wwPDB EM Validation Summary Report ⓘ

Mar 22, 2025 – 07:00 am GMT

PDB ID	:	9F60
EMDB ID	:	EMD-50205
Title	:	Structure of the Chlamydomonas reinhardtii respiratory complex IV from respiratory supercomplex
Authors	:	Waltz, F.; Righetto, R.; Kotecha, A.; Engel, B.D.
Deposited on	:	2024-04-30
Resolution	:	2.39 Å(reported)

This is a wwPDB EM Validation Summary 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:

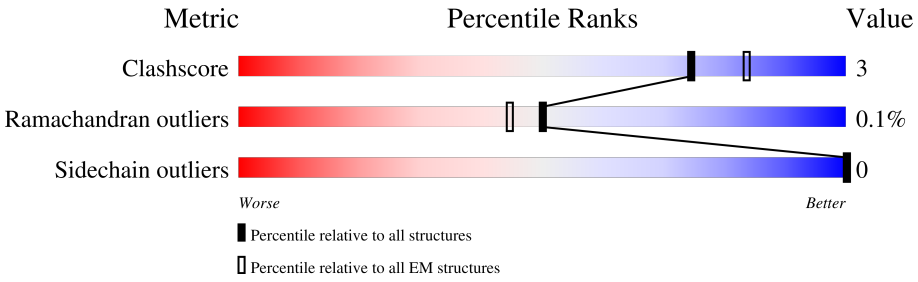
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.5

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.39 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	2A	505	90% 10%
2	2B	284	7% 45% 5% 50%
3	2C	153	23% 93% 7%
4	2D	382	64% 5% 30%
5	2E	175	51% 49%
6	2F	96	19% 86% 10%
7	2G	125	19% 62% 10% 27%
8	2H	148	27% 72% 5% 23%

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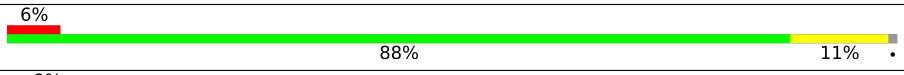
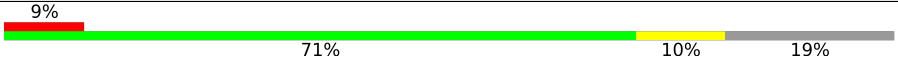
Mol	Chain	Length	Quality of chain
9	2I	101	
10	2J	105	
11	2K	58	
12	2L	87	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
18	CUA	2C	301	-	-	X	-

2 Entry composition (i)

There are 20 unique types of molecules in this entry. The entry contains 14202 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 Cytochrome c oxidase subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	2A	504	3888	2600	618	643	27	0	0

- Molecule 2 is a protein called Cytochrome c oxidase polypeptide II.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	2B	141	1169	774	188	201	6	0	0

- Molecule 3 is a protein called cytochrome-c oxidase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2C	153	1212	776	206	223	7	0	0

- Molecule 4 is a protein called Cytochrome c oxidase subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	2D	266	2079	1373	334	351	21	0	0

- Molecule 5 is a protein called Cox5b.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	2E	90	737	478	114	144	1	0	0

- Molecule 6 is a protein called Cox5c.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	2F	86	706	456	122	126	2	0	0

- Molecule 7 is a protein called Cox6a.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	2G	91	Total	C	N	O	S	0	0
			733	484	120	124	5		

- Molecule 8 is a protein called Cox6b.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	2H	114	Total	C	N	O	S	0	0
			954	606	159	185	4		

- Molecule 9 is a protein called Cox7c.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	2I	72	Total	C	N	O	0	0
			594	393	98	103		

- Molecule 10 is a protein called Cytochrome c oxidase subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	2J	104	Total	C	N	O	S	0	0
			816	522	144	147	3		

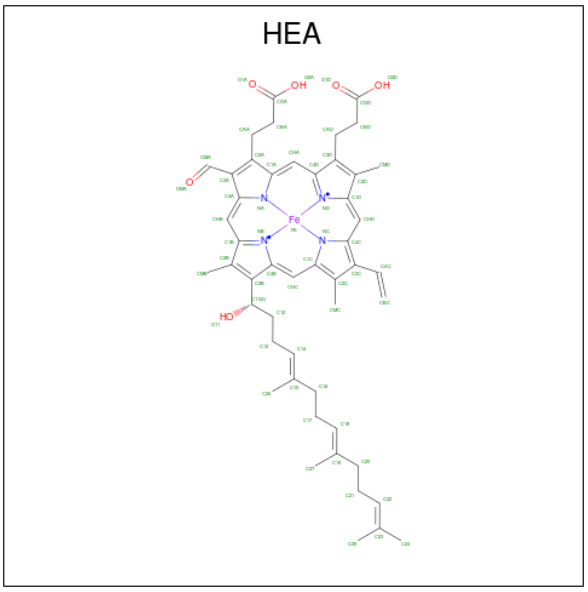
- Molecule 11 is a protein called Cox7a.

Mol	Chain	Residues	Atoms				AltConf	Trace
11	2K	47	Total	C	N	O	0	0
			382	249	63	70		

- Molecule 12 is a protein called CoxIn.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	2L	76	Total	C	N	O	S	0	0
			605	390	100	111	4		

- Molecule 13 is HEME-A (three-letter code: HEA) (formula: $C_{49}H_{56}FeN_4O_6$).



Mol	Chain	Residues	Atoms					AltConf
13	2A	1	Total	C	Fe	N	O	0
			60	49	1	4	6	
13	2A	1	Total	C	Fe	N	O	0
			60	49	1	4	6	

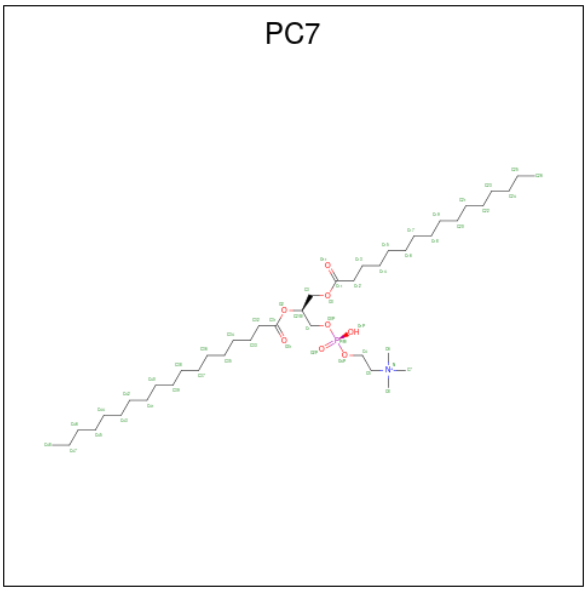
- Molecule 14 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

Mol	Chain	Residues	Atoms		AltConf
14	2A	1	Total	Cu	0
			1	1	

- Molecule 15 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

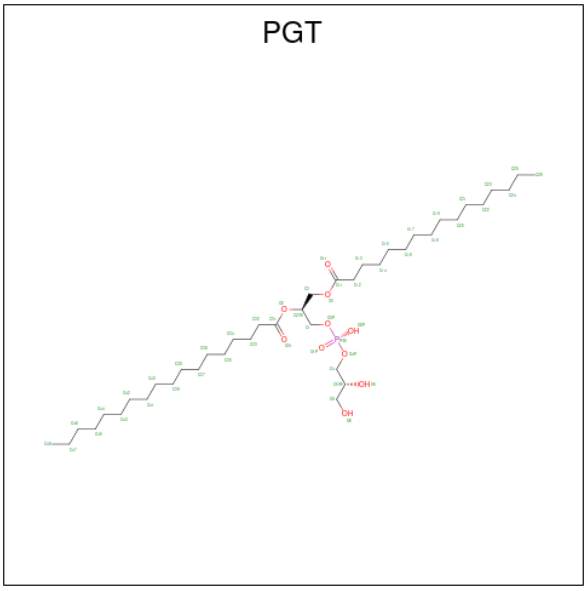
Mol	Chain	Residues	Atoms		AltConf
15	2A	1	Total	Mg	0
			1	1	

- Molecule 16 is (7S)-4-HYDROXY-N,N,N-TRIMETHYL-9-OXO-7-[(PALMITOYLOXY)METHYL]-3,5,8-TRIOXA-4-PHOSPHAHEXACOSAN-1-AMINIUM 4-OXIDE (three-letter code: PC7) (formula: $C_{42}H_{85}NO_8P$).



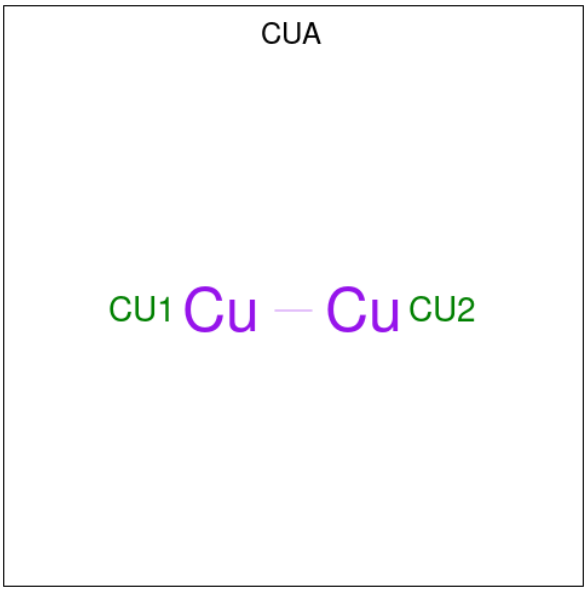
Mol	Chain	Residues	Atoms					AltConf
16	2A	1	Total	C	N	O	P	0
			27	17	1	8	1	

- Molecule 17 is (1S)-2-{[{[(2R)-2,3-DIHYDROXYPROPYL]OXY}(HYDROXY)PHOSPHORYL]OXY}-1-[(PALMITOYLOXY)METHYL]ETHYL STEARATE (three-letter code: PGT) (formula: $C_{40}H_{79}O_{10}P$).



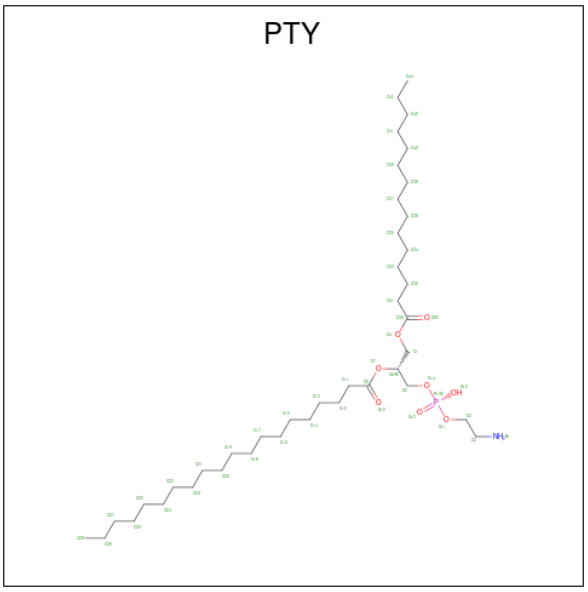
Mol	Chain	Residues	Atoms				AltConf
17	2A	1	Total	C	O	P	0
			33	22	10	1	

- Molecule 18 is DINUCLEAR COPPER ION (three-letter code: CUA) (formula: Cu_2).



