A:532:VAL:HG21	1:A:601:TRP:CE3	2.48	0.48
1:C:541:ARG:NH1	1:C:566:GLU:OE2	2.46	0.48
1:C:540:SER:C	1:C:542:PHE:H	2.22	0.48
1:C:532:VAL:HG21	1:C:601:TRP:CE3	2.48	0.48
1:B:532:VAL:HG21	1:B:601:TRP:CE3	2.49	0.47
2:G:30:THR:HG21	2:G:177:TRP:CZ2	2.51	0.46
2:G:30:THR:HG22	2:G:31:ASP:H	1.81	0.46
1:A:585[B]:CYS:HB2	1:A:587:ILE:O	2.15	0.46
1:C:541:ARG:NH2	6:C:1502:HOH:O	2.49	0.46
1:D:542:PHE:O	1:D:543:SER:HB2	2.17	0.45
2:E:30:THR:HG22	2:E:31:ASP:H	1.81	0.45
2:E:30:THR:HG21	2:E:177:TRP:CZ2	2.50	0.45
1:A:515:ASP:N	1:A:516:PRO:CD	2.81	0.44
1:A:541:ARG:HH11	1:A:567:PHE:H	1.64	0.44
1:B:541:ARG:NH2	6:B:1502:HOH:O	2.50	0.44
1:B:602:TRP:CD1	1:C:583[B]:GLN:HG3	2.53	0.43
1:C:542:PHE:HE2	2:H:136:LEU:HD11	1.83	0.43
1:C:585[B]:CYS:HB2	1:C:587:ILE:O	2.18	0.43
1:D:523:MET:HE1	2:E:179:PHE:HZ	1.83	0.43
1:D:515:ASP:N	1:D:516:PRO:CD	2.81	0.43
1:D:538:LEU:HD11	2:E:140:ILE:CD1	2.48	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:515:ASP:N	1:B:516:PRO:CD	2.82	0.43
1:B:595:ARG:HD2	1:C:570:PHE:CZ	2.55	0.42
1:C:515:ASP:N	1:C:516:PRO:CD	2.83	0.42
1:A:803:MET:HE1	2:E:147:LEU:HD12	2.01	0.42
2:H:40:CYS:HA	2:H:78:LYS:HG2	2.01	0.41
2:E:65:ARG:HB3	2:E:77:CYS:SG	2.61	0.40
1:A:583[B]:GLN:HG3	1:D:602:TRP:CD1	2.56	0.40
1:B:585[A]:CYS:SG	1:B:587[A]:ILE:HG13	2.61	0.40
1:C:803:MET:HE1	2:G:147:LEU:HD12	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	131/915 (14%)	125 (95%)	6 (5%)	0	100	100
1	B	134/915 (15%)	126 (94%)	8 (6%)	0	100	100
1	C	132/915 (14%)	125 (95%)	7 (5%)	0	100	100
1	D	140/915 (15%)	131 (94%)	7 (5%)	2 (1%)	9	12
2	E	166/314 (53%)	165 (99%)	1 (1%)	0	100	100
2	F	167/314 (53%)	166 (99%)	1 (1%)	0	100	100
2	G	166/314 (53%)	165 (99%)	1 (1%)	0	100	100
2	H	167/314 (53%)	166 (99%)	1 (1%)	0	100	100
All	All	1203/4916 (24%)	1169 (97%)	32 (3%)	2 (0%)	49	58

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	585[A]	CYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	585[B]	CYS

5.3.2 Protein sidechains ⓘ

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	106/778 (14%)	98 (92%)	8 (8%)	12	20
1	B	112/778 (14%)	107 (96%)	5 (4%)	24	40
1	C	107/778 (14%)	100 (94%)	7 (6%)	15	26
1	D	117/778 (15%)	110 (94%)	7 (6%)	17	29
2	E	141/273 (52%)	132 (94%)	9 (6%)	16	26
2	F	142/273 (52%)	134 (94%)	8 (6%)	19	31
2	G	141/273 (52%)	133 (94%)	8 (6%)	18	31
2	H	142/273 (52%)	131 (92%)	11 (8%)	12	19
All	All	1008/4204 (24%)	945 (94%)	63 (6%)	19	27

All (63) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	541	ARG
1	A	542	PHE
1	A	582	GLN
1	A	586[A]	ASP
1	A	586[B]	ASP
1	A	590	ARG
1	A	780	THR
1	A	791	VAL
1	B	541	ARG
1	B	543	SER
1	B	566	GLU
1	B	587[A]	ILE
1	B	587[B]	ILE
1	C	542	PHE

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	582	GLN
1	C	586[A]	ASP
1	C	586[B]	ASP
1	C	590	ARG
1	C	780	THR
1	C	791	VAL
1	D	504	GLN
1	D	505	LYS
1	D	541	ARG
1	D	542	PHE
1	D	566	GLU
1	D	624	ARG
1	D	780	THR
2	E	5	ASP
2	E	25	THR
2	E	30	THR
2	E	31	ASP
2	E	37	ARG
2	E	41	ARG
2	E	58	MET
2	E	120	LEU
2	E	202	GLU
2	F	57	VAL
2	F	68	CYS
2	F	78	LYS
2	F	120	LEU
2	F	174	SER
2	F	203	LYS
2	F	206	GLN
2	F	207	LEU
2	G	5	ASP
2	G	25	THR
2	G	30	THR
2	G	31	ASP
2	G	37	ARG
2	G	41	ARG
2	G	58	MET
2	G	120	LEU
2	H	57	VAL
2	H	66	THR
2	H	68	CYS
2	H	78	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	H	79	LYS
2	H	99	ARG
2	H	120	LEU
2	H	132	HIS
2	H	174	SER
2	H	206	GLN
2	H	207	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	615	ASN
2	E	9	GLN
2	E	160	ASN
2	F	9	GLN
2	F	206	GLN
2	G	160	ASN
2	H	132	HIS
2	H	206	GLN

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](#)

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	PLM	D	1401	-	13,13,17	0.60	0	13,13,17	0.65	0
3	PLM	B	1401	-	13,13,17	0.62	0	13,13,17	0.67	0
3	PLM	C	1401	-	12,12,17	0.65	0	12,12,17	0.67	0
3	PLM	A	1401	-	12,12,17	0.63	0	12,12,17	0.79	0
3	PLM	H	1601	-	14,14,17	0.55	0	14,14,17	0.66	0
5	POV	E	401	-	45,45,51	0.42	0	48,50,59	0.63	1 (2%)
4	OLC	A	1402	-	24,24,24	0.25	0	25,25,25	0.40	0
4	OLC	D	1402	-	24,24,24	0.37	0	25,25,25	0.72	1 (4%)
5	POV	G	401	-	45,45,51	0.41	0	48,50,59	0.65	1 (2%)
3	PLM	F	1601	-	14,14,17	0.51	0	14,14,17	0.66	0
4	OLC	B	1402	-	24,24,24	0.31	0	25,25,25	0.68	1 (4%)
4	OLC	C	1402	-	24,24,24	0.26	0	25,25,25	0.39	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	PLM	D	1401	-	-	10/11/11/15	-
3	PLM	B	1401	-	-	9/11/11/15	-
3	PLM	C	1401	-	-	5/10/10/15	-
3	PLM	A	1401	-	-	5/10/10/15	-
3	PLM	H	1601	-	-	7/12/12/15	-
5	POV	E	401	-	-	13/47/47/55	-
4	OLC	A	1402	-	-	8/24/24/24	-
4	OLC	D	1402	-	-	14/24/24/24	-
5	POV	G	401	-	-	14/47/47/55	-
3	PLM	F	1601	-	-	6/12/12/15	-
4	OLC	B	1402	-	-	14/24/24/24	-
4	OLC	C	1402	-	-	6/24/24/24	-

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	401	POV	O13-P-O14	2.35	119.99	110.83
5	G	401	POV	O13-P-O14	2.30	119.81	110.83
4	D	1402	OLC	O20-C1-C2	2.18	118.48	111.83
4	B	1402	OLC	O20-C1-C2	2.01	117.97	111.83

There are no chirality outliers.

All (111) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	1402	OLC	O20-C21-C22-O23
4	B	1402	OLC	C2-C1-O20-C21
4	B	1402	OLC	O19-C1-O20-C21
4	D	1402	OLC	O20-C21-C22-O23
4	D	1402	OLC	C2-C1-O20-C21
4	D	1402	OLC	O19-C1-O20-C21
5	E	401	POV	C1-O11-P-O14
5	G	401	POV	C1-O11-P-O14
5	G	401	POV	C21-C22-C23-C24
4	B	1402	OLC	O20-C21-C22-C24
4	D	1402	OLC	O20-C21-C22-C24
3	B	1401	PLM	C4-C5-C6-C7
4	A	1402	OLC	C11-C12-C13-C14
5	E	401	POV	C311-C312-C313-C314
4	C	1402	OLC	C11-C12-C13-C14
3	D	1401	PLM	C4-C5-C6-C7
3	F	1601	PLM	C5-C6-C7-C8
3	F	1601	PLM	C4-C5-C6-C7
4	A	1402	OLC	C5-C6-C7-C8
5	E	401	POV	C21-C22-C23-C24
5	E	401	POV	C31-C32-C33-C34
3	H	1601	PLM	C5-C6-C7-C8
3	H	1601	PLM	C4-C5-C6-C7
3	D	1401	PLM	C3-C4-C5-C6
5	G	401	POV	C311-C312-C313-C314
3	B	1401	PLM	C3-C4-C5-C6
5	G	401	POV	C31-C32-C33-C34
5	E	401	POV	C310-C311-C312-C313
4	D	1402	OLC	C11-C12-C13-C14
3	A	1401	PLM	C6-C7-C8-C9
5	G	401	POV	C310-C311-C312-C313
4	D	1402	OLC	C2-C3-C4-C5
4	B	1402	OLC	C11-C12-C13-C14
4	C	1402	OLC	C10-C11-C12-C13

