



Full wwPDB EM Validation Report ⓘ

Mar 5, 2026 – 12:13 PM UTC

PDB ID : 9EII / pdb_00009eii
EMDB ID : EMD-48084
Title : Import stalled PINK1 TOM complex, symmetry expanded
Authors : Kirk, N.S.; Glukhova, A.; Callegari, S.; Komander, D.
Deposited on : 2024-11-26
Resolution : 2.75 Å (reported)
Based on initial models : ., 7CP9

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

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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:

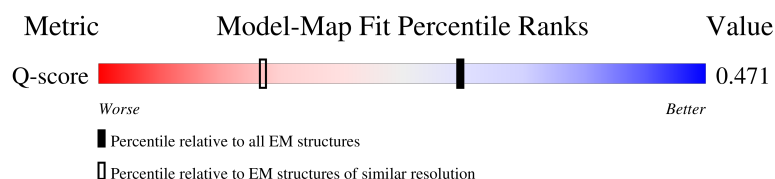
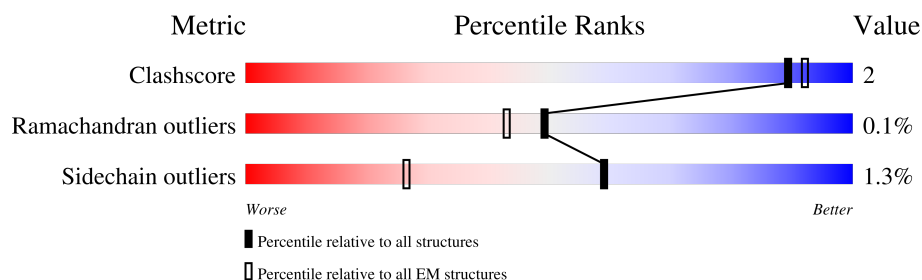
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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 2.75 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	10570 (2.25 - 3.25)

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	B	603	
2	D	145	
3	F	294	
4	I	361	

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Mol	Chain	Length	Quality of chain
4	J	361	
5	L	51	
5	Z	51	
6	N	55	
6	X	55	
7	P	74	
7	V	74	
8	R	142	
8	T	142	

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 14448 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 Serine/threonine-protein kinase PINK1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	443	Total	C	N	O	S	0	0
			3411	2172	609	604	26		

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	582	ASP	-	expression tag	UNP Q9BXM7
B	583	TYR	-	expression tag	UNP Q9BXM7
B	584	LYS	-	expression tag	UNP Q9BXM7
B	585	ASP	-	expression tag	UNP Q9BXM7
B	586	HIS	-	expression tag	UNP Q9BXM7
B	587	ASP	-	expression tag	UNP Q9BXM7
B	588	GLY	-	expression tag	UNP Q9BXM7
B	589	ASP	-	expression tag	UNP Q9BXM7
B	590	TYR	-	expression tag	UNP Q9BXM7
B	591	LYS	-	expression tag	UNP Q9BXM7
B	592	ASP	-	expression tag	UNP Q9BXM7
B	593	HIS	-	expression tag	UNP Q9BXM7
B	594	ASP	-	expression tag	UNP Q9BXM7
B	595	ILE	-	expression tag	UNP Q9BXM7
B	596	ASP	-	expression tag	UNP Q9BXM7
B	597	TYR	-	expression tag	UNP Q9BXM7
B	598	LYS	-	expression tag	UNP Q9BXM7
B	599	ASP	-	expression tag	UNP Q9BXM7
B	600	ASP	-	expression tag	UNP Q9BXM7
B	601	ASP	-	expression tag	UNP Q9BXM7
B	602	ASP	-	expression tag	UNP Q9BXM7
B	603	LYS	-	expression tag	UNP Q9BXM7

- Molecule 2 is a protein called Mitochondrial import receptor subunit TOM20 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	116	Total	C	N	O	S	0	0
			941	603	167	168	3		

- Molecule 3 is a protein called Voltage-dependent anion-selective channel protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	F	282	Total	C	N	O	S	0	0
			2131	1342	355	425	9		

- Molecule 4 is a protein called Mitochondrial import receptor subunit TOM40 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	I	285	Total	C	N	O	S	0	0
			2184	1390	375	409	10		
4	J	285	Total	C	N	O	S	0	0
			2184	1390	375	409	10		

- Molecule 5 is a protein called Mitochondrial import receptor subunit TOM5 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	L	48	Total	C	N	O	S	0	0
			400	263	69	65	3		
5	Z	34	Total	C	N	O	S	0	0
			288	190	51	45	2		

- Molecule 6 is a protein called Mitochondrial import receptor subunit TOM7 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	N	55	Total	C	N	O	S	0	0
			442	294	75	71	2		
6	X	51	Total	C	N	O	S	0	0
			410	272	70	67	1		

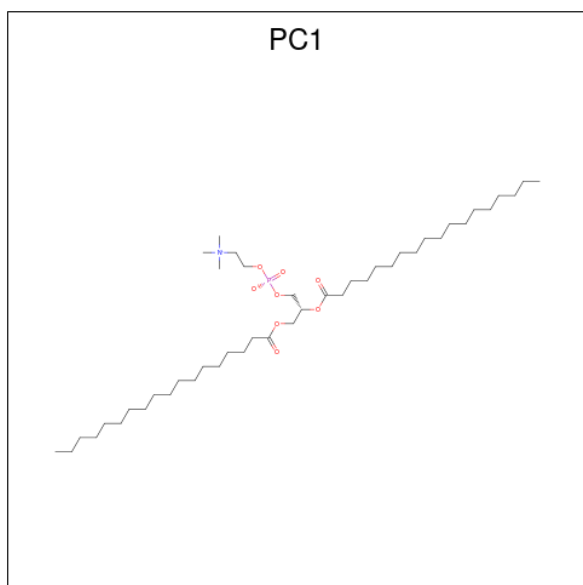
- Molecule 7 is a protein called Mitochondrial import receptor subunit TOM6 homolog.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	P	39	Total	C	N	O	0	0
			326	209	63	54		
7	V	42	Total	C	N	O	0	0
			350	225	66	59		

- Molecule 8 is a protein called Mitochondrial import receptor subunit TOM22 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	R	59	Total	C	N	O	S	0	0
			478	309	81	85	3		
8	T	50	Total	C	N	O	S	0	0
			417	271	70	73	3		

- Molecule 9 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PC1) (formula: C₄₄H₈₈NO₈P).