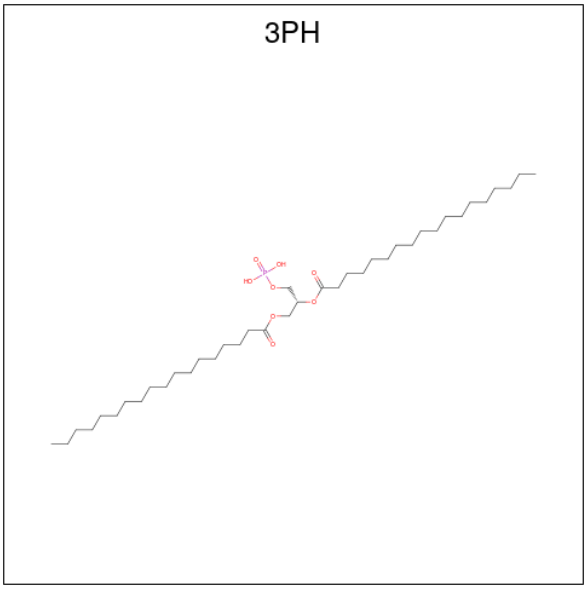
Mol	Chain	Residues	Atoms		AltConf
18	2C	1	Total	Cu	0
			2	2	

- Molecule 19 is PHOSPHATIDYLETHANOLAMINE (three-letter code: PTY) (formula: $C_{40}H_{80}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
19	2D	1	Total	C	N	O	P	0
			35	25	1	8	1	
19	2F	1	Total	C	N	O	P	0
			34	24	1	8	1	

- Molecule 20 is 1,2-DIACYL-GLYCEROL-3-SN-PHOSPHATE (three-letter code: 3PH) (formula: $C_{39}H_{77}O_8P$).



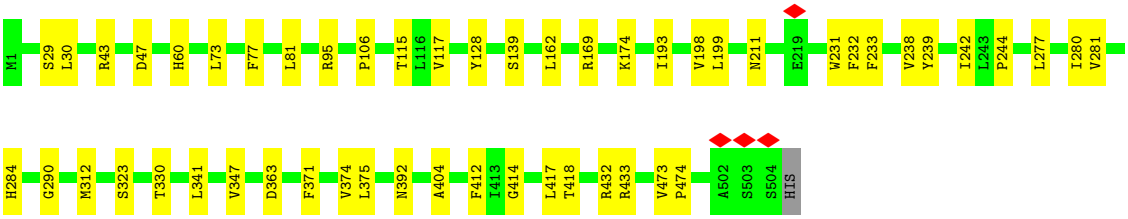
Mol	Chain	Residues	Atoms				AltConf
20	2D	1	Total	C	O	P	0
			32	23	8	1	
20	2I	1	Total	C	O	P	0
			42	33	8	1	

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.

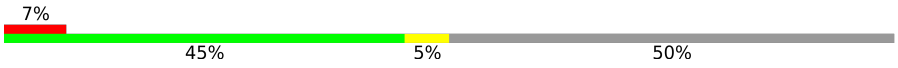
• Molecule 1: Cytochrome c oxidase subunit 1

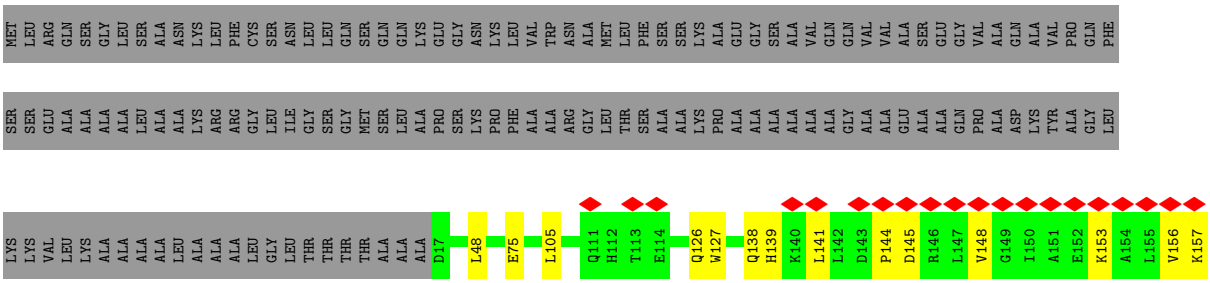
Chain 2A:



• Molecule 2: Cytochrome c oxidase polypeptide II

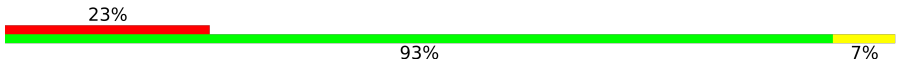
Chain 2B:

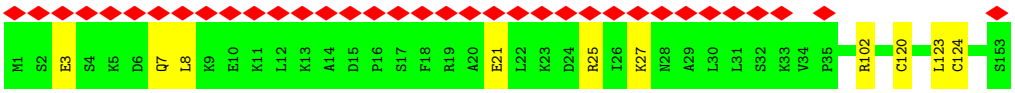




• Molecule 3: cytochrome-c oxidase

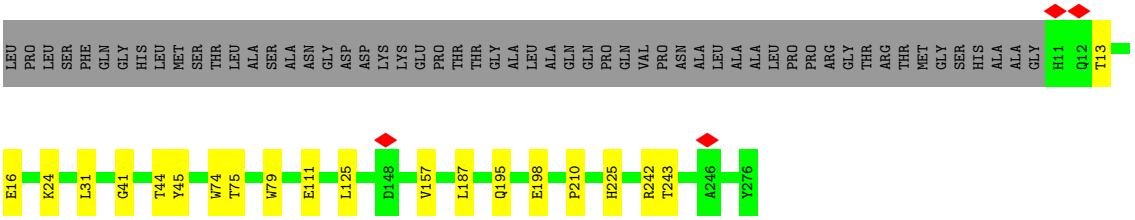
Chain 2C:





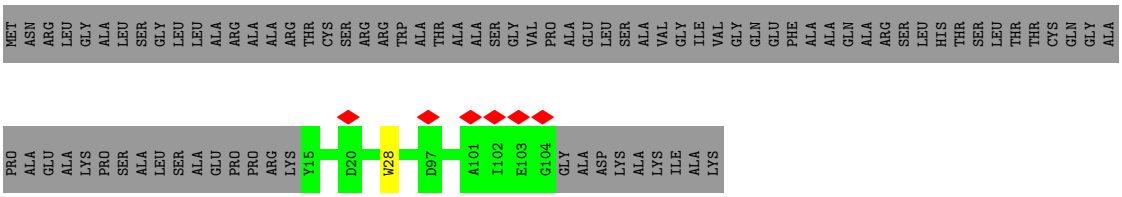
• Molecule 4: Cytochrome c oxidase subunit 3

Chain 2D:



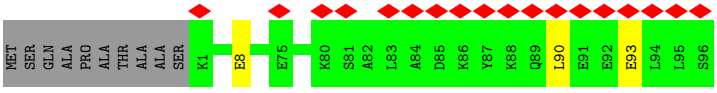
• Molecule 5: Cox5b

Chain 2E:



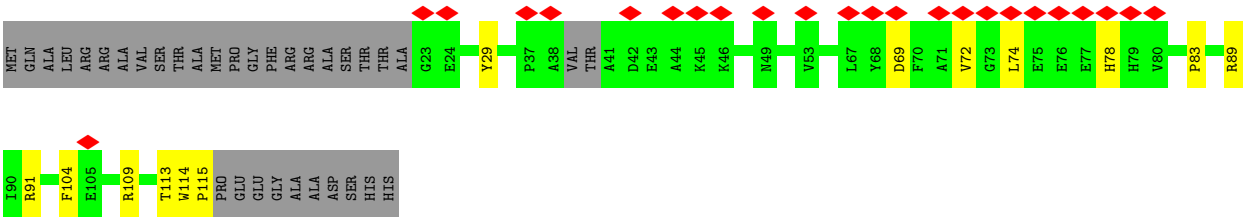
• Molecule 6: Cox5c

Chain 2F:



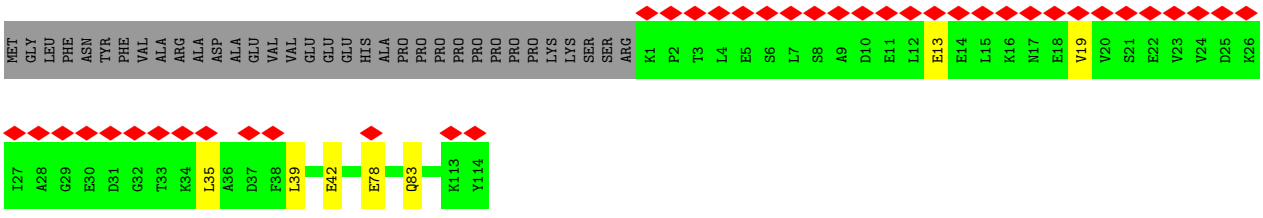
• Molecule 7: Cox6a

Chain 2G:



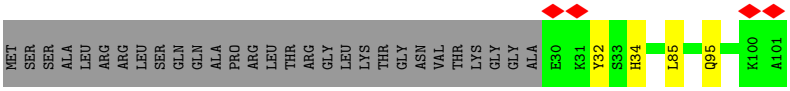
• Molecule 8: Cox6b

Chain 2H:

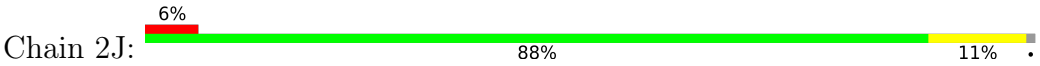


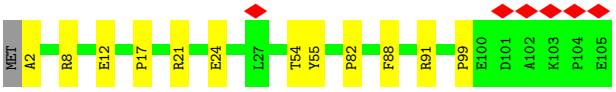
• Molecule 9: Cox7c

Chain 2I:

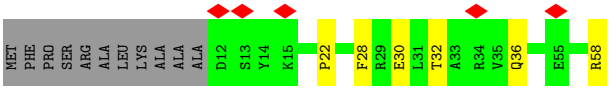


• Molecule 10: Cytochrome c oxidase subunit

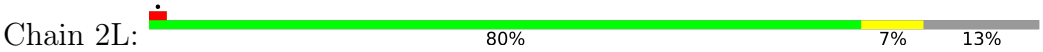


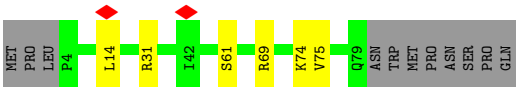


• Molecule 11: Cox7a



• Molecule 12: CoxIn





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	83443	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	36.27	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	165000	Depositor
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	0.850	Depositor
Minimum map value	-0.453	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.020	Depositor
Recommended contour level	0.135	Depositor
Map size (Å)	589.6, 589.6, 589.6	wwPDB
Map dimensions	588, 588, 588	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0027211, 1.0027211, 1.0027211	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PC7, PGT, CU, MG, HEA, CUA, PTY, 3PH

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	2A	0.33	0/4011	0.55	1/5484 (0.0%)
2	2B	0.31	0/1204	0.51	0/1641
3	2C	0.30	0/1237	0.53	0/1676
4	2D	0.32	0/2152	0.49	0/2937
5	2E	0.31	0/757	0.63	0/1029
6	2F	0.30	0/726	0.46	0/974
7	2G	0.30	0/762	0.58	1/1038 (0.1%)
8	2H	0.30	0/980	0.51	0/1325
9	2I	0.34	0/619	0.51	0/839
10	2J	0.31	0/839	0.51	0/1143
11	2K	0.31	0/392	0.51	0/531
12	2L	0.31	0/621	0.56	0/841
All	All	0.32	0/14300	0.53	2/19458 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	2G	74	LEU	CA-CB-CG	6.56	130.38	115.30
1	2A	417	LEU	CA-CB-CG	5.63	128.24	115.30

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	2A	3888	0	3936	34	0
2	2B	1169	0	1191	13	0
3	2C	1212	0	1243	11	0
4	2D	2079	0	2039	13	0
5	2E	737	0	706	0	0
6	2F	706	0	685	2	0
7	2G	733	0	708	10	0
8	2H	954	0	900	6	0
9	2I	594	0	553	4	0
10	2J	816	0	807	9	0
11	2K	382	0	367	6	0
12	2L	605	0	588	4	0
13	2A	120	0	108	2	0
14	2A	1	0	0	0	0
15	2A	1	0	0	0	0
16	2A	27	0	28	1	0
17	2A	33	0	36	1	0
18	2C	2	0	0	3	0
19	2D	35	0	43	1	0
19	2F	34	0	41	0	0
20	2D	32	0	37	0	0
20	2I	42	0	60	0	0
All	All	14202	0	14076	85	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.