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
5	G	401	POV	C212-C213-C214-C215
4	D	1402	OLC	C12-C13-C14-C15
3	D	1401	PLM	C2-C3-C4-C5
4	C	1402	OLC	C9-C10-C11-C12
3	D	1401	PLM	C7-C8-C9-CA
4	B	1402	OLC	C3-C4-C5-C6
4	A	1402	OLC	C14-C15-C16-C17
3	B	1401	PLM	C2-C3-C4-C5
3	B	1401	PLM	C7-C8-C9-CA
4	B	1402	OLC	C12-C13-C14-C15
3	C	1401	PLM	C3-C4-C5-C6
5	G	401	POV	C35-C36-C37-C38
3	H	1601	PLM	C8-C9-CA-CB
4	B	1402	OLC	C2-C3-C4-C5
3	A	1401	PLM	C3-C4-C5-C6
4	A	1402	OLC	C10-C11-C12-C13
4	A	1402	OLC	C6-C7-C8-C9
5	E	401	POV	C212-C213-C214-C215
5	E	401	POV	C23-C24-C25-C26
5	G	401	POV	C33-C34-C35-C36
3	D	1401	PLM	C6-C7-C8-C9
5	G	401	POV	C23-C24-C25-C26
3	F	1601	PLM	CA-CB-CC-CD
4	A	1402	OLC	C9-C10-C11-C12
3	B	1401	PLM	C6-C7-C8-C9
3	F	1601	PLM	C1-C2-C3-C4
4	B	1402	OLC	C15-C16-C17-C18
5	E	401	POV	C35-C36-C37-C38
4	D	1402	OLC	C15-C16-C17-C18
3	A	1401	PLM	C1-C2-C3-C4
4	B	1402	OLC	C6-C7-C8-C9
3	H	1601	PLM	C1-C2-C3-C4
3	C	1401	PLM	C4-C5-C6-C7
3	C	1401	PLM	C6-C7-C8-C9
5	E	401	POV	C33-C34-C35-C36
4	C	1402	OLC	C5-C6-C7-C8
4	D	1402	OLC	C3-C4-C5-C6
3	F	1601	PLM	C9-CA-CB-CC
4	C	1402	OLC	C14-C15-C16-C17
4	D	1402	OLC	C6-C7-C8-C9
5	E	401	POV	C211-C212-C213-C214
5	G	401	POV	C211-C212-C213-C214

Continued on next page...

Continued from previous page...

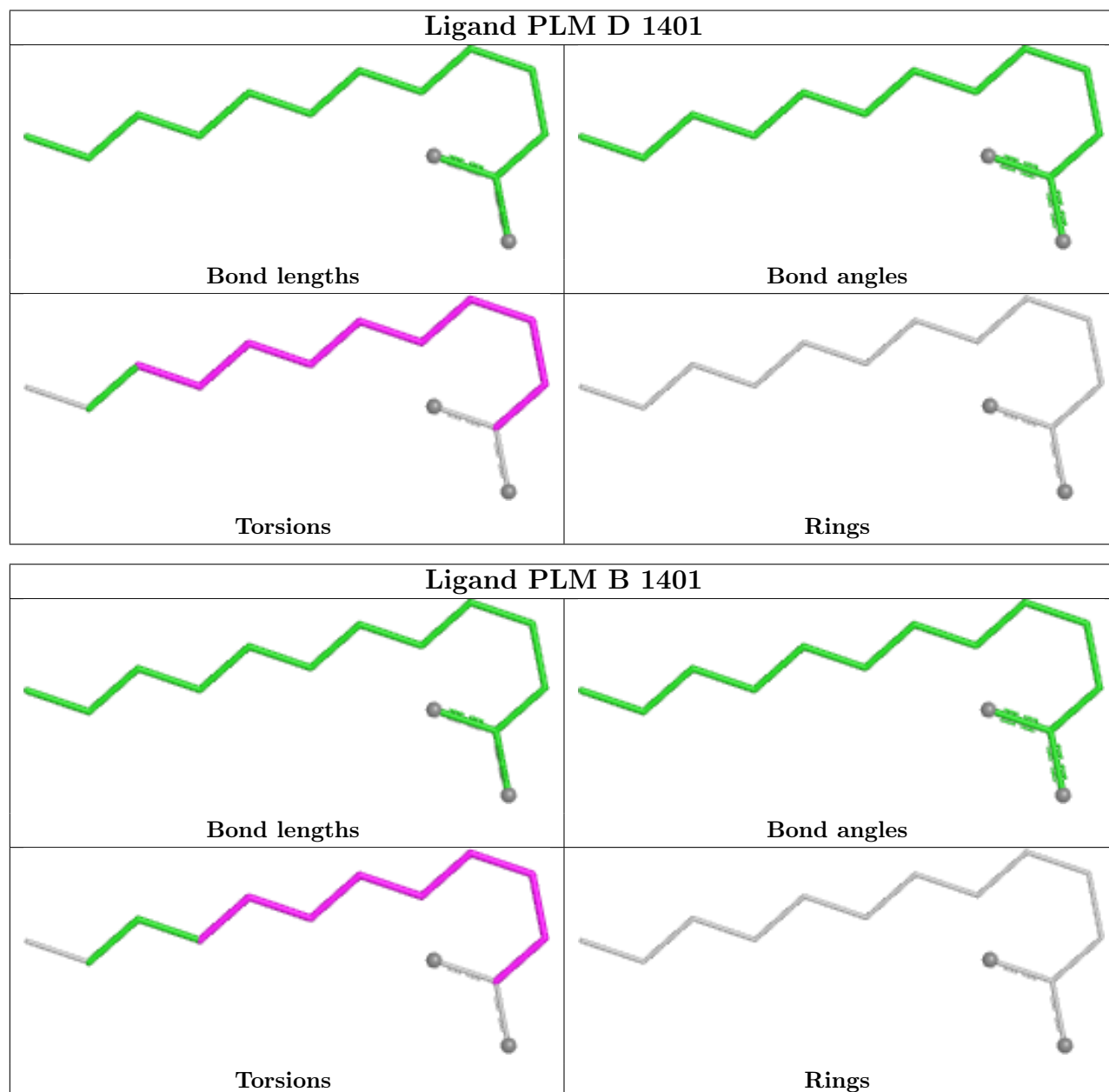
Mol	Chain	Res	Type	Atoms
3	H	1601	PLM	CA-CB-CC-CD
4	D	1402	OLC	C4-C5-C6-C7
4	B	1402	OLC	C4-C5-C6-C7
4	D	1402	OLC	C5-C6-C7-C8
4	A	1402	OLC	C15-C16-C17-C18
3	B	1401	PLM	C1-C2-C3-C4
3	B	1401	PLM	C5-C6-C7-C8
3	H	1601	PLM	C9-CA-CB-CC
3	F	1601	PLM	C8-C9-CA-CB
3	C	1401	PLM	C1-C2-C3-C4
4	C	1402	OLC	C15-C16-C17-C18
4	B	1402	OLC	C7-C8-C9-C10
3	D	1401	PLM	C5-C6-C7-C8
5	G	401	POV	C22-C23-C24-C25
5	E	401	POV	C22-C23-C24-C25
3	D	1401	PLM	O1-C1-C2-C3
3	B	1401	PLM	O1-C1-C2-C3
4	D	1402	OLC	C9-C10-C11-C12
3	B	1401	PLM	O2-C1-C2-C3
3	D	1401	PLM	O2-C1-C2-C3
5	E	401	POV	C313-C314-C315-C316
5	G	401	POV	C313-C314-C315-C316
5	G	401	POV	C29-C210-C211-C212
4	B	1402	OLC	C9-C10-C11-C12
5	E	401	POV	C29-C210-C211-C212
5	G	401	POV	O11-C1-C2-O21
3	H	1601	PLM	C3-C4-C5-C6
4	B	1402	OLC	C5-C6-C7-C8
4	D	1402	OLC	C7-C8-C9-C10
4	A	1402	OLC	C7-C8-C9-C10
3	D	1401	PLM	C1-C2-C3-C4
3	A	1401	PLM	C4-C5-C6-C7
3	D	1401	PLM	C8-C9-CA-CB
3	A	1401	PLM	O1-C1-C2-C3
3	C	1401	PLM	O1-C1-C2-C3