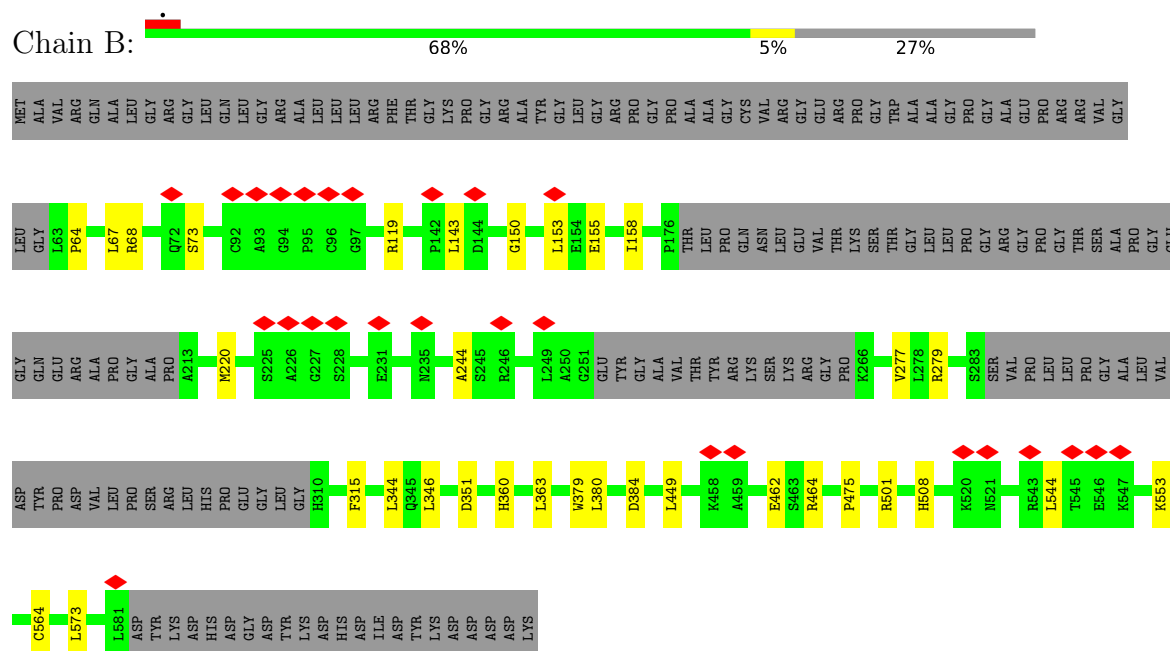


Mol	Chain	Residues	Atoms					AltConf
9	F	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	I	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	I	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	I	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	J	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	N	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	N	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	R	1	Total	C	N	O	P	0
			54	44	1	8	1	
9	T	1	Total	C	N	O	P	0
			54	44	1	8	1	

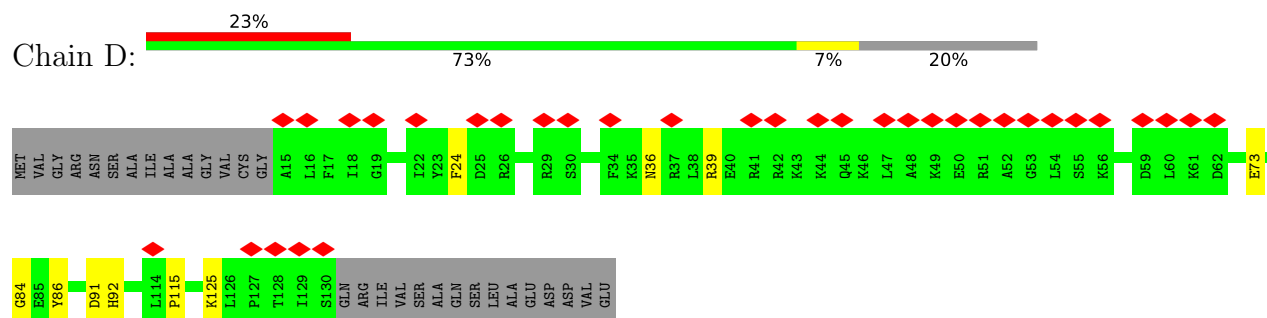
3 Residue-property plots

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: Serine/threonine-protein kinase PINK1, mitochondrial

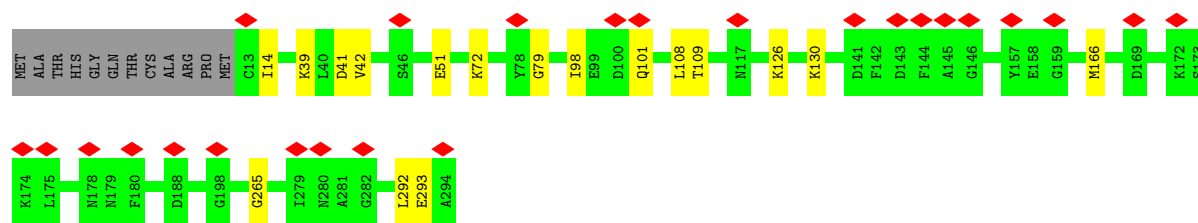


- Molecule 2: Mitochondrial import receptor subunit TOM20 homolog



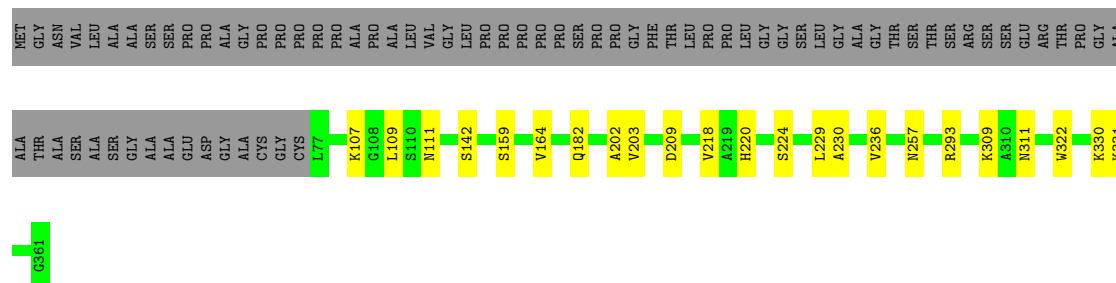
- Molecule 3: Voltage-dependent anion-selective channel protein 2