The worst 5 of 85 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)
3:2C:120:CYS:SG	18:2C:301:CUA:CU2	1.01	1.51
7:2G:78:HIS:O	7:2G:109:ARG:NH1	1.85	1.09
3:2C:120:CYS:HG	18:2C:301:CUA:CU2	0.94	0.78
3:2C:124:CYS:SG	18:2C:301:CUA:CU1	1.75	0.74
1:2A:375:LEU:HD13	13:2A:602:HEA:HAC	1.74	0.69

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	2A	502/505 (99%)	489 (97%)	13 (3%)	0	100	100
2	2B	139/284 (49%)	136 (98%)	3 (2%)	0	100	100
3	2C	151/153 (99%)	144 (95%)	7 (5%)	0	100	100
4	2D	264/382 (69%)	255 (97%)	9 (3%)	0	100	100
5	2E	88/175 (50%)	85 (97%)	2 (2%)	1 (1%)	12	18
6	2F	84/96 (88%)	81 (96%)	3 (4%)	0	100	100
7	2G	87/125 (70%)	78 (90%)	9 (10%)	0	100	100
8	2H	112/148 (76%)	108 (96%)	4 (4%)	0	100	100
9	2I	70/101 (69%)	67 (96%)	3 (4%)	0	100	100
10	2J	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
11	2K	45/58 (78%)	44 (98%)	1 (2%)	0	100	100
12	2L	74/87 (85%)	70 (95%)	4 (5%)	0	100	100
All	All	1718/2219 (77%)	1657 (96%)	60 (4%)	1 (0%)	50	65

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	2E	28	TRP

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	2A	408/409 (100%)	408 (100%)	0	100	100
2	2B	132/224 (59%)	132 (100%)	0	100	100
3	2C	137/137 (100%)	137 (100%)	0	100	100
4	2D	211/294 (72%)	211 (100%)	0	100	100
5	2E	79/137 (58%)	79 (100%)	0	100	100
6	2F	66/72 (92%)	66 (100%)	0	100	100
7	2G	75/100 (75%)	75 (100%)	0	100	100
8	2H	103/132 (78%)	103 (100%)	0	100	100
9	2I	58/80 (72%)	58 (100%)	0	100	100
10	2J	83/84 (99%)	83 (100%)	0	100	100
11	2K	39/46 (85%)	39 (100%)	0	100	100
12	2L	63/74 (85%)	63 (100%)	0	100	100
All	All	1454/1789 (81%)	1454 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 11 ligands modelled in this entry, 2 are monoatomic - leaving 9 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	$\#\|Z\|>2$
13	HEA	2A	601	1	57,67,67	2.06	16 (28%)	61,103,103	2.43	25 (40%)
19	PTY	2D	301	-	34,34,49	0.57	0	37,39,54	0.57	0
19	PTY	2F	101	-	33,33,49	0.55	0	36,38,54	0.45	0
20	3PH	2I	201	-	41,41,47	0.67	1 (2%)	45,46,52	0.67	1 (2%)
13	HEA	2A	602	1	57,67,67	2.08	15 (26%)	61,103,103	2.42	23 (37%)
17	PGT	2A	606	-	32,32,50	0.61	0	35,38,56	0.60	0
16	PC7	2A	605	-	26,26,51	0.66	0	32,34,59	0.70	0
18	CUA	2C	301	-	0,1,1	-	-	-		
20	3PH	2D	302	-	31,31,47	0.77	1 (3%)	35,36,52	0.72	1 (2%)

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
13	HEA	2A	601	1	-	7/32/76/76	-
19	PTY	2D	301	-	-	13/38/38/53	-
19	PTY	2F	101	-	-	15/37/37/53	-
20	3PH	2I	201	-	-	14/43/43/49	-
13	HEA	2A	602	1	-	5/32/76/76	-
17	PGT	2A	606	-	-	10/37/37/55	-
16	PC7	2A	605	-	-	10/30/30/55	-
20	3PH	2D	302	-	-	19/33/33/49	-

The worst 5 of 33 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
13	2A	602	HEA	C3B-C2B	5.67	1.47	1.34
13	2A	601	HEA	C3A-C2A	5.34	1.47	1.40
13	2A	601	HEA	C3B-C2B	5.12	1.46	1.34
13	2A	602	HEA	CHC-C4B	4.98	1.47	1.35
13	2A	602	HEA	C3D-C2D	4.97	1.47	1.36

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
13	2A	601	HEA	C3D-C4D-ND	6.78	116.92	110.36
13	2A	602	HEA	C3D-C4D-ND	6.73	116.87	110.36
13	2A	602	HEA	C2B-C1B-NB	5.66	116.66	109.88
13	2A	602	HEA	C2D-C1D-ND	5.64	116.53	109.84
13	2A	601	HEA	C3B-C4B-NB	5.60	116.48	109.84

There are no chirality outliers.

5 of 93 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	2A	602	HEA	C3B-C11-C12-C13
13	2A	602	HEA	O11-C11-C12-C13
13	2A	602	HEA	C15-C16-C17-C18
19	2D	301	PTY	C11-C8-O7-C6
19	2F	101	PTY	C3-O11-P1-O12

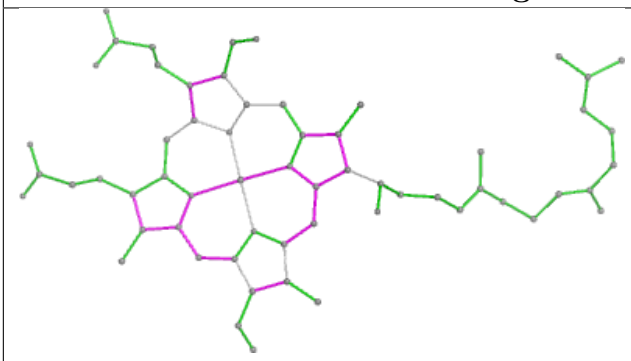
There are no ring outliers.

6 monomers are involved in 8 short contacts:

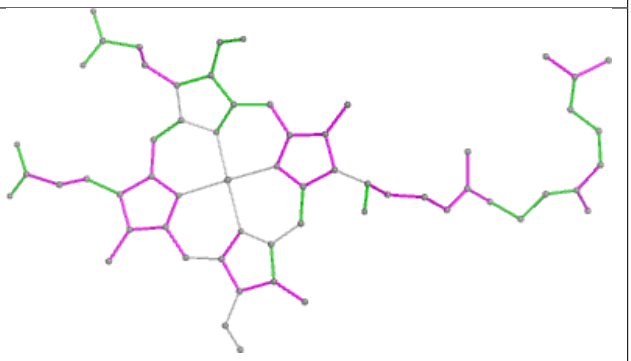
Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	2A	601	HEA	1	0
19	2D	301	PTY	1	0
13	2A	602	HEA	1	0
17	2A	606	PGT	1	0
16	2A	605	PC7	1	0
18	2C	301	CUA	3	0

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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