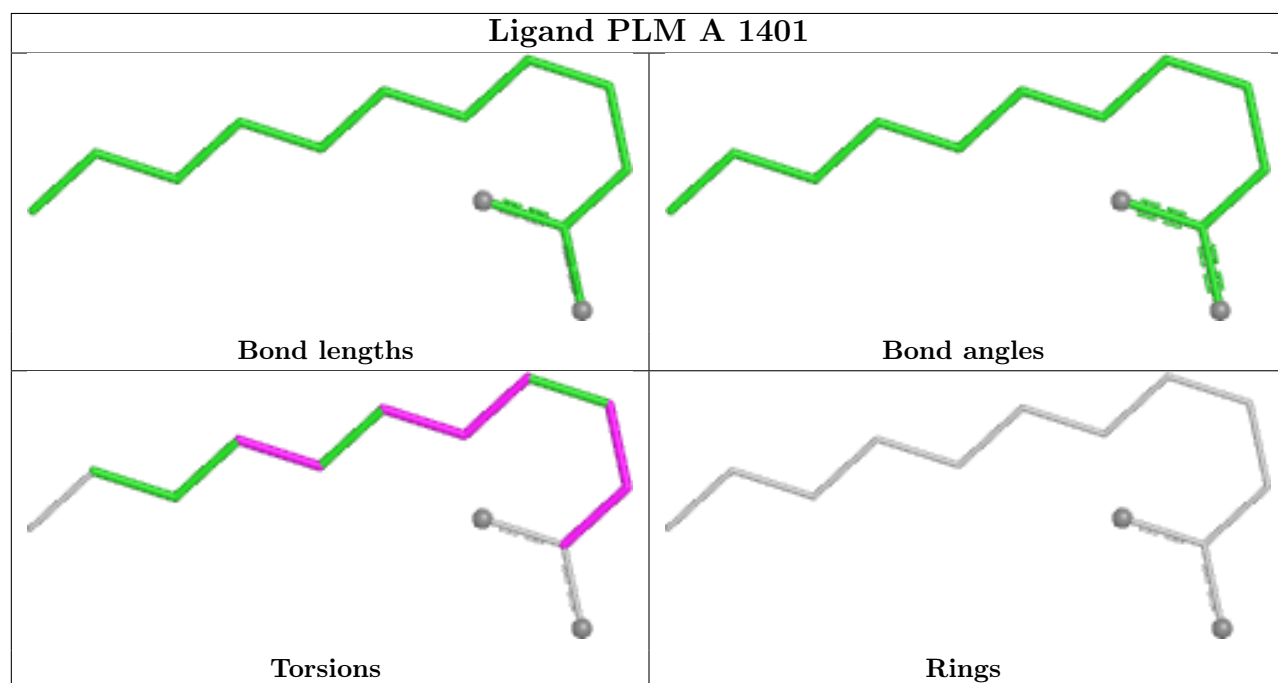
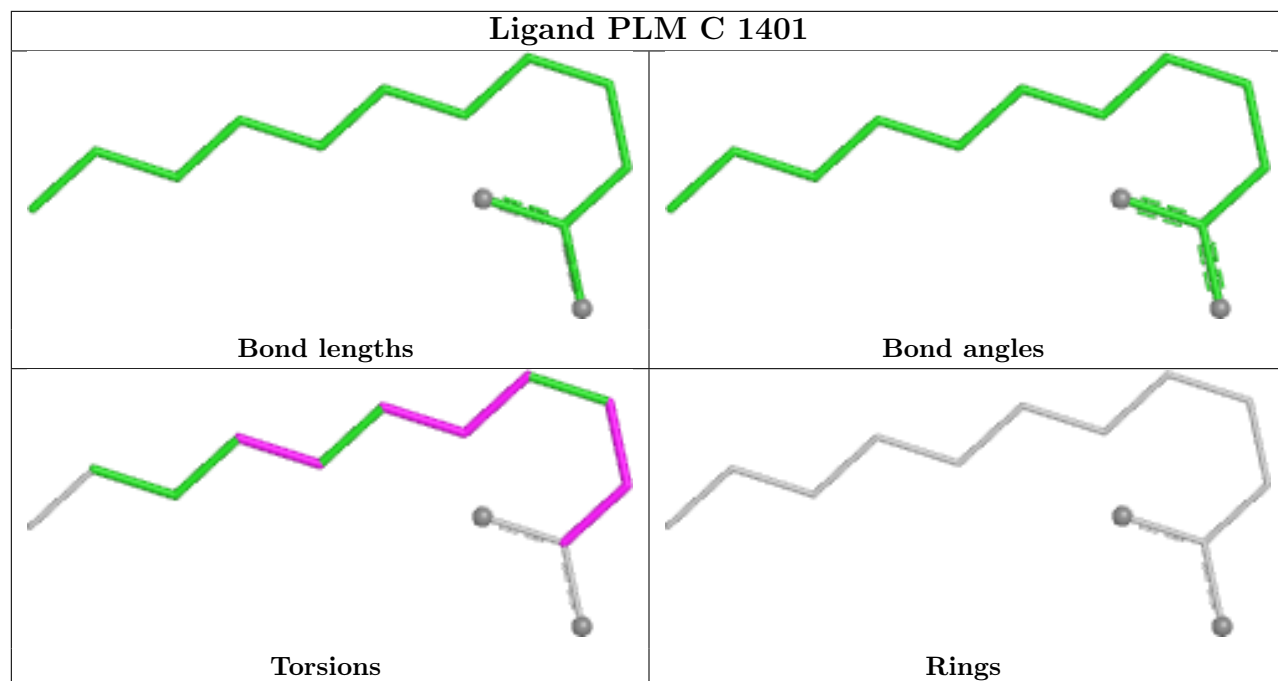
There are no ring outliers.

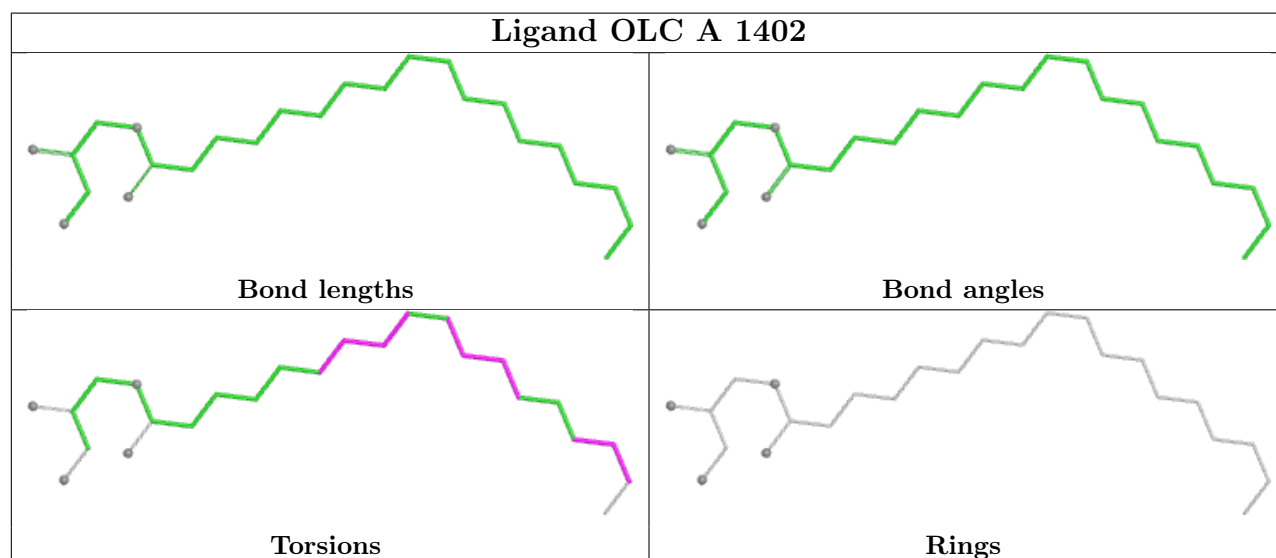
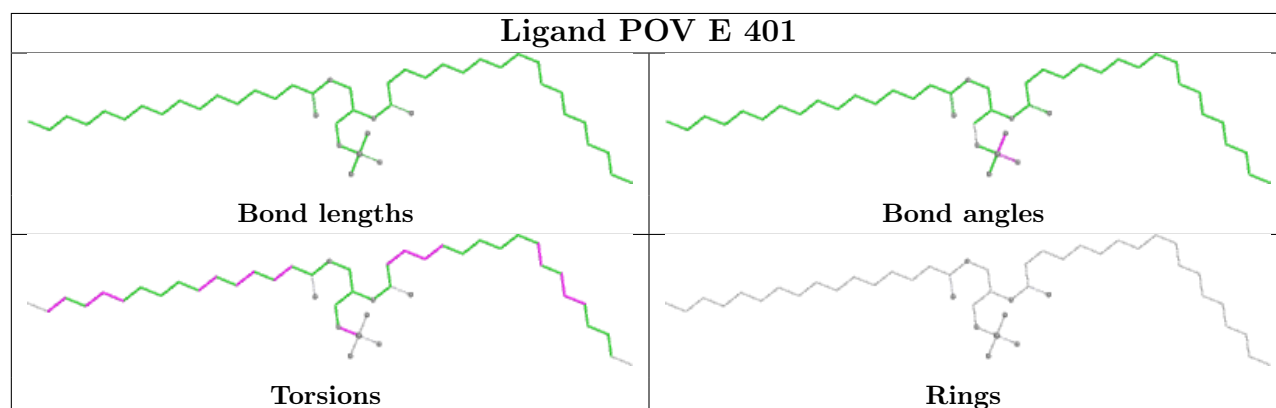
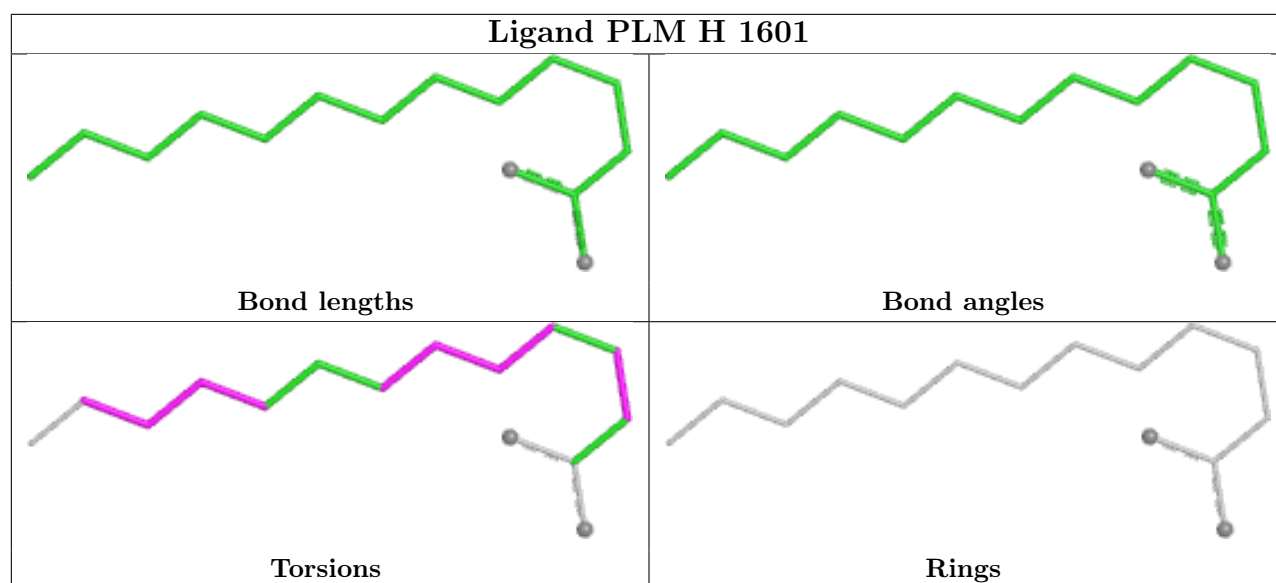
No monomer is involved in short contacts.