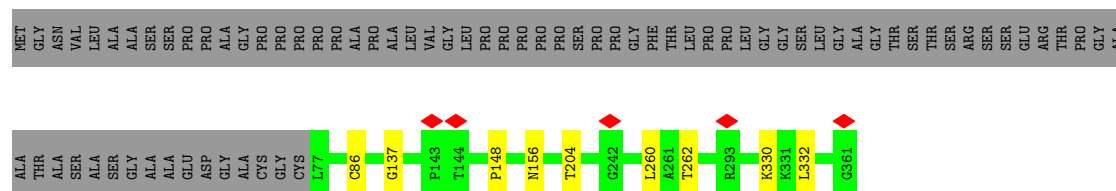
- Molecule 4: Mitochondrial import receptor subunit TOM40 homolog

Chain I: 73% 6% 21%



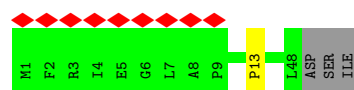
- Molecule 4: Mitochondrial import receptor subunit TOM40 homolog

Chain J: 76% 21%



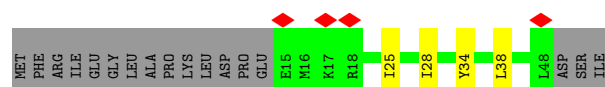
- Molecule 5: Mitochondrial import receptor subunit TOM5 homolog

Chain L: 18% 92% 6%



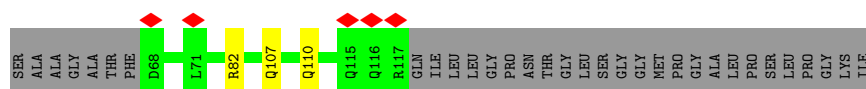
- Molecule 5: Mitochondrial import receptor subunit TOM5 homolog

Chain Z: 8% 59% 8% 33%



- Molecule 6: Mitochondrial import receptor subunit TOM7 homolog

Chain N: 7% 95% 5%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	791000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION; Patch CTF	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	52.4	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.236	Depositor
Minimum map value	-0.096	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.04	Depositor
Map size (Å)	319.872, 319.872, 319.872	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.833, 0.833, 0.833	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PC1

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	B	0.11	0/3479	0.32	0/4713
2	D	0.09	0/957	0.26	0/1286
3	F	0.11	0/2172	0.37	0/2935
4	I	0.14	0/2234	0.39	0/3031
4	J	0.13	0/2234	0.36	0/3031
5	L	0.12	0/406	0.39	0/542
5	Z	0.11	0/291	0.30	0/387
6	N	0.10	0/454	0.31	0/609
6	X	0.10	0/422	0.33	0/567
7	P	0.10	0/333	0.33	0/450
7	V	0.09	0/357	0.30	0/483
8	R	0.11	0/486	0.34	0/654
8	T	0.13	0/424	0.36	0/570
All	All	0.12	0/14249	0.35	0/19258

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

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	B	3411	0	3481	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	941	0	981	5	0
3	F	2131	0	2082	9	0
4	I	2184	0	2166	10	0
4	J	2184	0	2166	3	0
5	L	400	0	443	1	0
5	Z	288	0	325	2	0
6	N	442	0	468	2	0
6	X	410	0	423	3	0
7	P	326	0	320	0	0
7	V	350	0	346	0	0
8	R	478	0	487	3	0
8	T	417	0	428	2	0
9	F	54	0	88	0	0
9	I	162	0	264	2	0
9	J	54	0	88	0	0
9	N	108	0	176	0	0
9	R	54	0	88	0	0
9	T	54	0	88	2	0
All	All	14448	0	14908	52	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 2.