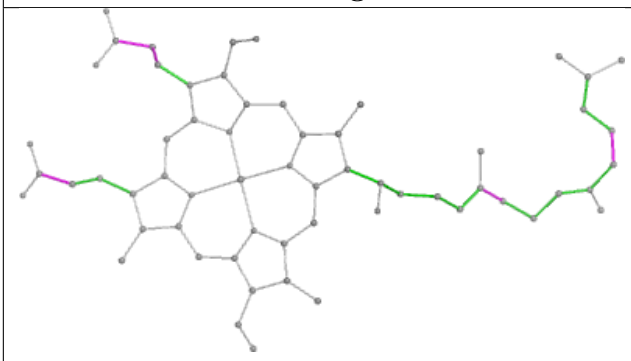
Ligand HEA 2A 601



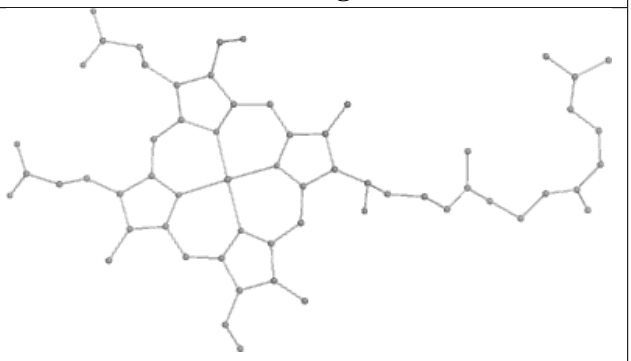
Bond lengths



Bond angles

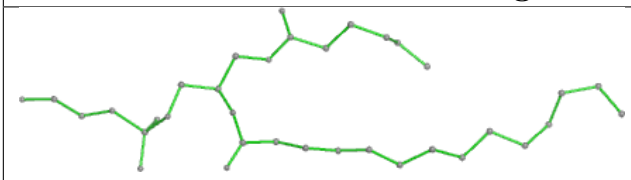


Torsions

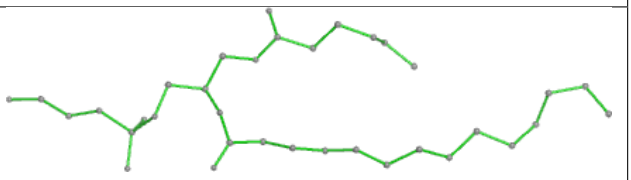


Rings

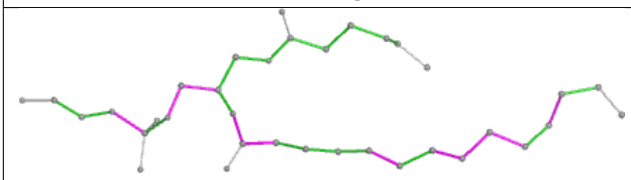
Ligand PTY 2D 301



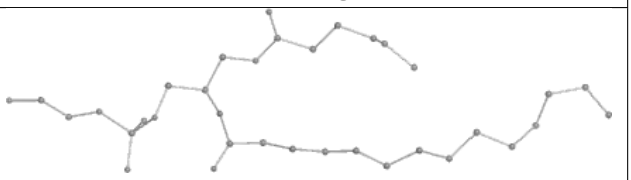
Bond lengths



Bond angles

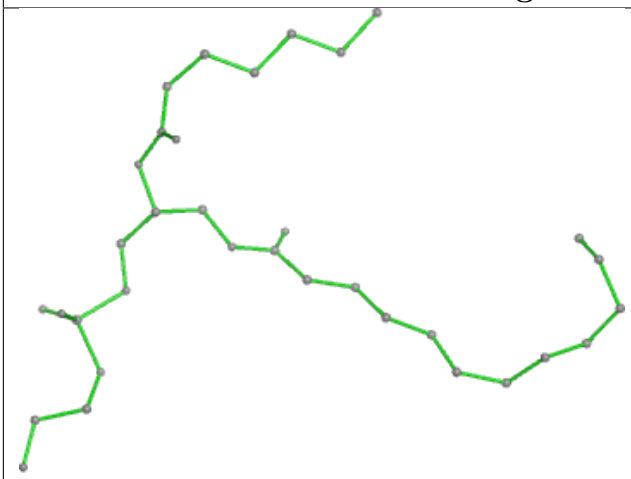


Torsions

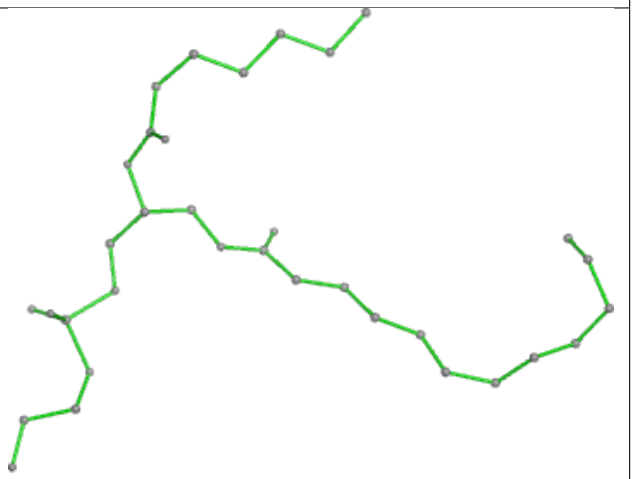


Rings

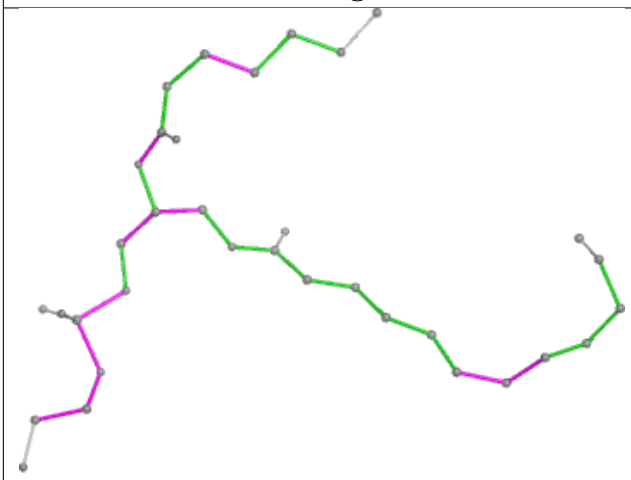
Ligand PTY 2F 101



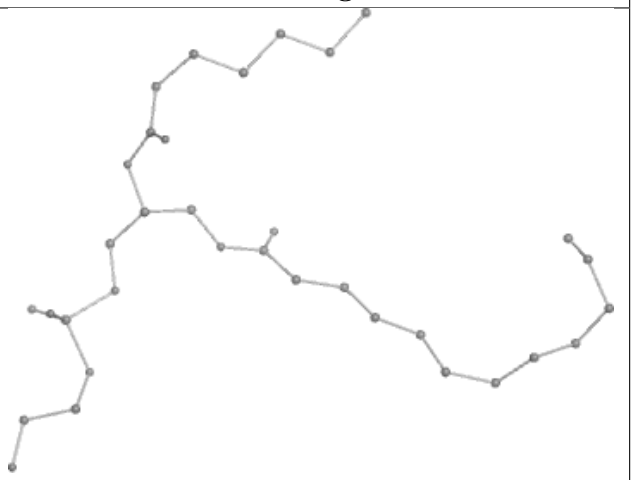
Bond lengths



Bond angles

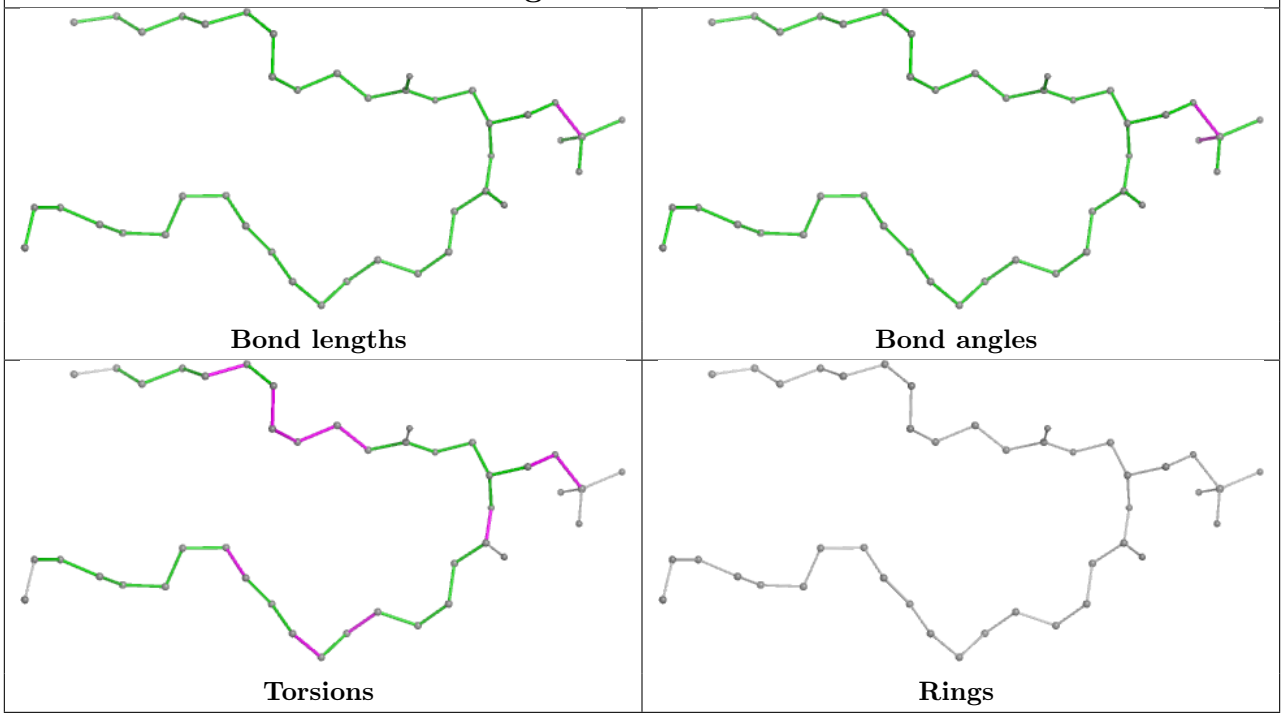


Torsions

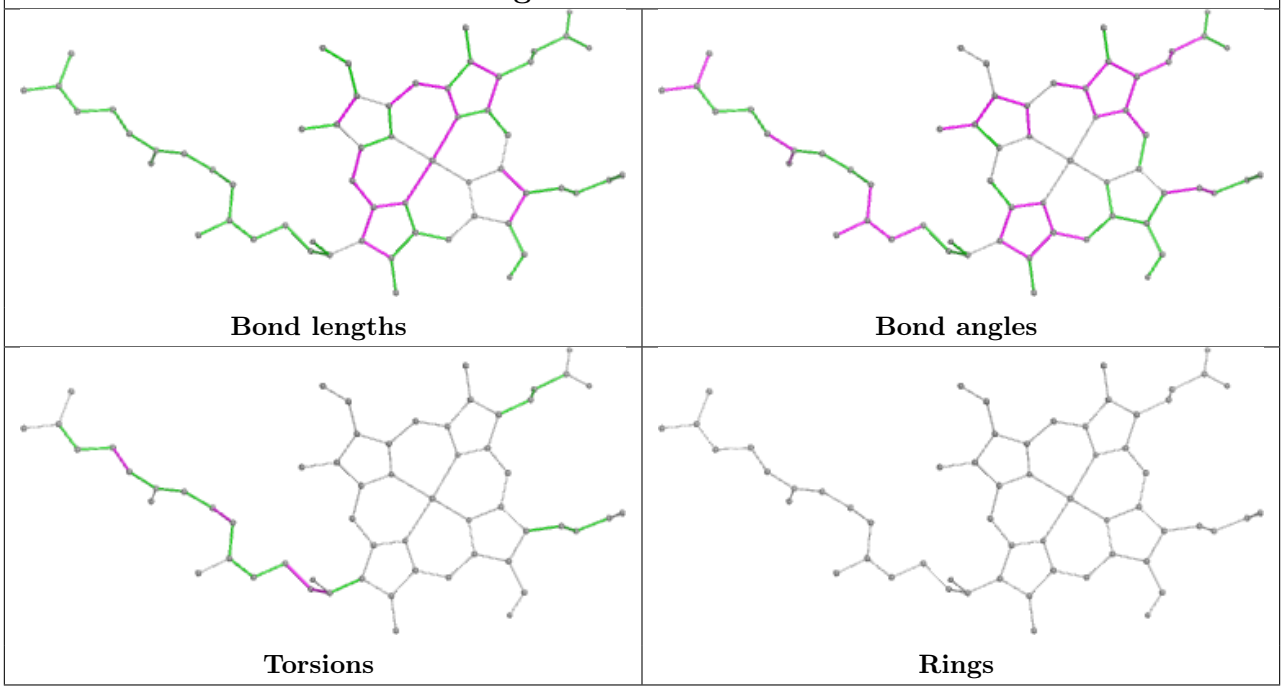


Rings

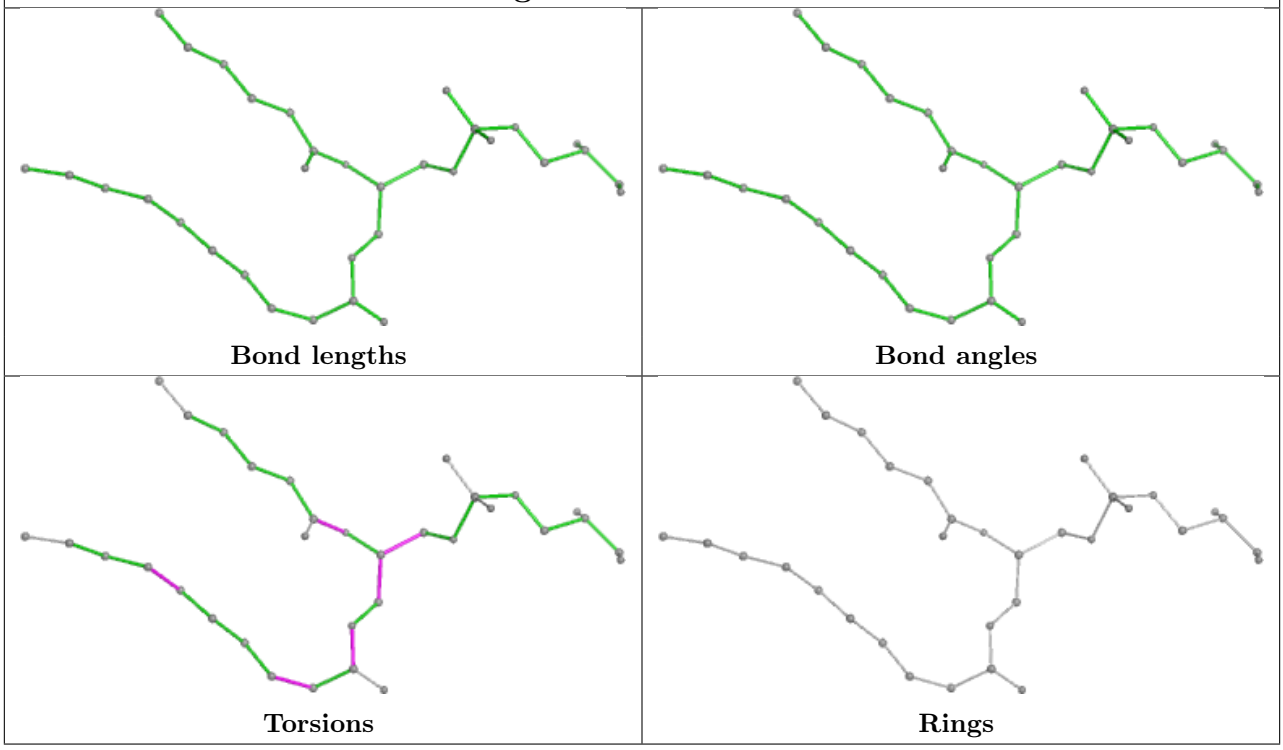
Ligand 3PH 2I 201



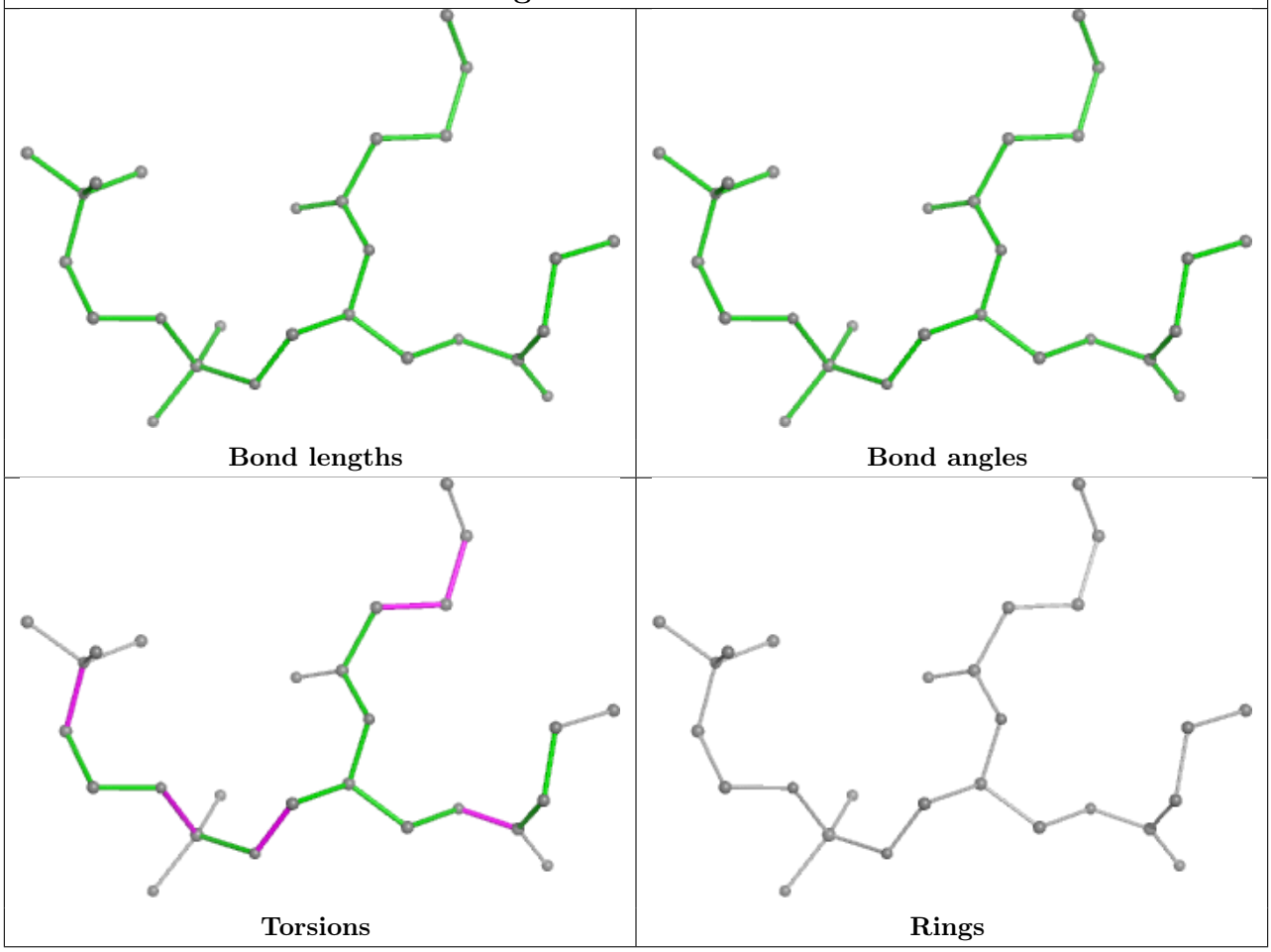
Ligand HEA 2A 602