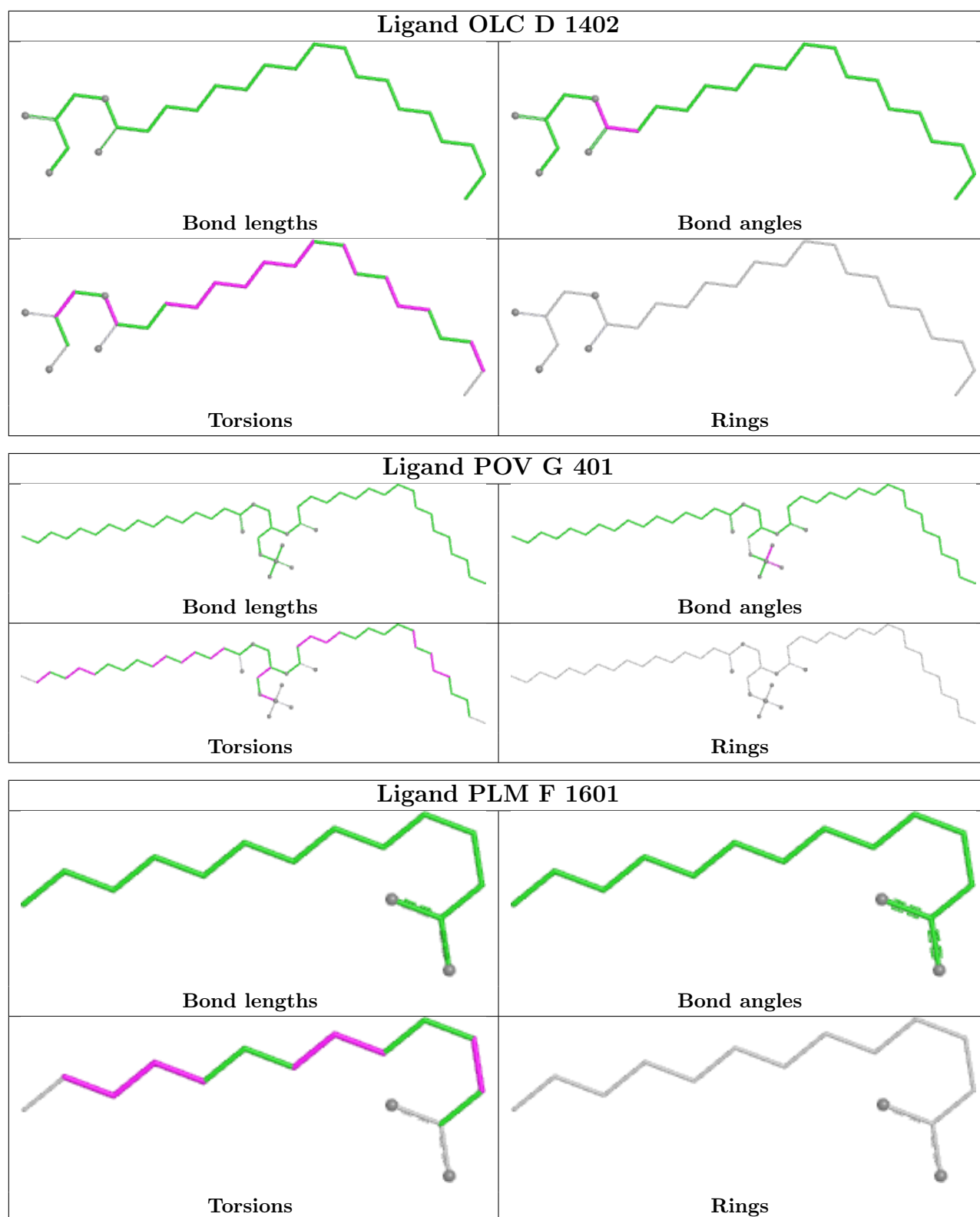
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is

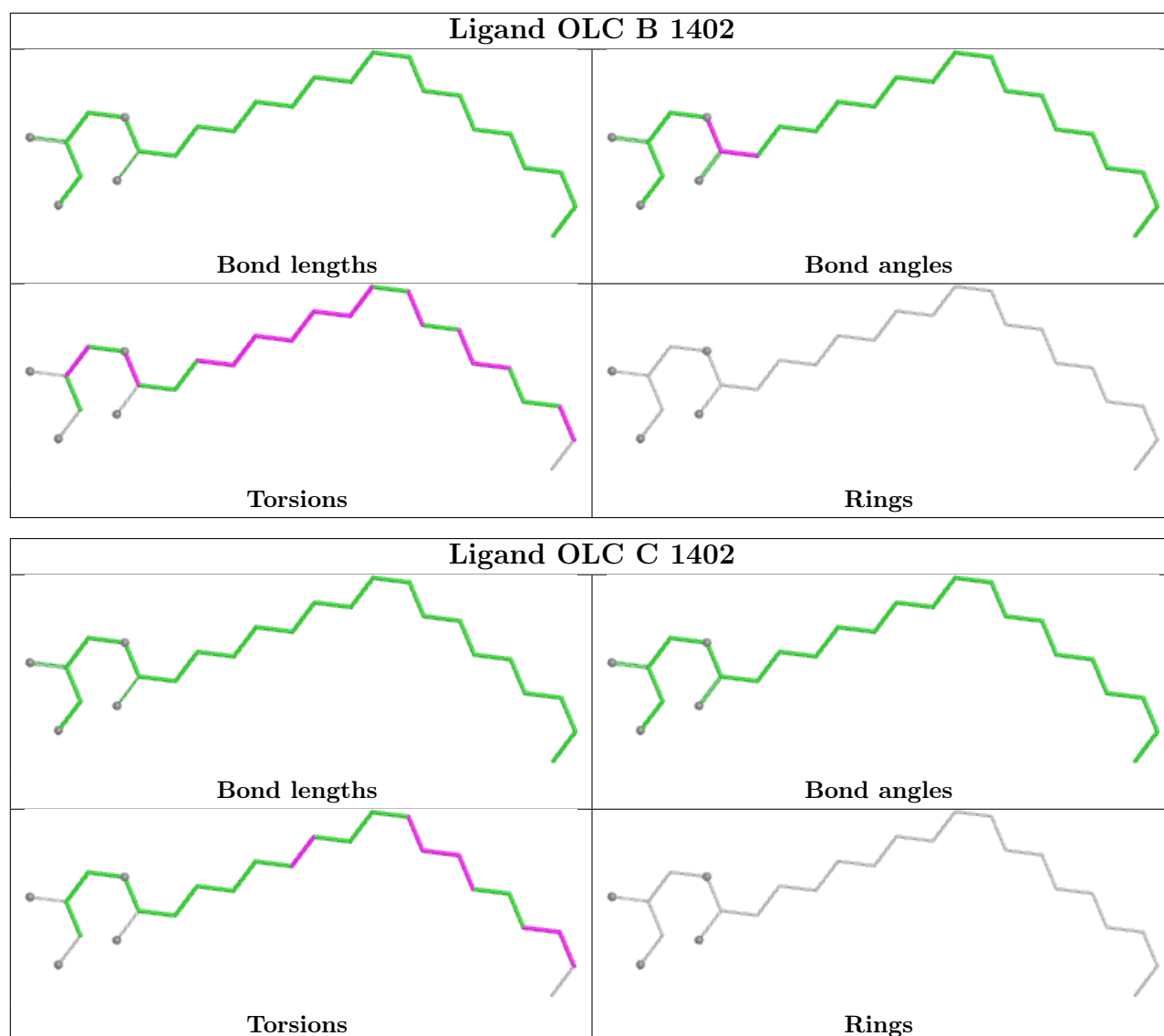
within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question 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 [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

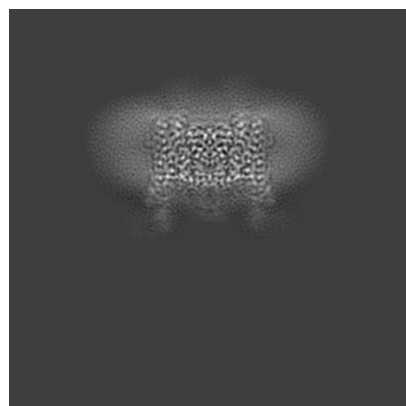
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-16390. These allow visual inspection of the internal detail of the map and identification of artifacts.