All (52) 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)
4:I:257:ASN:ND2	9:I:403:PC1:O14	2.20	0.73
6:X:7:GLU:OE1	6:X:10:GLN:NE2	2.28	0.67
6:X:40:ALA:HB2	6:X:46:GLU:HA	1.76	0.66
3:F:79:GLY:HA3	3:F:101:GLN:HG3	1.78	0.66
1:B:351:ASP:OD2	1:B:501:ARG:NH1	2.29	0.64
4:J:156:ASN:ND2	9:T:201:PC1:O12	2.30	0.63
1:B:449:LEU:HD11	1:B:475:PRO:HD3	1.83	0.60
1:B:143:LEU:O	1:B:279:ARG:NH2	2.22	0.59
2:D:91:ASP:OD1	2:D:125:LYS:NZ	2.30	0.56
2:D:36:ASN:OD1	2:D:39:ARG:NH1	2.38	0.56
1:B:360:HIS:NE2	1:B:384:ASP:O	2.39	0.55
6:N:40:ALA:HB2	6:N:47:PRO:HD3	1.89	0.55
8:R:104:GLU:OE1	8:R:107:GLN:NE2	2.39	0.54
1:B:544:LEU:HD13	2:D:115:PRO:HD3	1.90	0.53
3:F:98:ILE:HD11	3:F:108:LEU:HB3	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:T:107:GLN:HA	8:T:110:GLN:HG2	1.93	0.51
3:F:265:GLY:O	3:F:293:GLU:N	2.46	0.49
3:F:109:THR:HB	3:F:126:LYS:HB2	1.95	0.48
1:B:462:GLU:OE2	1:B:464:ARG:NH1	2.46	0.48
1:B:64:PRO:HA	1:B:67:LEU:HB2	1.95	0.47
1:B:119:ARG:NH2	4:I:209:ASP:OD2	2.47	0.47
4:I:330:LYS:HE3	9:I:402:PC1:H321	1.95	0.47
3:F:42:VAL:HG22	3:F:292:LEU:HD21	1.96	0.47
4:I:311:ASN:HB3	4:I:331:LYS:HB2	1.97	0.46
1:B:153:LEU:HD11	1:B:158:ILE:HD11	1.98	0.45
8:R:105:LYS:NZ	8:R:109:GLU:OE2	2.38	0.45
2:D:73:GLU:OE1	2:D:92:HIS:ND1	2.36	0.45
4:I:202:ALA:HB3	4:I:220:HIS:HB2	2.00	0.44
1:B:220:MET:HE2	1:B:315:PHE:HE1	1.82	0.44
1:B:244:ALA:HA	1:B:277:VAL:HB	1.99	0.44
1:B:379:TRP:CH2	1:B:553:LYS:HE3	2.53	0.44
4:I:224:SER:HA	4:I:230:ALA:HA	2.00	0.44
4:J:86:CYS:HB3	4:J:262:THR:HG21	2.01	0.43
6:X:27:PHE:O	6:X:31:VAL:HG23	2.18	0.43
1:B:68:ARG:HD3	4:I:109:LEU:HD23	1.99	0.43
2:D:84:GLY:HA2	2:D:86:TYR:CE1	2.53	0.43
3:F:39:LYS:NZ	3:F:41:ASP:OD2	2.44	0.43
3:F:14:ILE:HG21	3:F:130:LYS:HB3	2.00	0.42
3:F:98:ILE:C	3:F:98:ILE:HD12	2.44	0.42
4:J:137:GLY:HA3	4:J:148:PRO:HD2	2.01	0.42
1:B:573:LEU:HD11	5:L:13:PRO:HB3	2.01	0.42
5:Z:34:TYR:CZ	5:Z:38:LEU:HD11	2.54	0.41
5:Z:25:ILE:HA	5:Z:28:ILE:HG22	2.02	0.41
3:F:51:GLU:HB3	3:F:72:LYS:HB2	2.01	0.41
4:I:107:LYS:NZ	6:N:55:GLY:OXT	2.47	0.41
1:B:150:GLY:H	1:B:155:GLU:CD	2.28	0.41
8:R:78:TYR:CZ	8:R:82:ARG:HD2	2.55	0.41
1:B:344:LEU:HD11	1:B:508:HIS:CE1	2.56	0.40
8:T:82:ARG:HH21	9:T:201:PC1:P	2.44	0.40
1:B:346:LEU:HD21	1:B:380:LEU:HD23	2.02	0.40
4:I:218:VAL:HG13	4:I:236:VAL:HG22	2.03	0.40
4:I:322:TRP:N	4:I:322:TRP:CD1	2.88	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	B	435/603 (72%)	423 (97%)	12 (3%)	0	100	100
2	D	114/145 (79%)	110 (96%)	4 (4%)	0	100	100
3	F	280/294 (95%)	261 (93%)	19 (7%)	0	100	100
4	I	283/361 (78%)	274 (97%)	8 (3%)	1 (0%)	30	50
4	J	283/361 (78%)	278 (98%)	5 (2%)	0	100	100
5	L	46/51 (90%)	42 (91%)	4 (9%)	0	100	100
5	Z	32/51 (63%)	32 (100%)	0	0	100	100
6	N	53/55 (96%)	52 (98%)	1 (2%)	0	100	100
6	X	49/55 (89%)	48 (98%)	1 (2%)	0	100	100
7	P	37/74 (50%)	37 (100%)	0	0	100	100
7	V	40/74 (54%)	39 (98%)	1 (2%)	0	100	100
8	R	57/142 (40%)	56 (98%)	1 (2%)	0	100	100
8	T	48/142 (34%)	48 (100%)	0	0	100	100
All	All	1757/2408 (73%)	1700 (97%)	56 (3%)	1 (0%)	49	71

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	I	203	VAL

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	B	360/478 (75%)	357 (99%)	3 (1%)	73	84
2	D	102/123 (83%)	101 (99%)	1 (1%)	68	81
3	F	230/239 (96%)	229 (100%)	1 (0%)	84	91
4	I	237/288 (82%)	229 (97%)	8 (3%)	32	57
4	J	237/288 (82%)	233 (98%)	4 (2%)	53	71
5	L	45/48 (94%)	45 (100%)	0	100	100
5	Z	33/48 (69%)	33 (100%)	0	100	100
6	N	46/46 (100%)	46 (100%)	0	100	100
6	X	42/46 (91%)	42 (100%)	0	100	100
7	P	32/59 (54%)	30 (94%)	2 (6%)	16	30
7	V	35/59 (59%)	35 (100%)	0	100	100
8	R	51/115 (44%)	50 (98%)	1 (2%)	48	69
8	T	46/115 (40%)	46 (100%)	0	100	100
All	All	1496/1952 (77%)	1476 (99%)	20 (1%)	59	76

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	73	SER
1	B	363	LEU
1	B	564	CYS
2	D	24	PHE
3	F	166	MET
4	I	111	ASN
4	I	142	SER
4	I	159	SER
4	I	164	VAL
4	I	182	GLN
4	I	229	LEU
4	I	293	ARG
4	I	309	LYS
4	J	204	THR
4	J	260	LEU
4	J	330	LYS
4	J	332	LEU
7	P	45	LEU
7	P	58	LEU
8	R	99	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	533	GLN
2	D	75	GLN
2	D	105	GLN
3	F	194	ASN
3	F	196	ASN
3	F	218	ASN
4	I	220	HIS
4	I	350	ASN
4	J	281	GLN
4	J	295	GLN
4	J	353	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](#)

9 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	$\# Z > 2$
9	PC1	N	101	-	53,53,53	0.50	0	59,61,61	0.48	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	PC1	T	201	-	53,53,53	0.49	0	59,61,61	0.56	0
9	PC1	R	201	-	53,53,53	0.48	0	59,61,61	0.66	1 (1%)
9	PC1	N	102	-	53,53,53	0.52	0	59,61,61	0.55	0
9	PC1	J	401	-	53,53,53	0.50	0	59,61,61	0.49	0
9	PC1	F	301	-	53,53,53	0.49	0	59,61,61	0.45	0
9	PC1	I	403	-	53,53,53	0.50	0	59,61,61	0.44	0
9	PC1	I	402	-	53,53,53	0.48	0	59,61,61	0.55	1 (1%)
9	PC1	I	401	-	53,53,53	0.49	0	59,61,61	0.52	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
9	PC1	N	101	-	-	9/57/57/57	-
9	PC1	T	201	-	-	7/57/57/57	-
9	PC1	R	201	-	-	9/57/57/57	-
9	PC1	N	102	-	-	6/57/57/57	-
9	PC1	J	401	-	-	7/57/57/57	-
9	PC1	F	301	-	-	10/57/57/57	-
9	PC1	I	403	-	-	8/57/57/57	-
9	PC1	I	402	-	-	14/57/57/57	-
9	PC1	I	401	-	-	8/57/57/57	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	R	201	PC1	C3-O31-C31	2.71	127.01	117.12
9	I	402	PC1	C2-O21-C21	2.28	123.26	117.80

There are no chirality outliers.