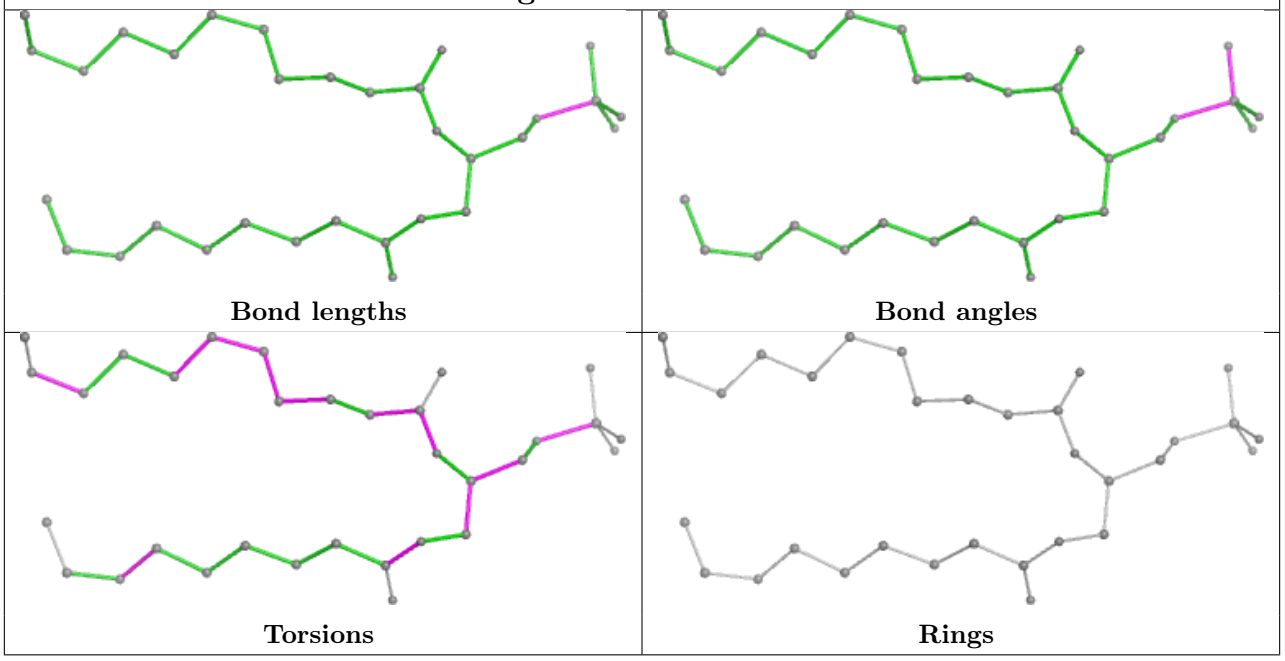
Ligand PGT 2A 606



Ligand PC7 2A 605



Ligand 3PH 2D 302



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

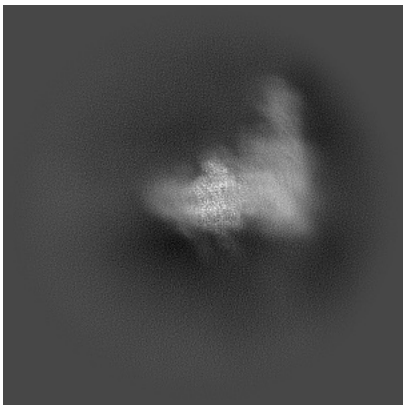
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-50205. These allow visual inspection of the internal detail of the map and identification of artifacts.

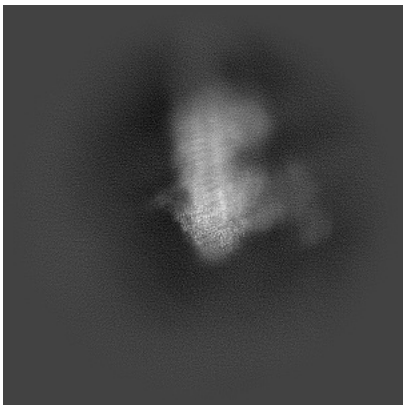
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

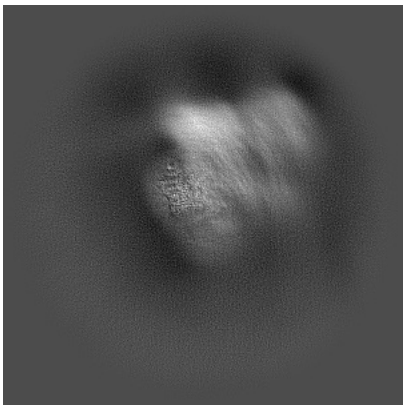
6.1.1 Primary map



X

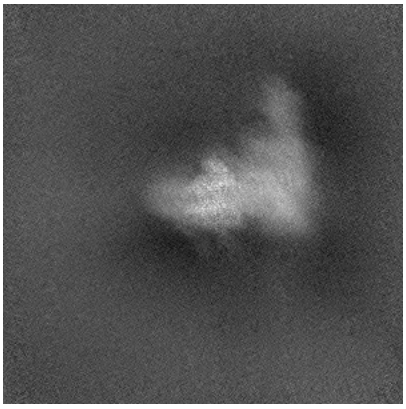


Y

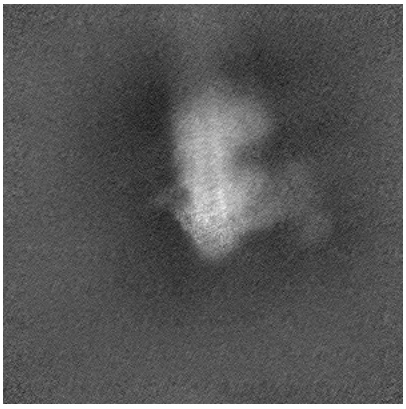


Z

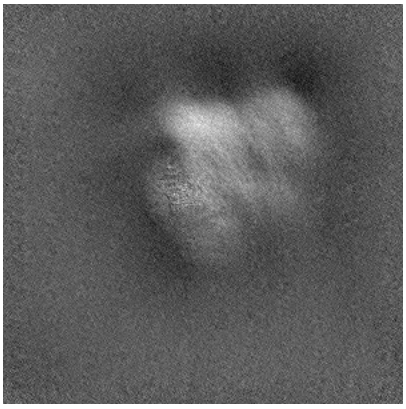
6.1.2 Raw map



X



Y

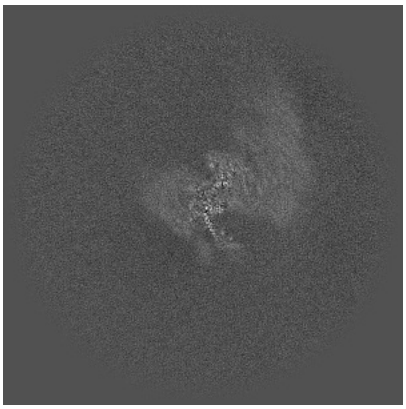


Z

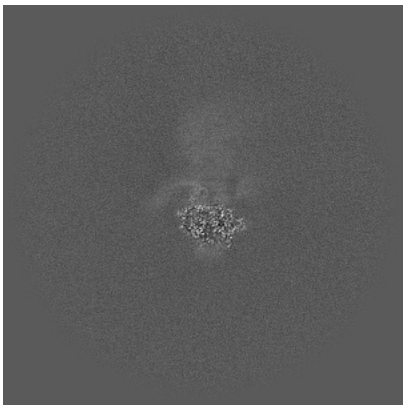
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