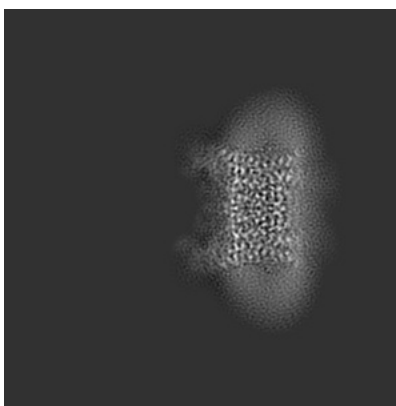
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

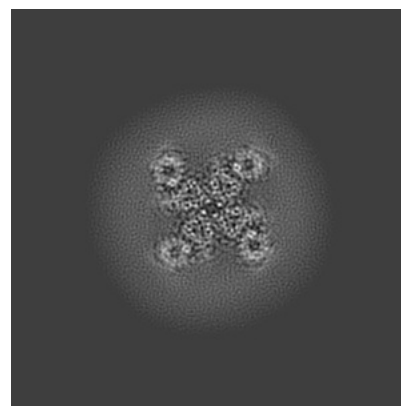
6.1.1 Primary map



X

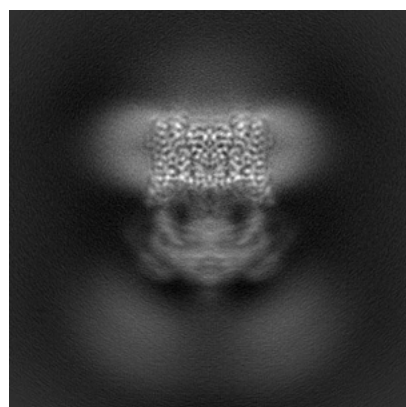


Y

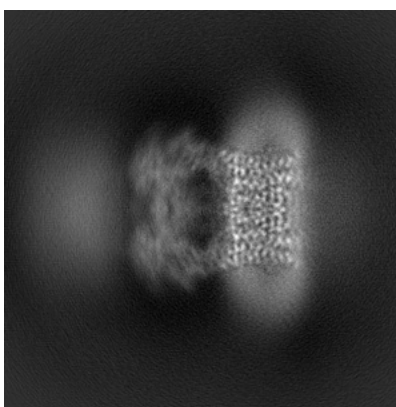


Z

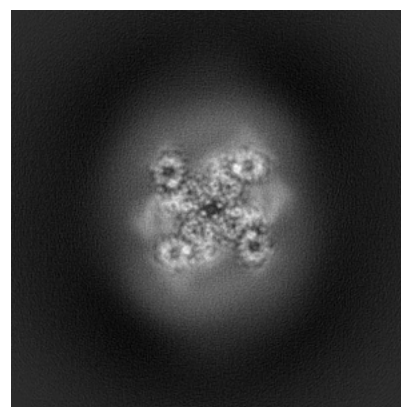
6.1.2 Raw map



X



Y

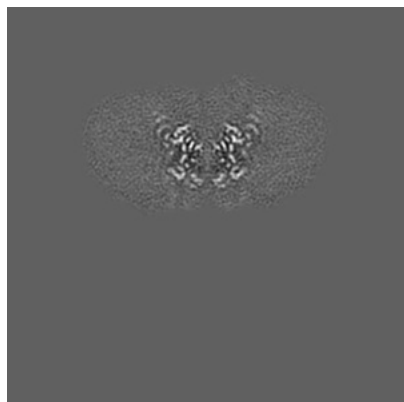


Z

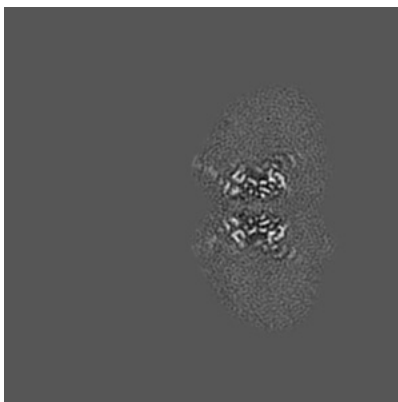
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

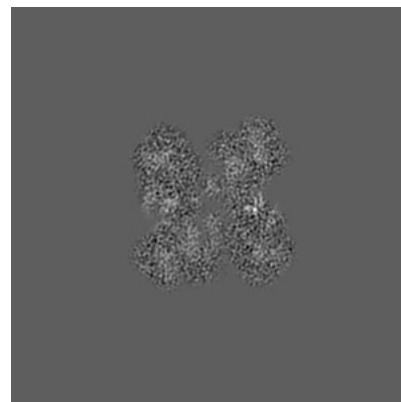
6.2.1 Primary map



X Index: 153

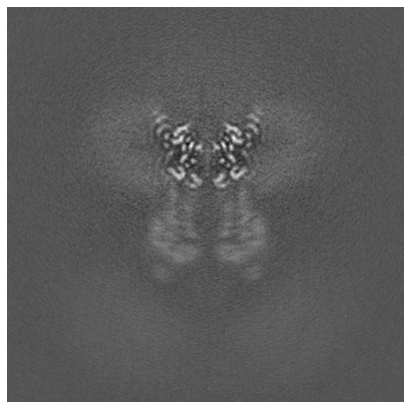


Y Index: 153

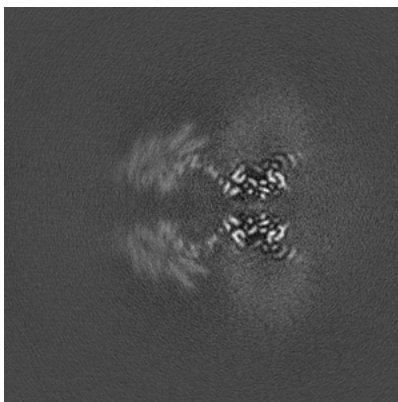


Z Index: 153

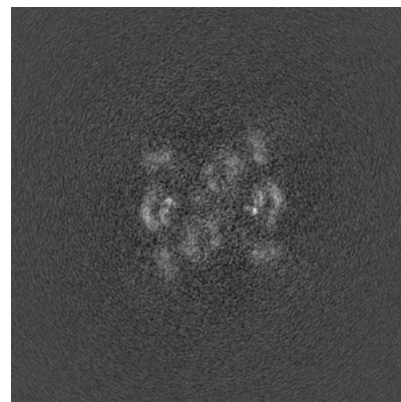
6.2.2 Raw map



X Index: 153



Y Index: 153

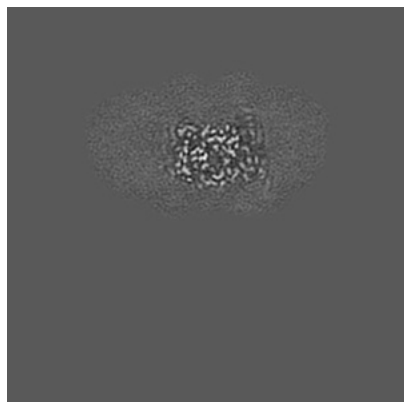


Z Index: 153

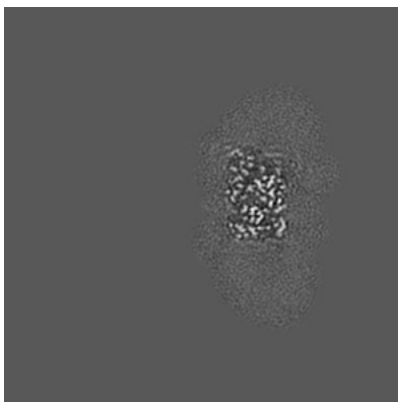
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

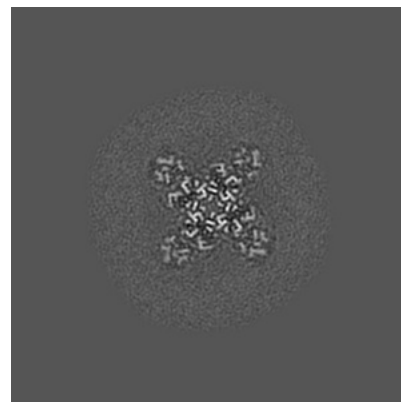
6.3.1 Primary map



X Index: 169

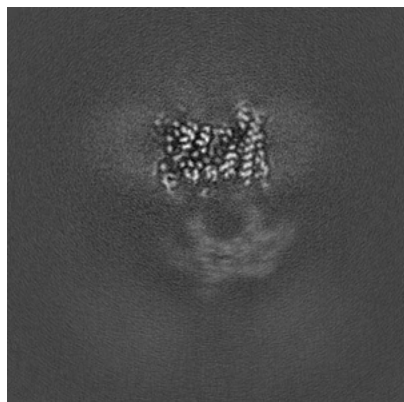


Y Index: 137

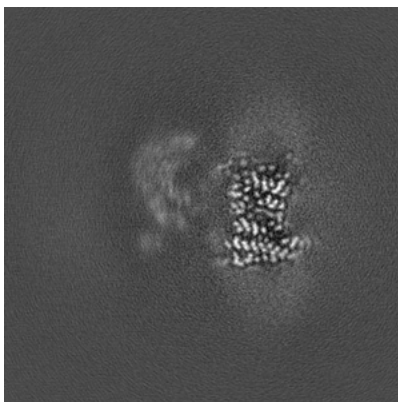


Z Index: 199

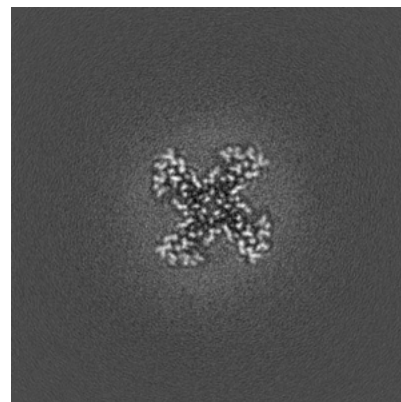
6.3.2 Raw map



X Index: 174



Y Index: 174

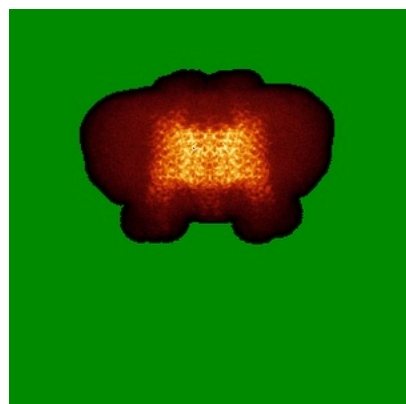


Z Index: 177

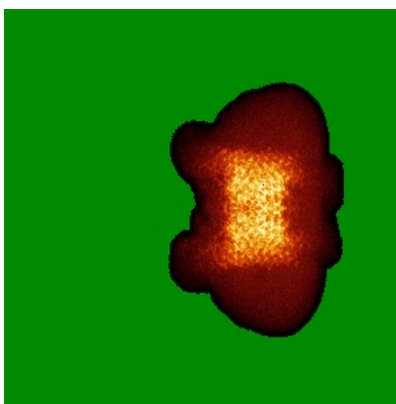
The images above show the largest variance slices of the map in three orthogonal directions.