All (78) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	F	301	PC1	C11-O13-P-O14
9	I	401	PC1	C11-O13-P-O12

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Mol	Chain	Res	Type	Atoms
9	I	401	PC1	C11-O13-P-O11
9	I	401	PC1	C12-C11-O13-P
9	J	401	PC1	C1-O11-P-O12
9	R	201	PC1	O32-C31-O31-C3
9	R	201	PC1	C32-C31-O31-C3
9	T	201	PC1	O32-C31-O31-C3
9	T	201	PC1	C32-C31-O31-C3
9	N	102	PC1	C31-C32-C33-C34
9	J	401	PC1	C2-C1-O11-P
9	F	301	PC1	C34-C35-C36-C37
9	I	402	PC1	C3A-C3B-C3C-C3D
9	F	301	PC1	C2E-C2F-C2G-C2H
9	I	402	PC1	C29-C2A-C2B-C2C
9	I	403	PC1	C28-C29-C2A-C2B
9	R	201	PC1	C36-C37-C38-C39
9	J	401	PC1	C38-C39-C3A-C3B
9	R	201	PC1	C2C-C2D-C2E-C2F
9	I	402	PC1	C1-C2-C3-O31
9	T	201	PC1	C1-C2-C3-O31
9	R	201	PC1	C38-C39-C3A-C3B
9	N	101	PC1	C38-C39-C3A-C3B
9	I	403	PC1	O11-C1-C2-O21
9	I	403	PC1	C2-C1-O11-P
9	T	201	PC1	O21-C2-C3-O31
9	I	403	PC1	O11-C1-C2-C3
9	I	402	PC1	C3B-C3C-C3D-C3E
9	I	402	PC1	C23-C24-C25-C26
9	I	402	PC1	C37-C38-C39-C3A
9	I	402	PC1	C12-C11-O13-P
9	I	403	PC1	C12-C11-O13-P
9	N	102	PC1	C12-C11-O13-P
9	R	201	PC1	C12-C11-O13-P
9	I	402	PC1	O13-C11-C12-N
9	N	102	PC1	O13-C11-C12-N
9	R	201	PC1	O13-C11-C12-N
9	I	402	PC1	C24-C25-C26-C27
9	N	102	PC1	C32-C33-C34-C35
9	F	301	PC1	C23-C24-C25-C26
9	I	402	PC1	C1-O11-P-O14
9	J	401	PC1	C1-O11-P-O14
9	J	401	PC1	C1-O11-P-O13
9	R	201	PC1	C11-O13-P-O14

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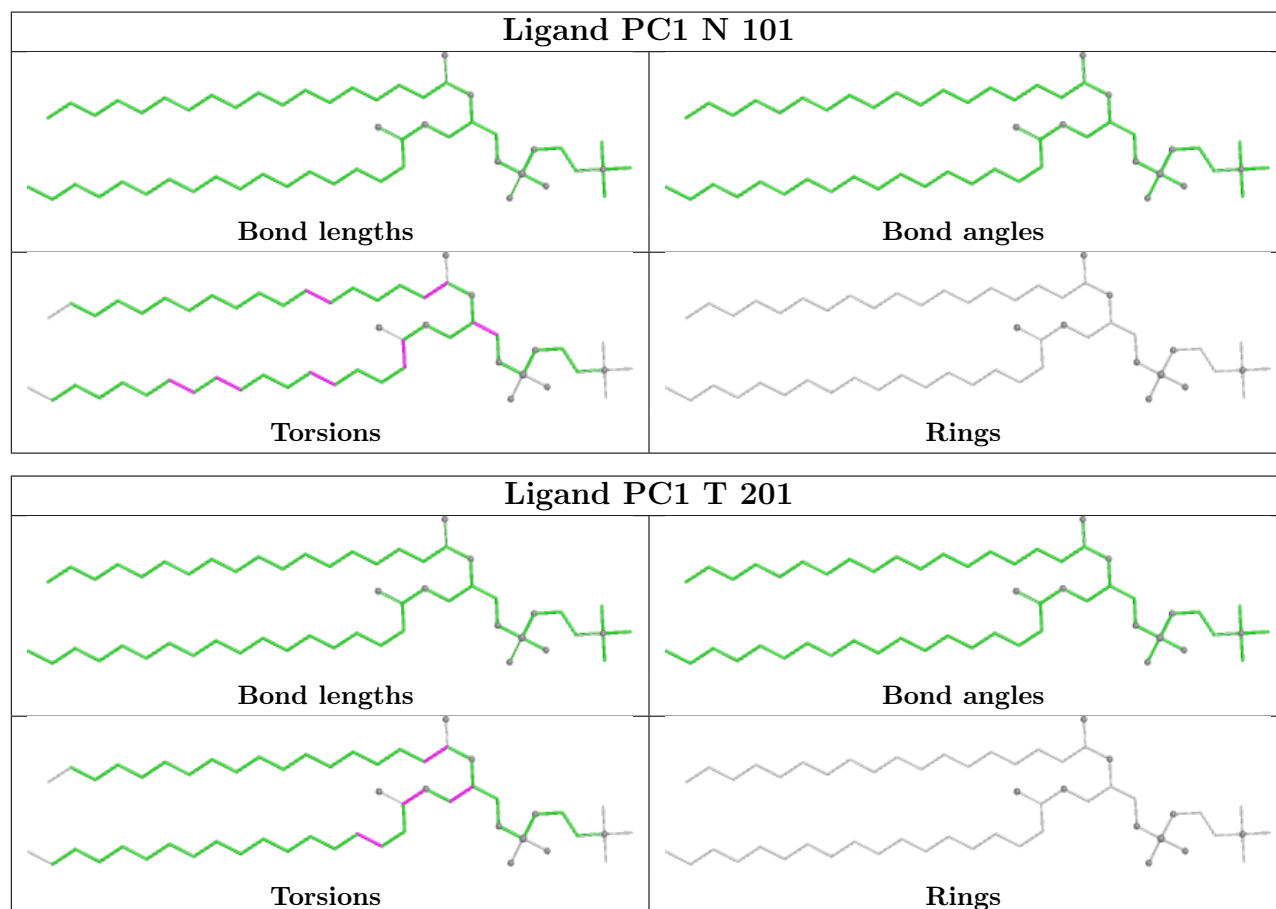
Mol	Chain	Res	Type	Atoms
9	I	403	PC1	C2E-C2F-C2G-C2H
9	I	401	PC1	C2C-C2D-C2E-C2F
9	I	401	PC1	O21-C2-C3-O31
9	N	101	PC1	C34-C35-C36-C37
9	I	401	PC1	C32-C33-C34-C35
9	N	101	PC1	O11-C1-C2-C3
9	I	403	PC1	C2A-C2B-C2C-C2D
9	F	301	PC1	O22-C21-O21-C2
9	F	301	PC1	C21-C22-C23-C24
9	I	402	PC1	C22-C23-C24-C25
9	F	301	PC1	C2A-C2B-C2C-C2D
9	F	301	PC1	C35-C36-C37-C38
9	I	402	PC1	C3-C2-O21-C21
9	I	402	PC1	C3C-C3D-C3E-C3F
9	J	401	PC1	C39-C3A-C3B-C3C
9	R	201	PC1	C2B-C2C-C2D-C2E
9	I	401	PC1	C34-C35-C36-C37
9	N	102	PC1	C23-C24-C25-C26
9	N	101	PC1	O31-C31-C32-C33
9	F	301	PC1	C22-C21-O21-C2
9	J	401	PC1	C35-C36-C37-C38
9	T	201	PC1	O21-C21-C22-C23
9	N	101	PC1	O21-C21-C22-C23
9	I	403	PC1	C33-C34-C35-C36
9	I	402	PC1	C1-C2-O21-C21
9	N	101	PC1	C3A-C3B-C3C-C3D
9	N	102	PC1	C25-C26-C27-C28
9	N	101	PC1	O32-C31-C32-C33
9	T	201	PC1	C32-C33-C34-C35
9	T	201	PC1	O22-C21-C22-C23
9	I	401	PC1	O21-C21-C22-C23
9	F	301	PC1	O21-C21-C22-C23
9	N	101	PC1	O22-C21-C22-C23
9	N	101	PC1	C25-C26-C27-C28