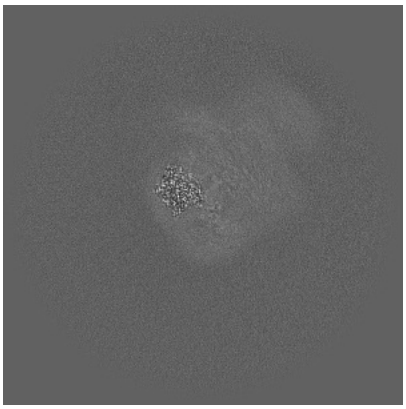
6.2.1 Primary map



X Index: 294

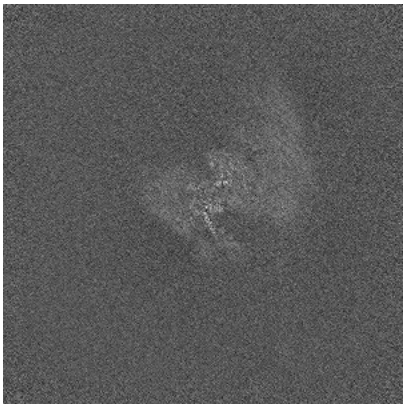


Y Index: 294

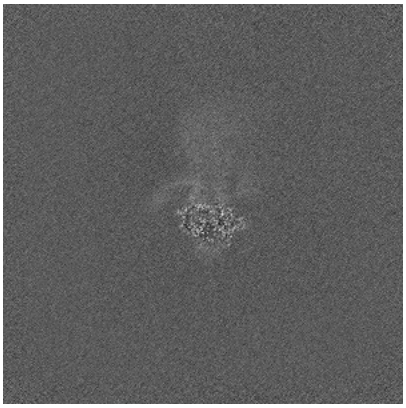


Z Index: 294

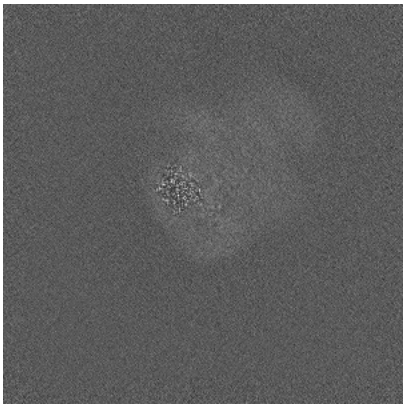
6.2.2 Raw map



X Index: 294



Y Index: 294

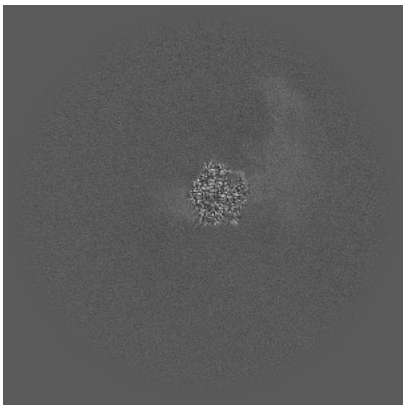


Z Index: 294

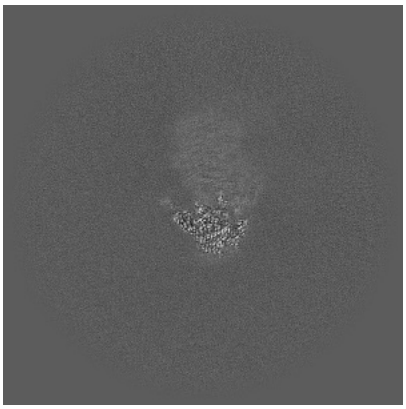
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

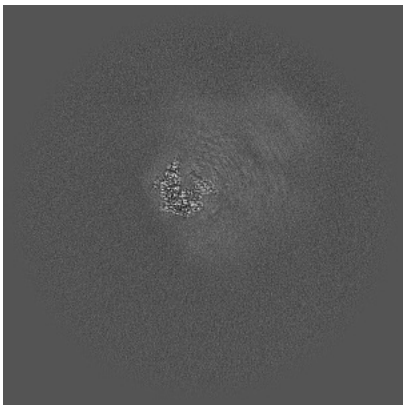
6.3.1 Primary map



X Index: 256

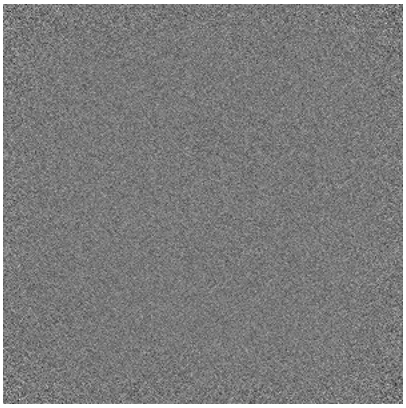


Y Index: 317

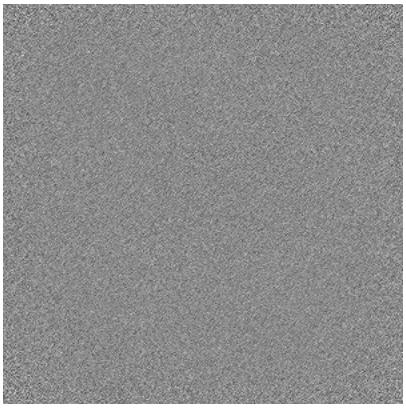


Z Index: 322

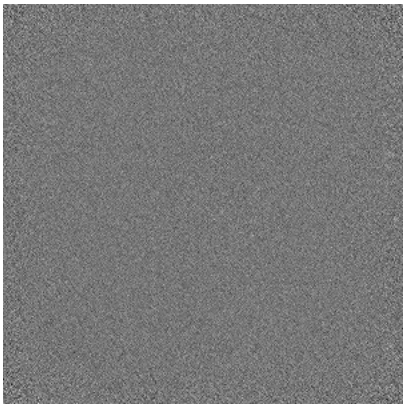
6.3.2 Raw map



X Index: 0



Y Index: 0

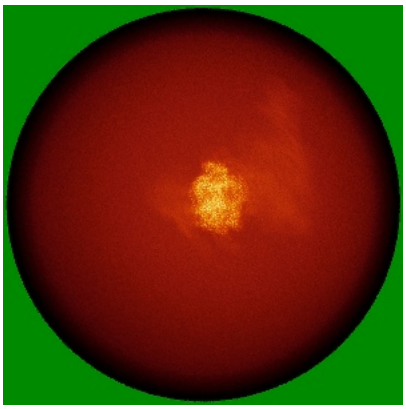


Z Index: 0

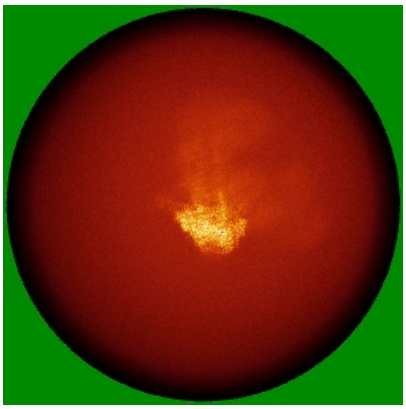
The images above show the largest variance slices of the map in three orthogonal directions.

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

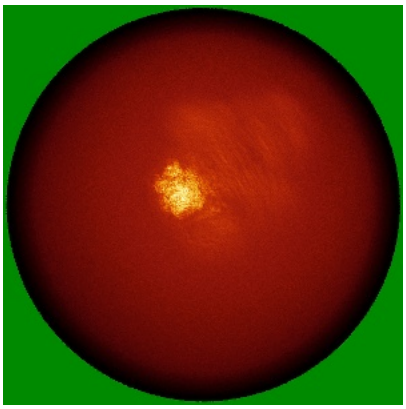
6.4.1 Primary map



X

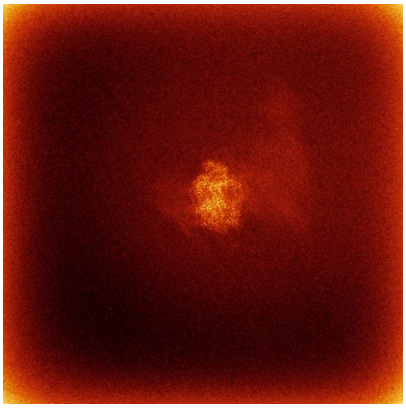


Y

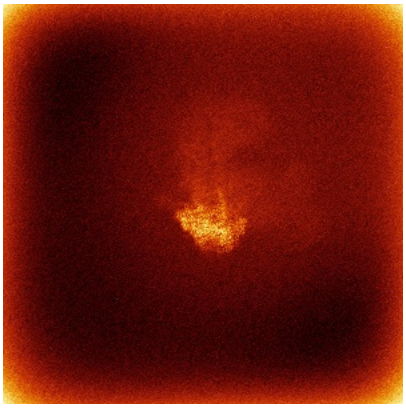


Z

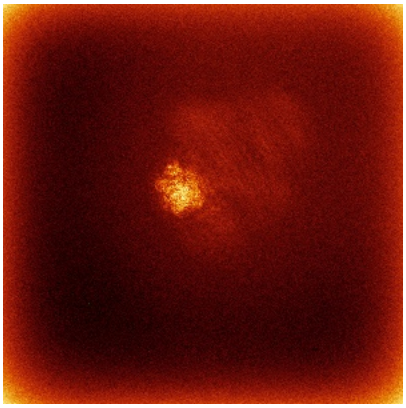
6.4.2 Raw map



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

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.135. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X Y Z

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

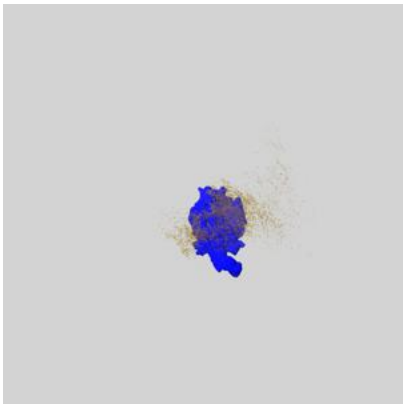
6.6 Mask visualisation (i)

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

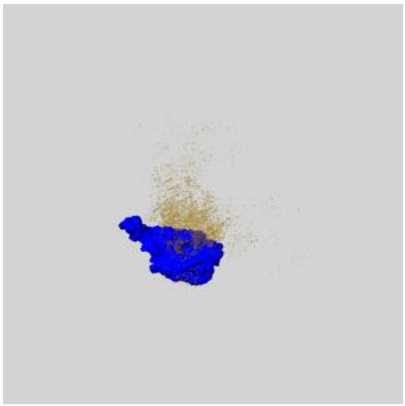
A mask typically either:

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

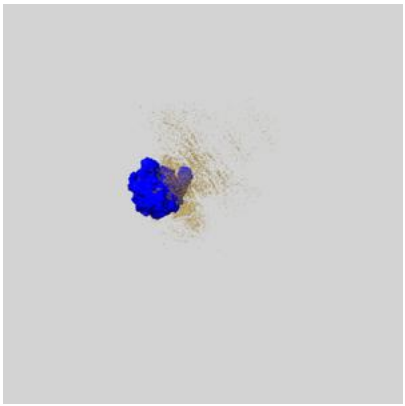
6.6.1 emd_50205_msk_1.map (i)