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

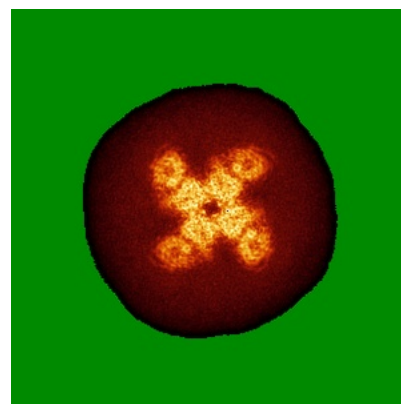
6.4.1 Primary map



X

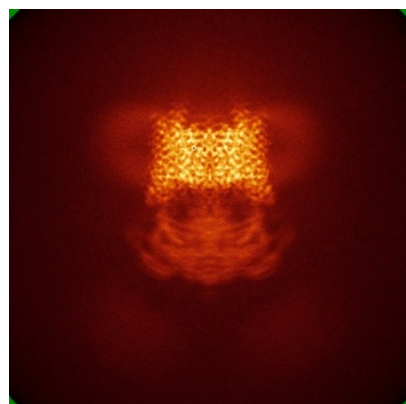


Y

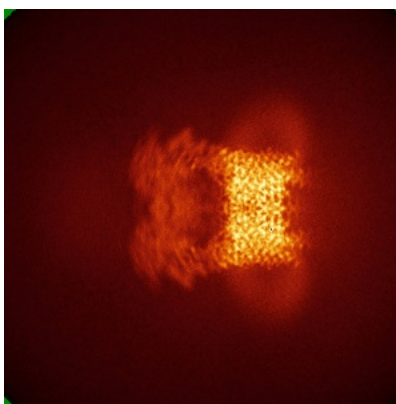


Z

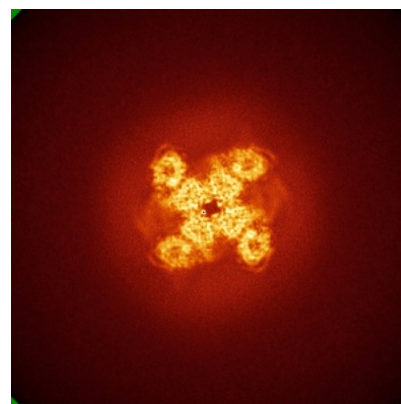
6.4.2 Raw map



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](#)

This section was not generated.

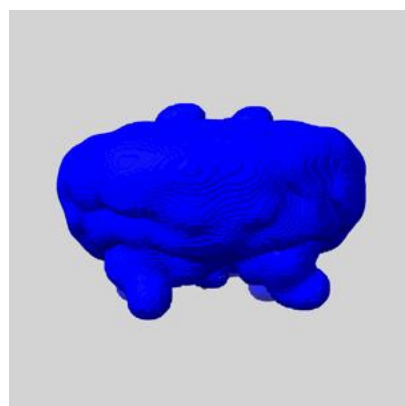
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

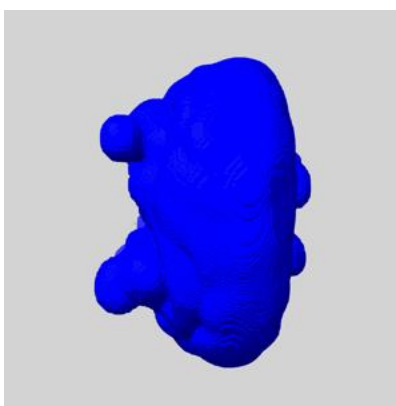
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

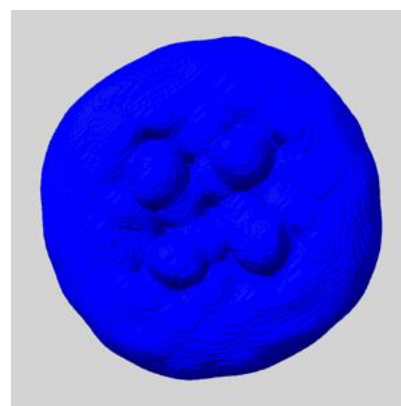
6.6.1 emd_16390_msk_1.map [i](#)