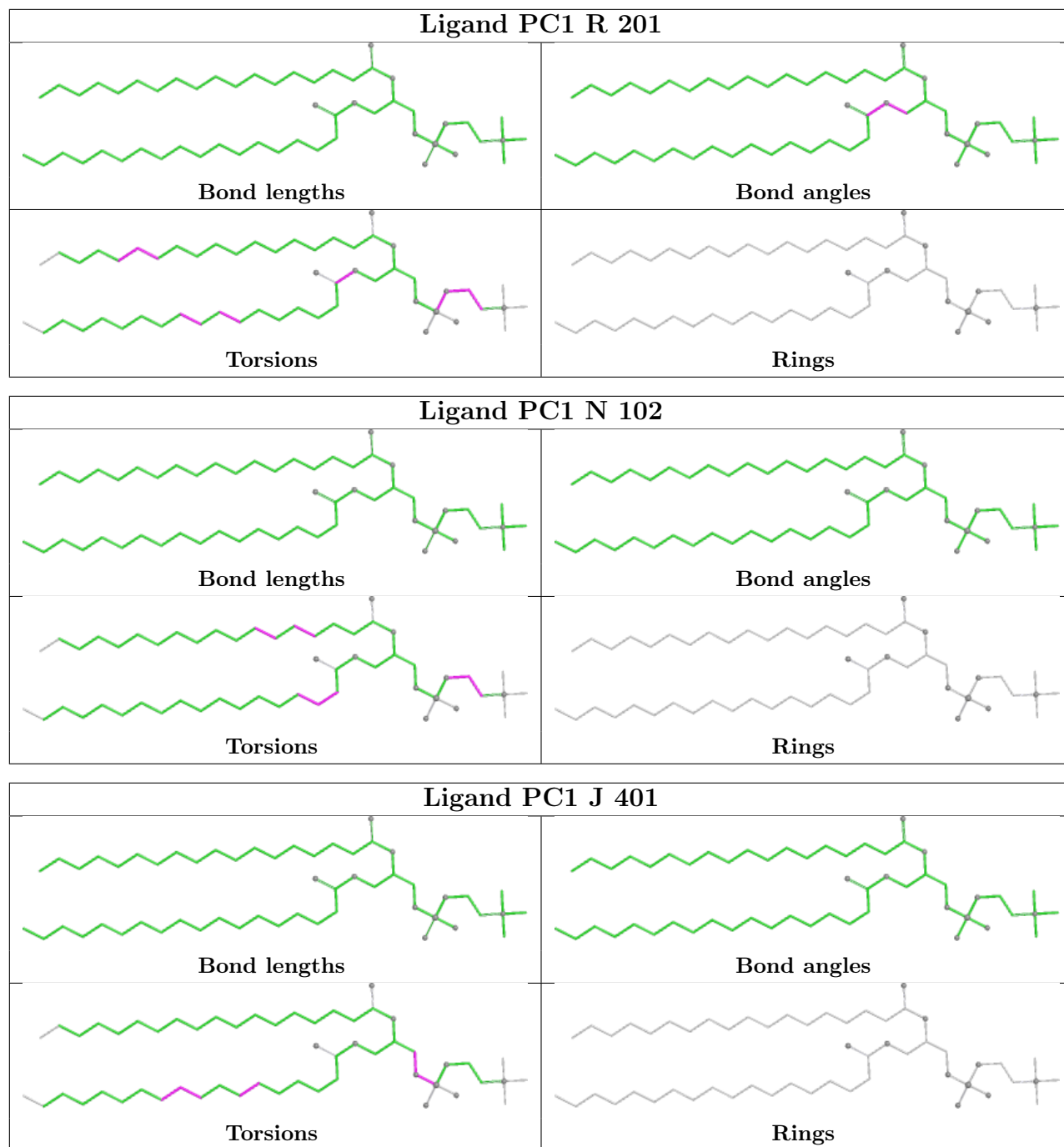
There are no ring outliers.