X



Y

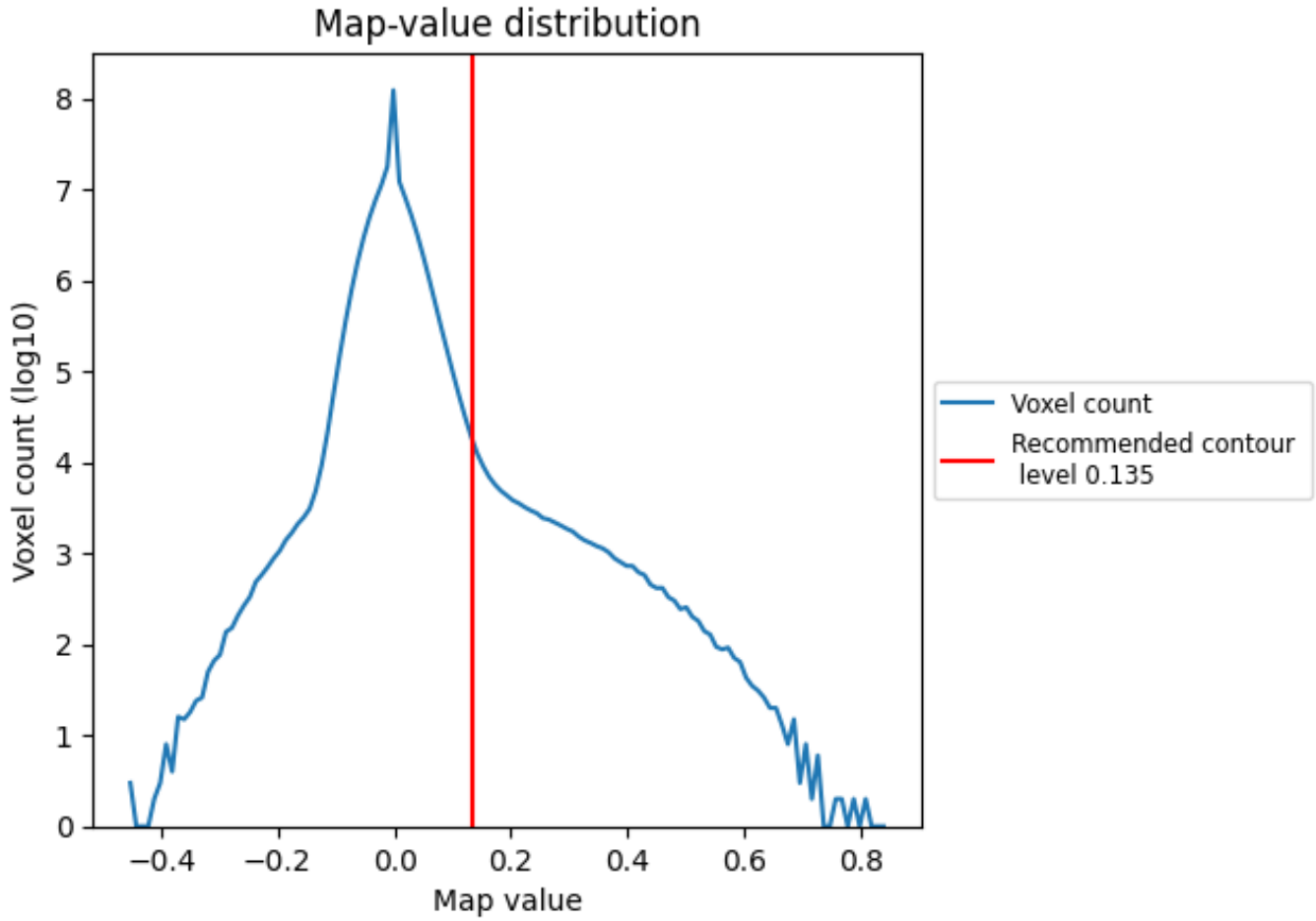


Z

7 Map analysis

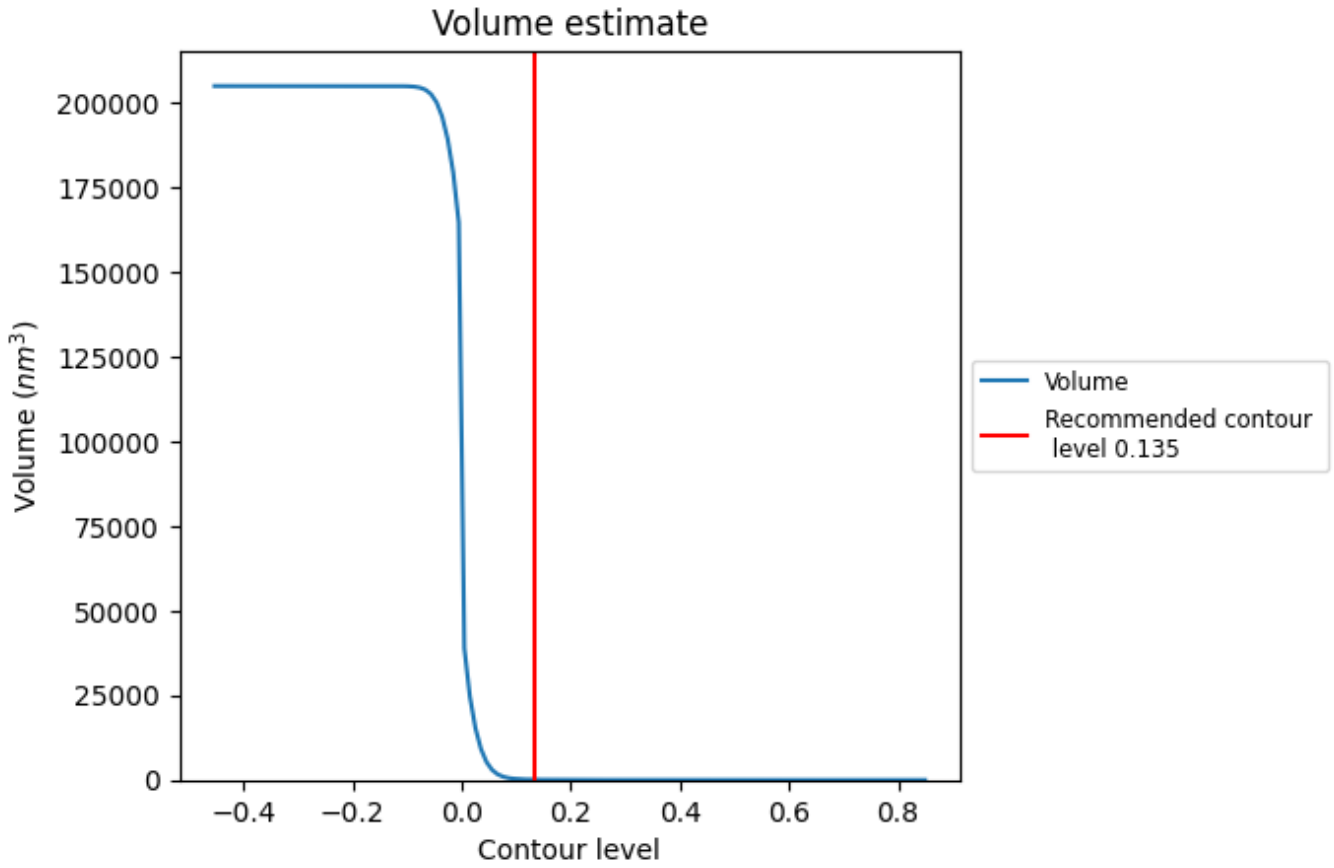
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

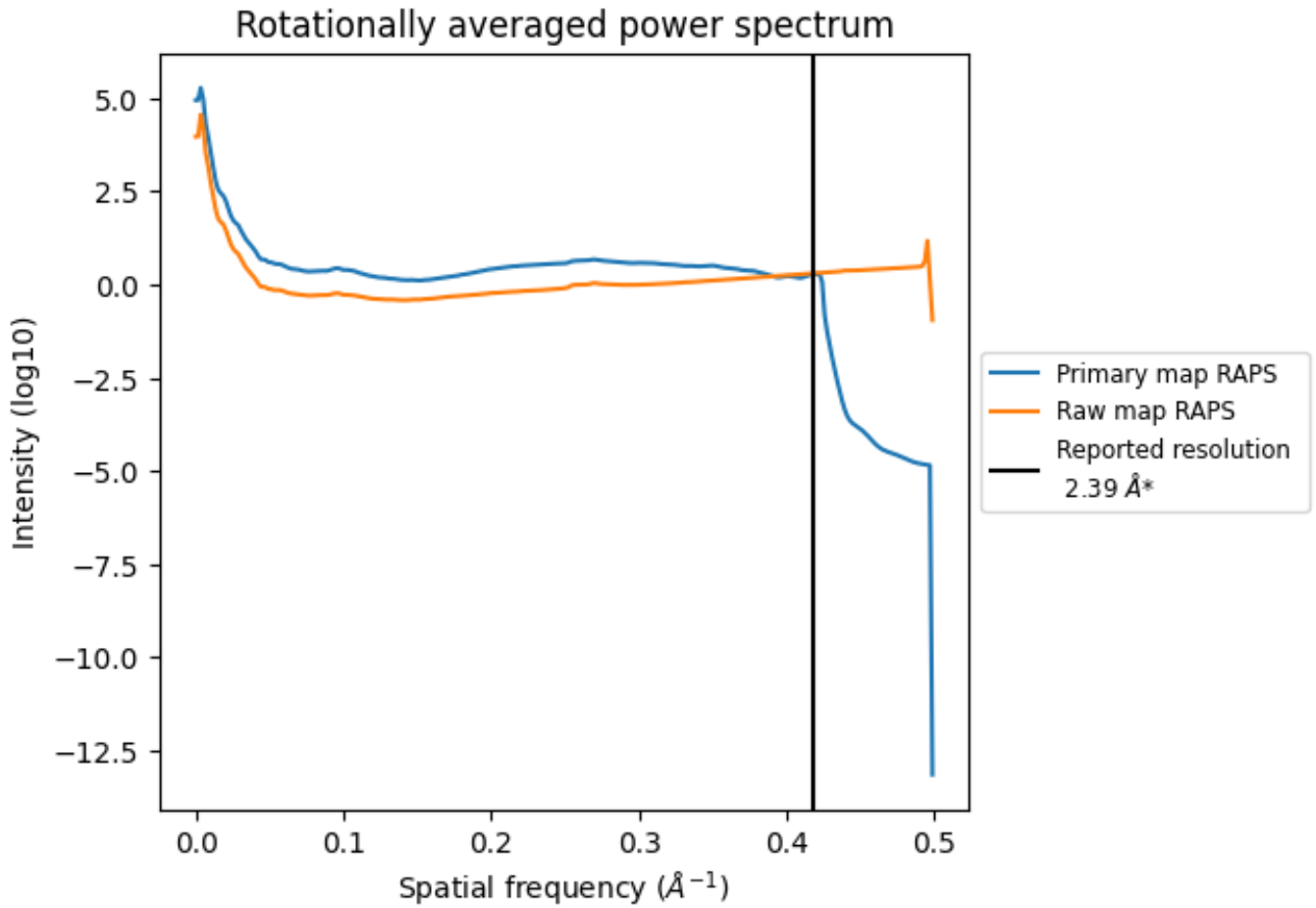
7.2 Volume estimate (i)



The volume at the recommended contour level is 102 nm^3; this corresponds to an approximate mass of 92 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 (i)