X



Y

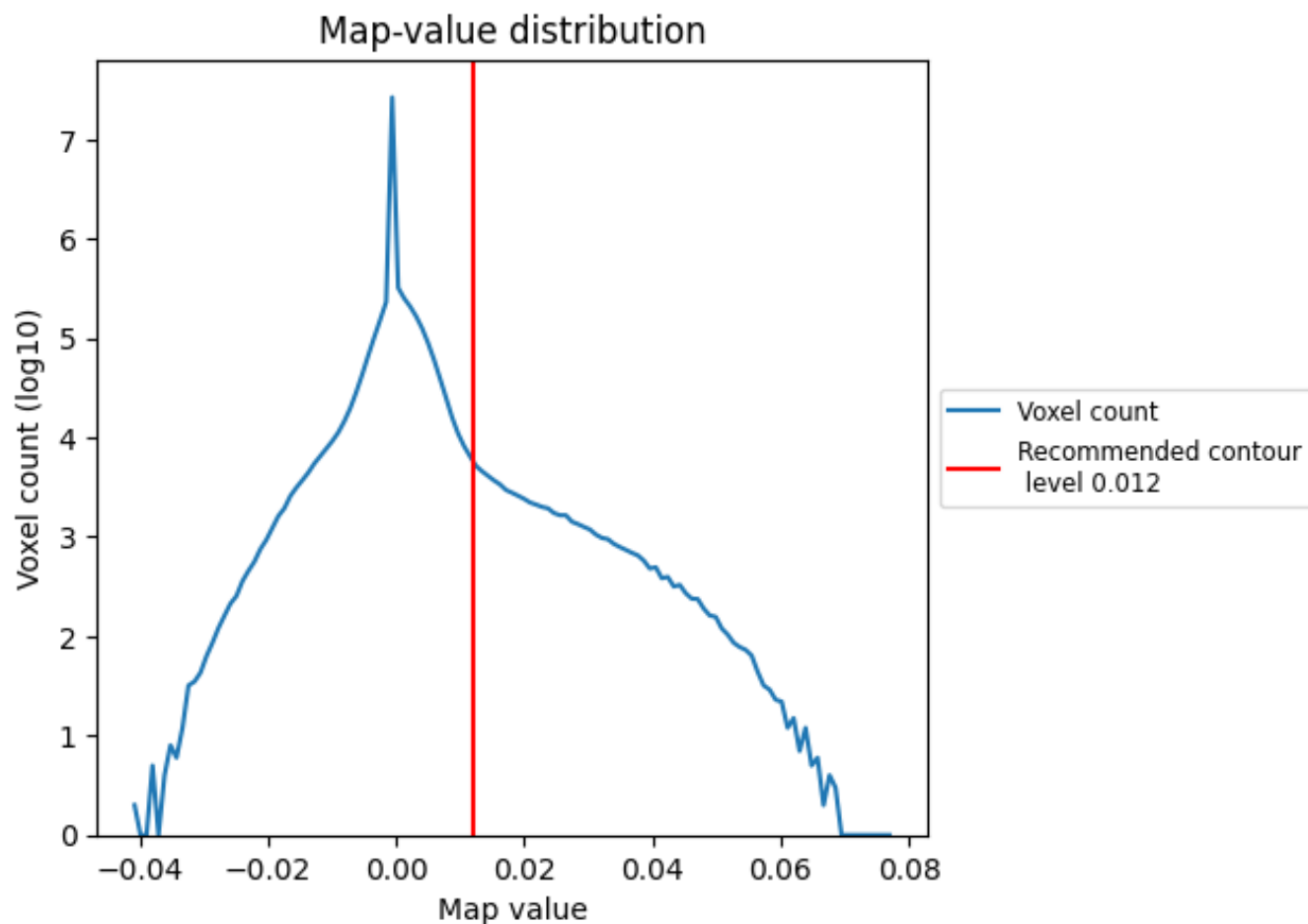


Z

7 Map analysis [i](#)

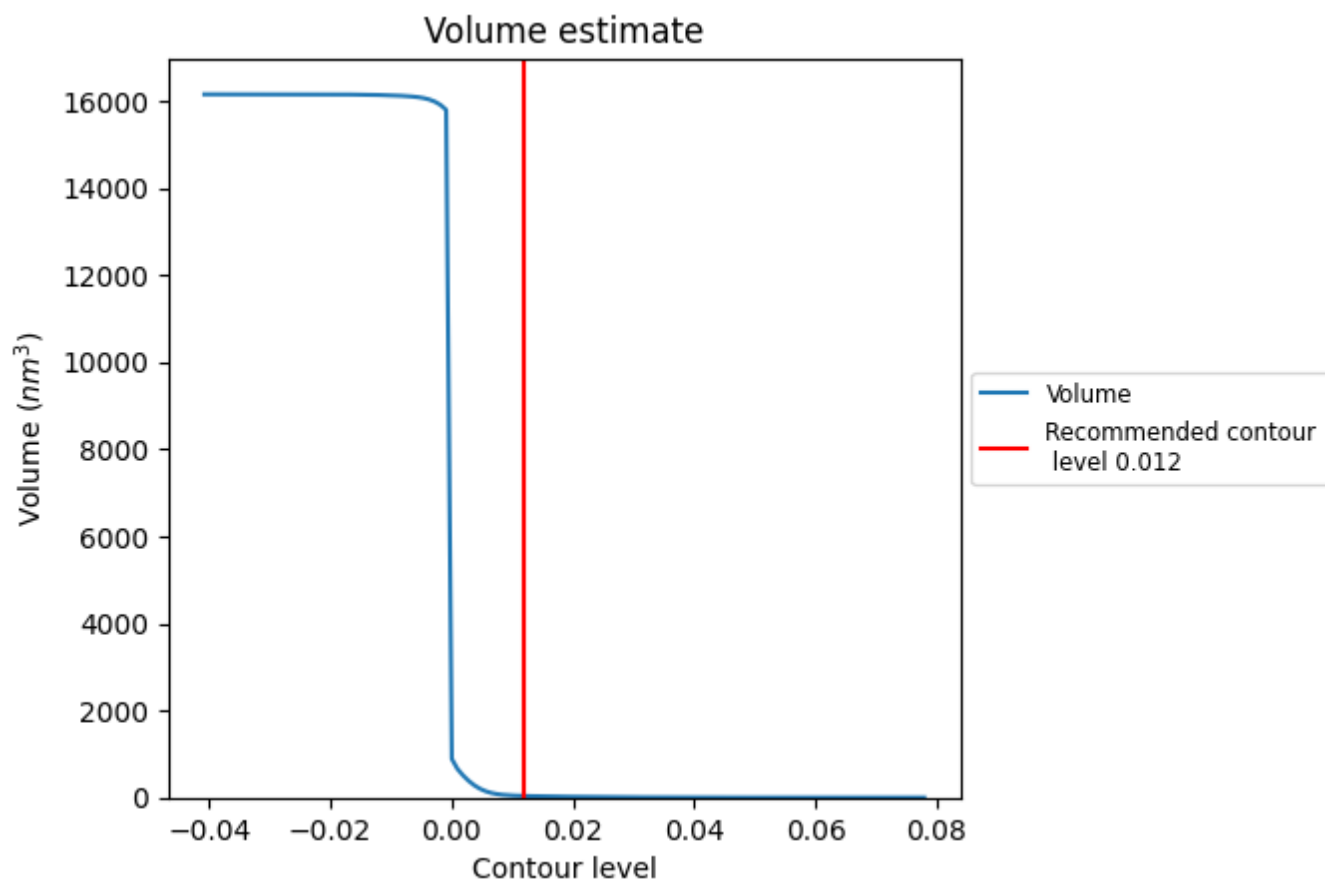
This section contains the results of statistical analysis of the map.

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.

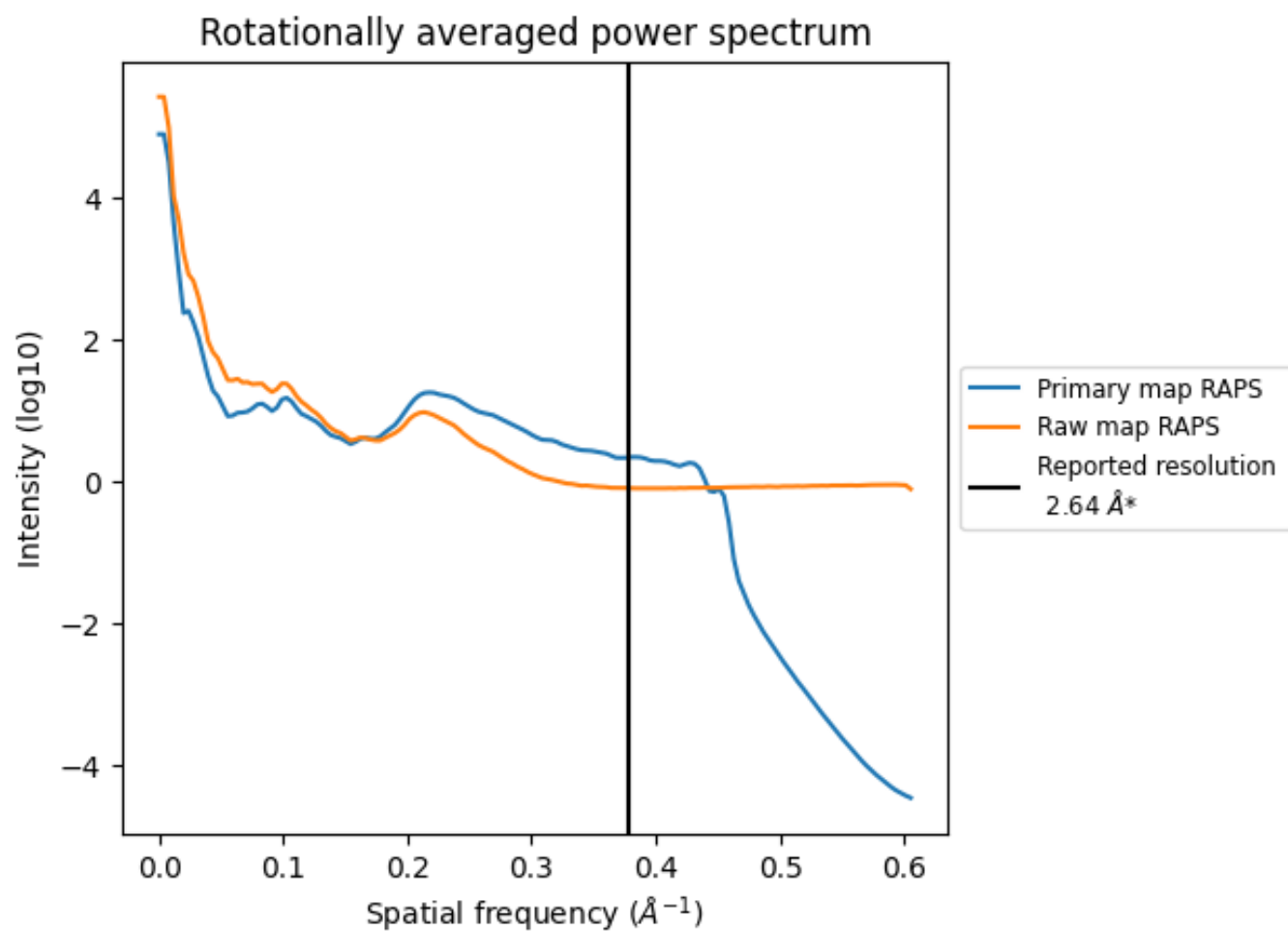
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 37 nm³; this corresponds to an approximate mass of 33 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 ⓘ

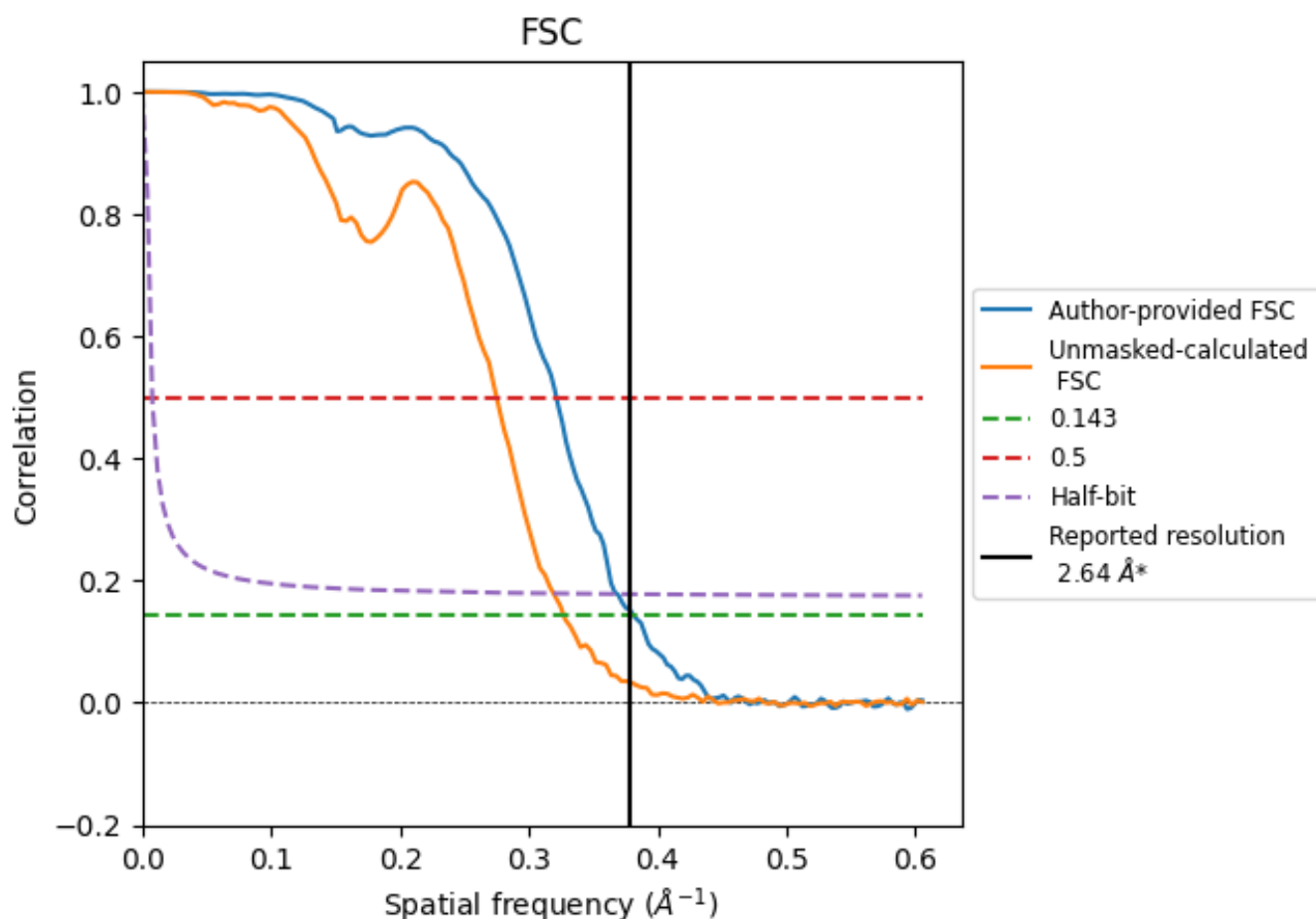


*Reported resolution corresponds to spatial frequency of 0.379 Å⁻¹

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 0.379 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

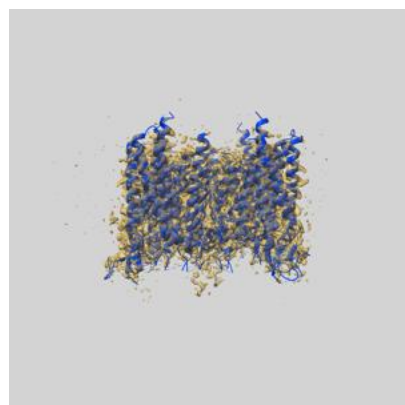
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.64	-	-
Author-provided FSC curve	2.62	3.11	2.71
Unmasked-calculated*	3.06	3.64	3.13

*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 3.06 differs from the reported value 2.64 by more than 10 %

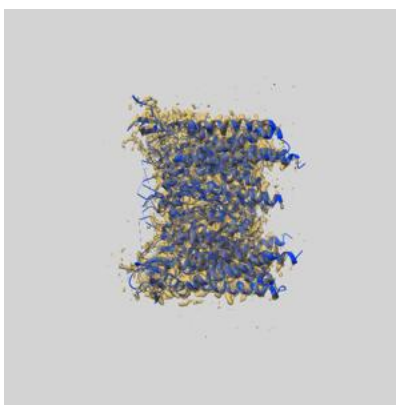
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-16390 and PDB model 8C2H. Per-residue inclusion information can be found in section [3](#) on page [8](#).