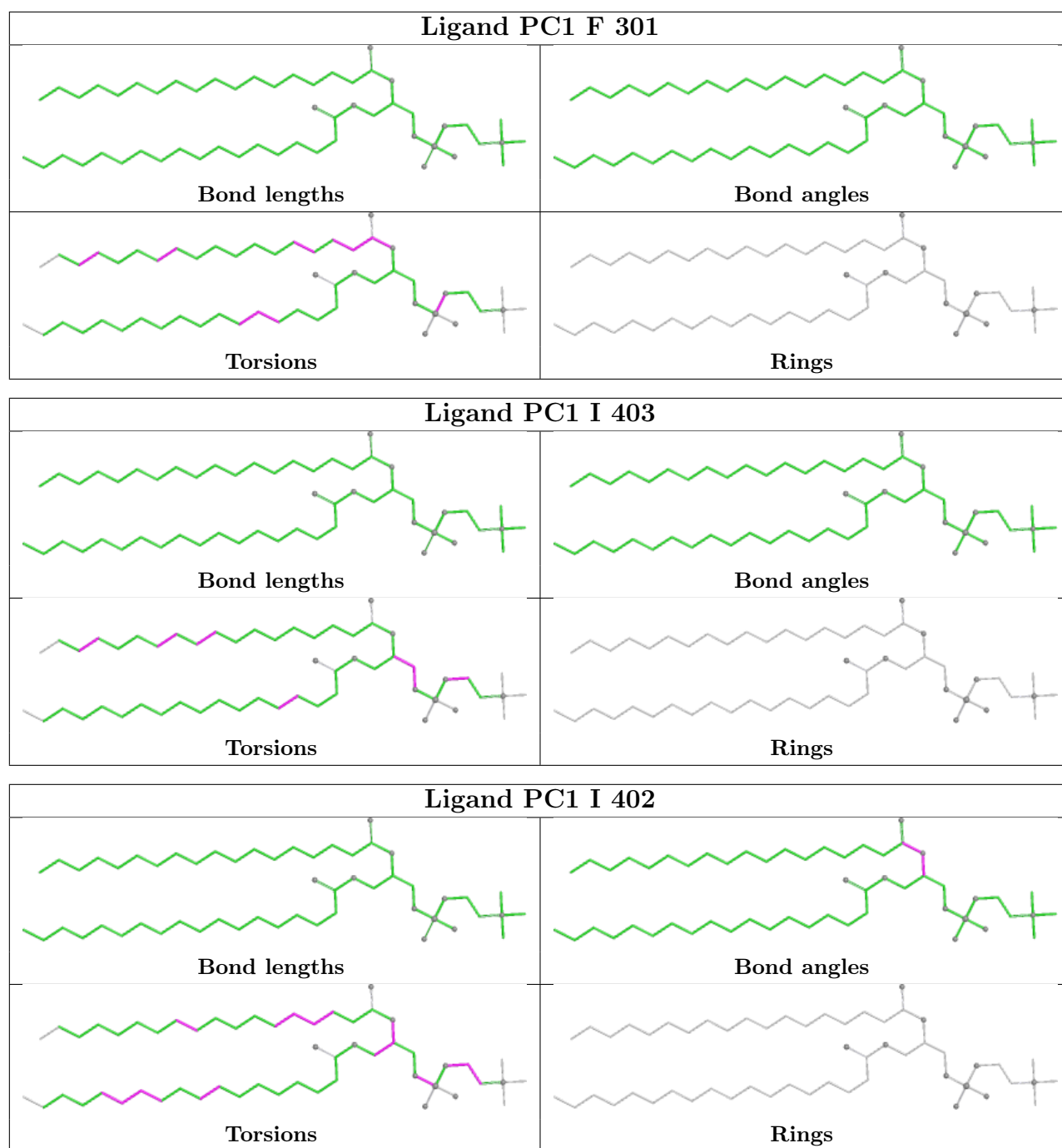
3 monomers are involved in 4 short contacts:

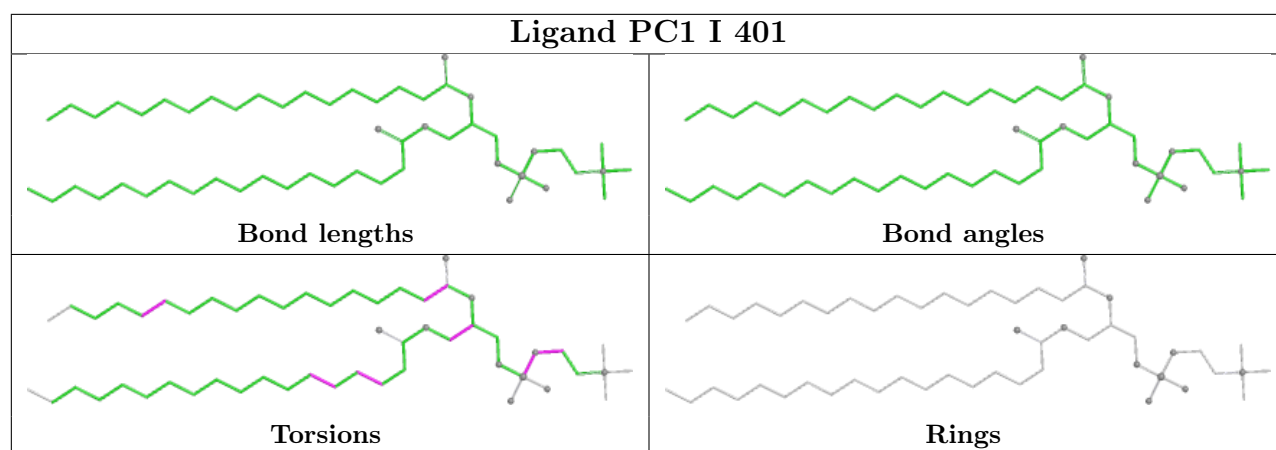
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	T	201	PC1	2	0
9	I	403	PC1	1	0
9	I	402	PC1	1	0

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 [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

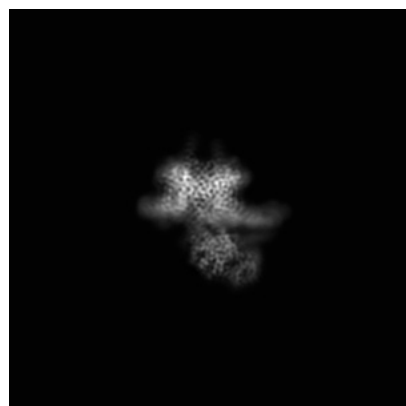
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-48084. These allow visual inspection of the internal detail of the map and identification of artifacts.