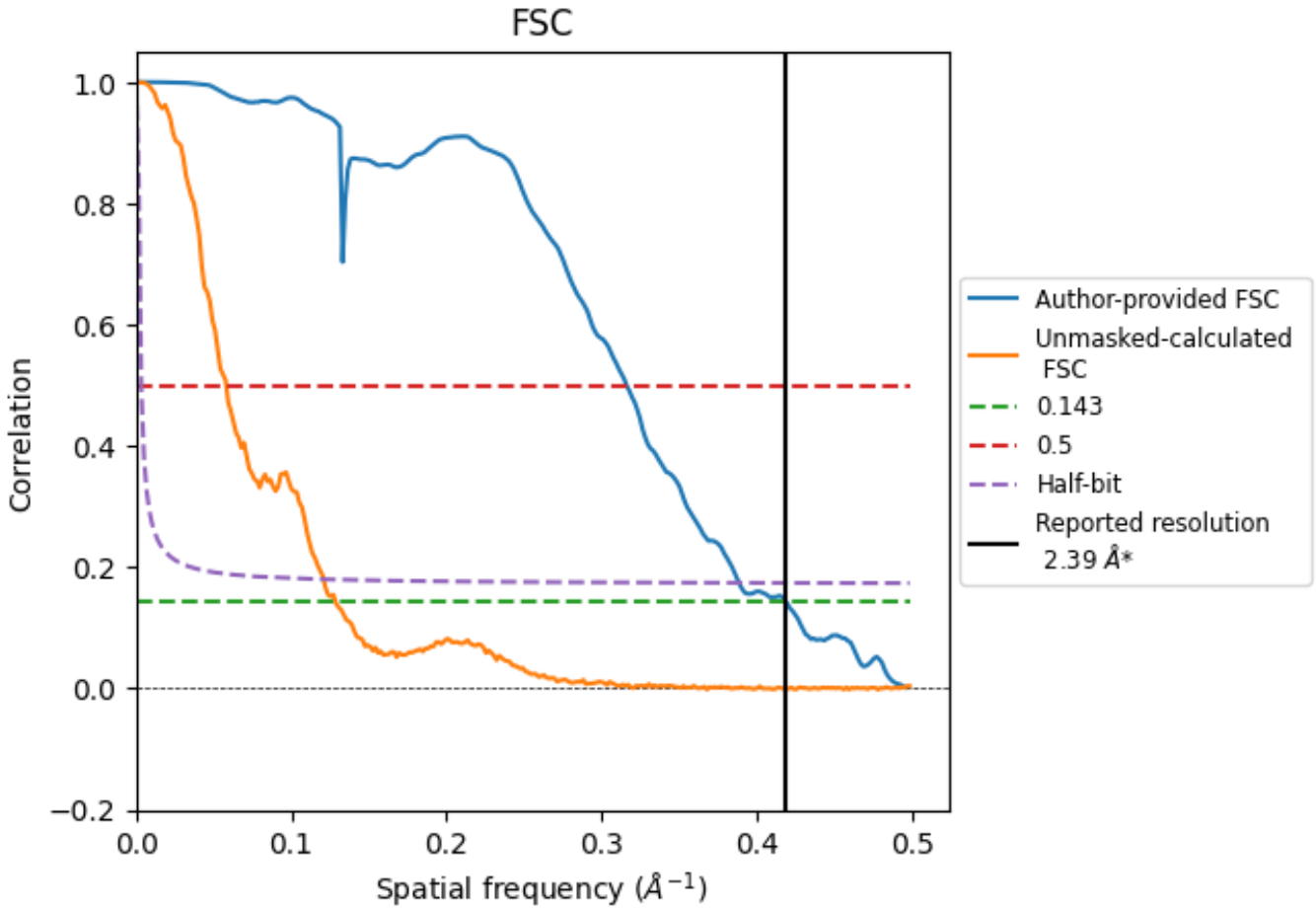


*Reported resolution corresponds to spatial frequency of 0.418 $Å^{-1}$

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.418 Å^{-1}

8.2 Resolution estimates (i)

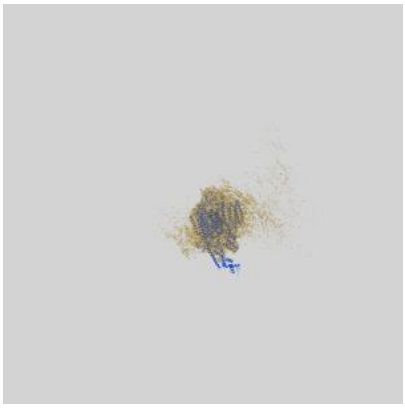
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.39	-	-
Author-provided FSC curve	2.39	3.16	2.57
Unmasked-calculated*	7.78	17.24	8.27

*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 7.78 differs from the reported value 2.39 by more than 10 %

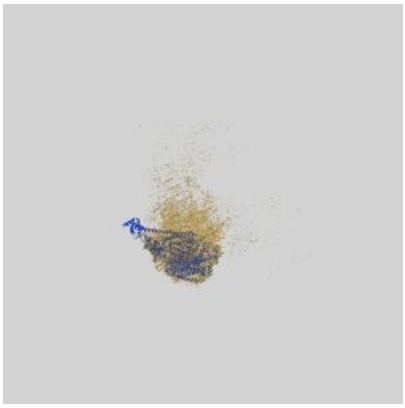
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-50205 and PDB model 9F60. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay



X

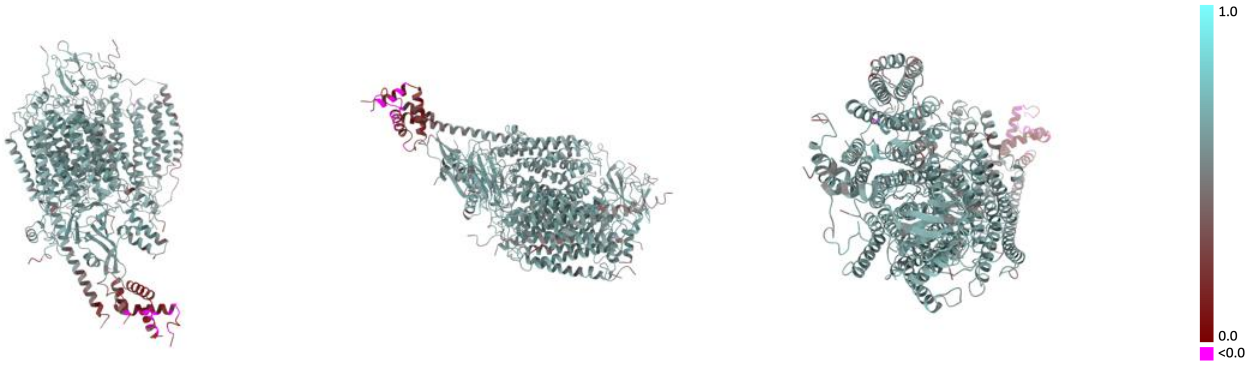


Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.135 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

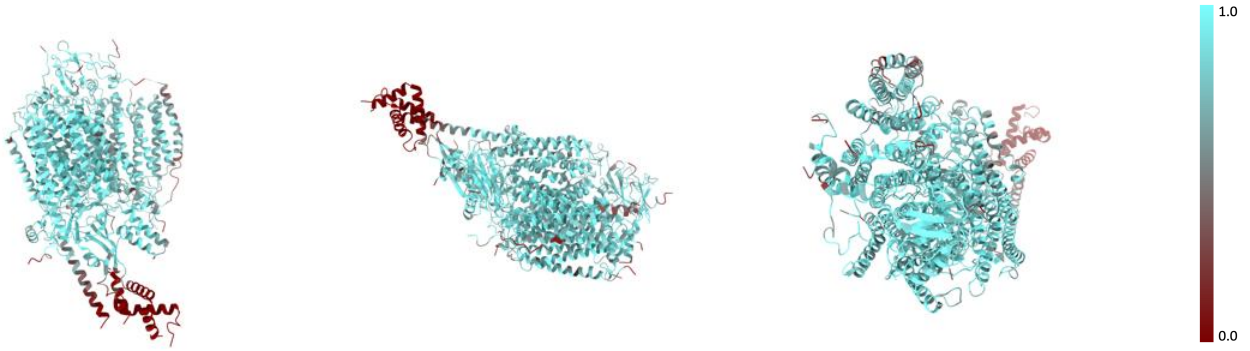
9.2 Q-score mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

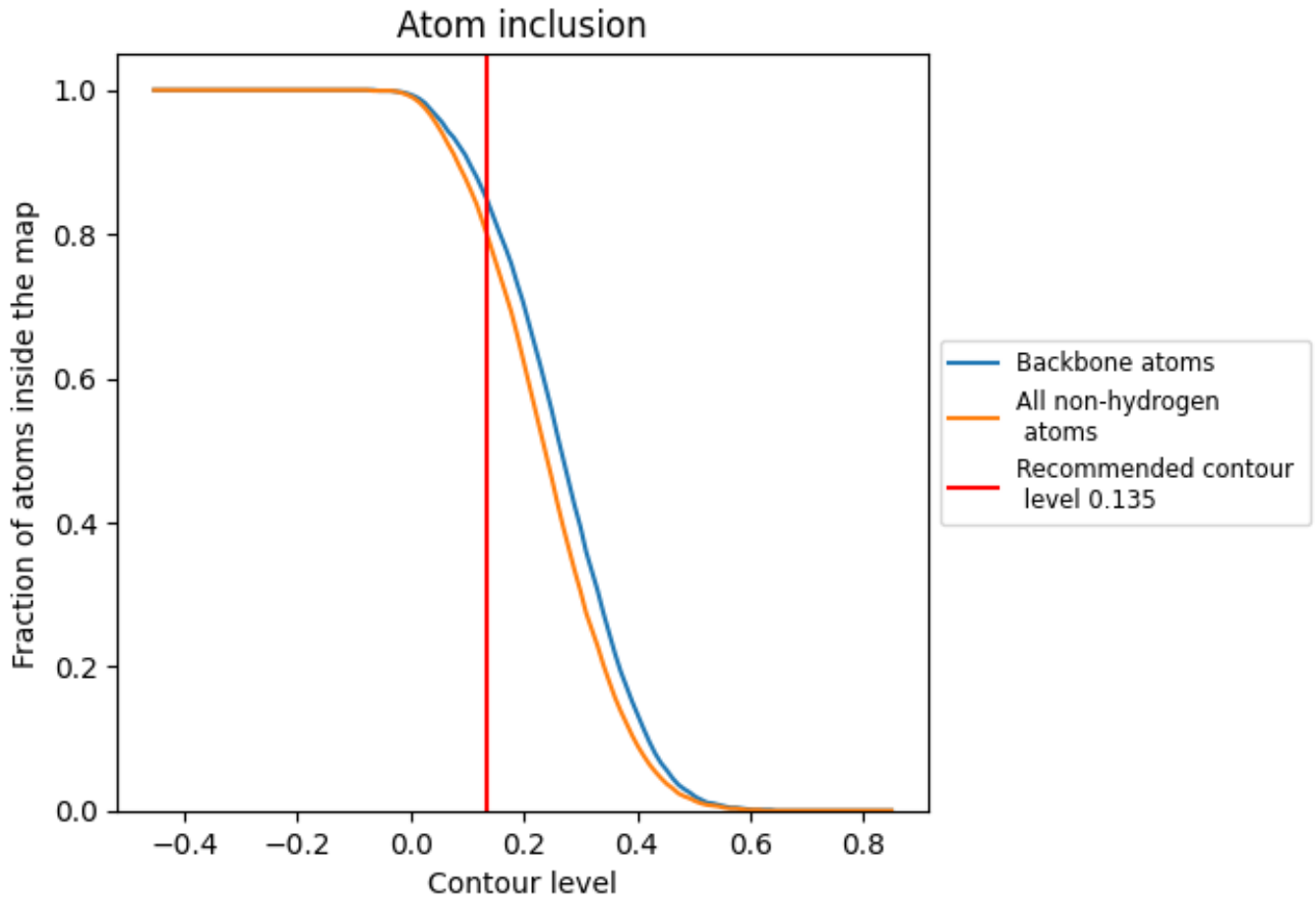
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.135).

9.4 Atom inclusion (i)



At the recommended contour level, 85% of all backbone atoms, 80% 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 (0.135) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8000	0.5680
2A	0.9200	0.6170
2B	0.7950	0.5700
2C	0.7100	0.5200
2D	0.8600	0.5950
2E	0.7870	0.5620
2F	0.6940	0.5210
2G	0.6300	0.5180
2H	0.5700	0.4410
2I	0.7820	0.5800
2J	0.7970	0.5760
2K	0.7390	0.5640
2L	0.7310	0.5400