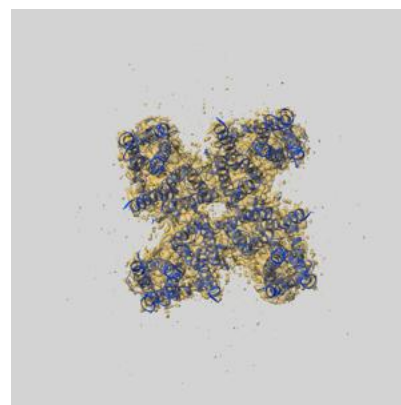
9.1 Map-model overlay [i](#)



X



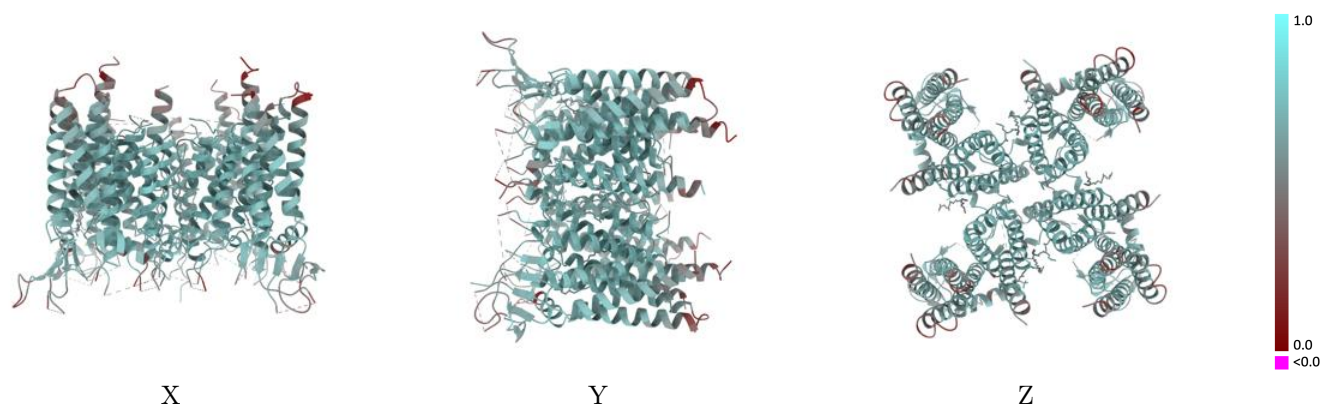
Y



Z

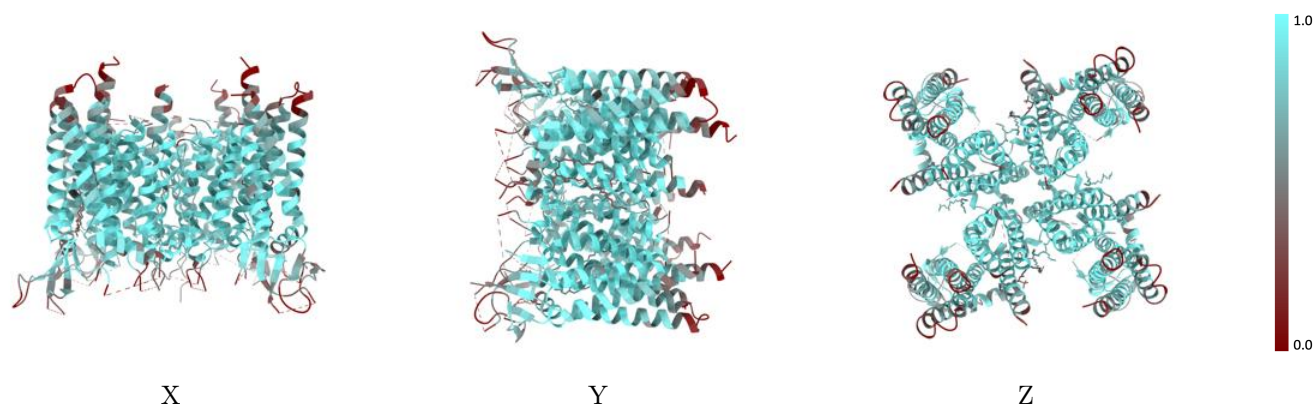
The images above show the 3D surface view of the map at the recommended contour level 0.012 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



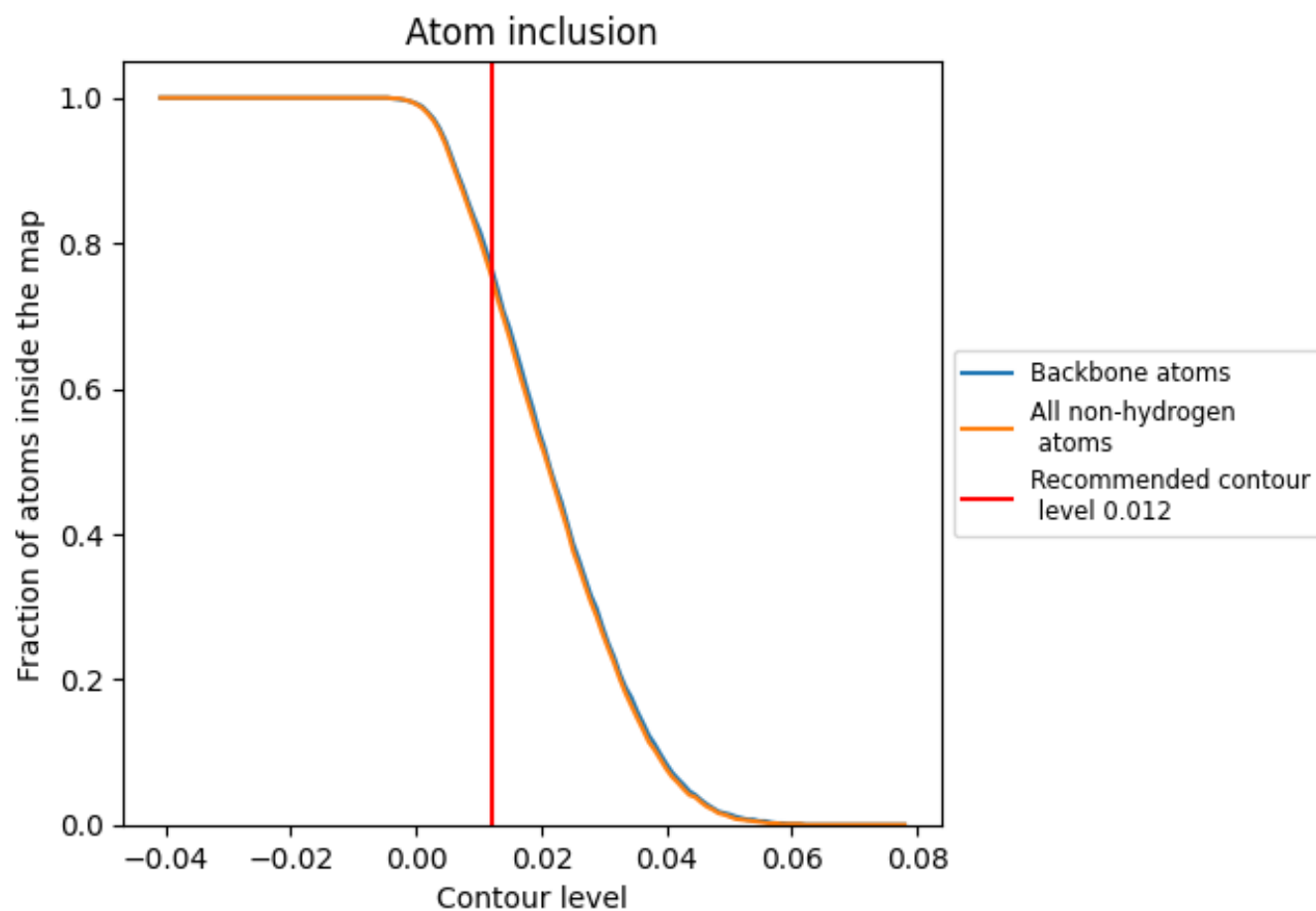
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.012).

9.4 Atom inclusion [i](#)



At the recommended contour level, 77% of all backbone atoms, 76% 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 (0.012) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7560	0.6190
A	0.8730	0.6650
B	0.8820	0.6710
C	0.8730	0.6680
D	0.8480	0.6650
E	0.6290	0.5740
F	0.7190	0.5890
G	0.6580	0.5740
H	0.7190	0.5920

1.0

0.0

<0.0