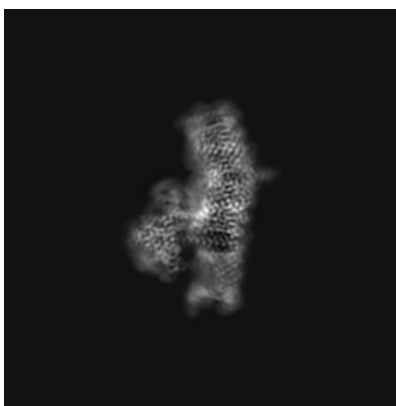
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

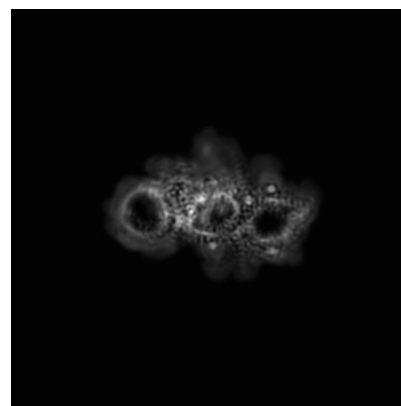
6.1.1 Primary map



X

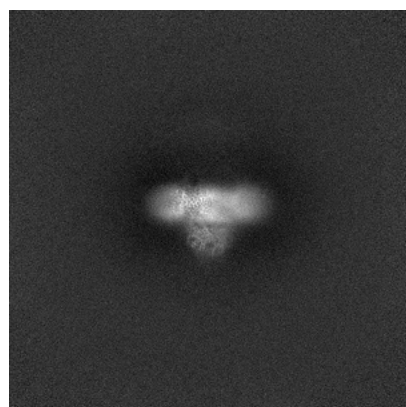


Y

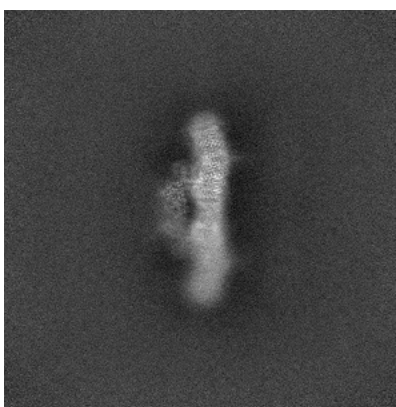


Z

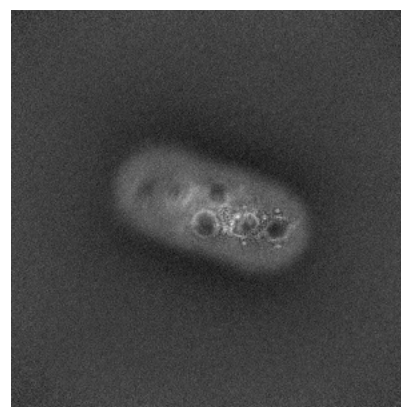
6.1.2 Raw map



X



Y



Z

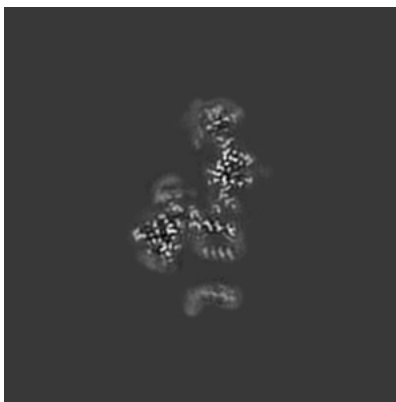
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

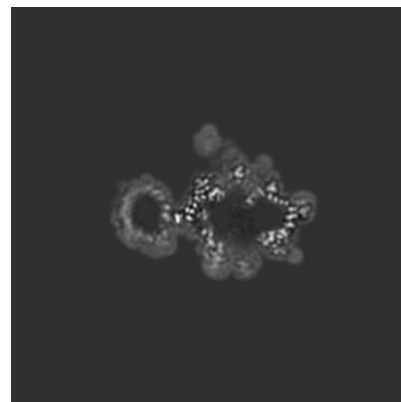
6.2.1 Primary map



X Index: 192



Y Index: 192



Z Index: 192

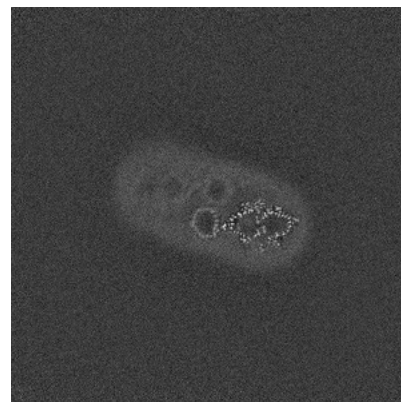
6.2.2 Raw map



X Index: 336



Y Index: 336

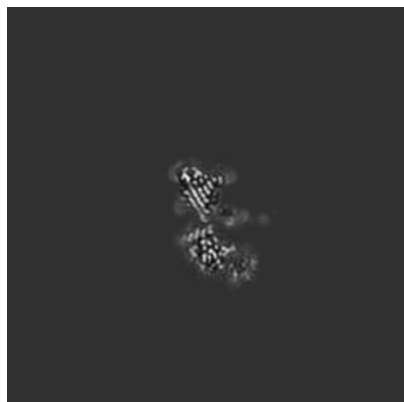


Z Index: 336

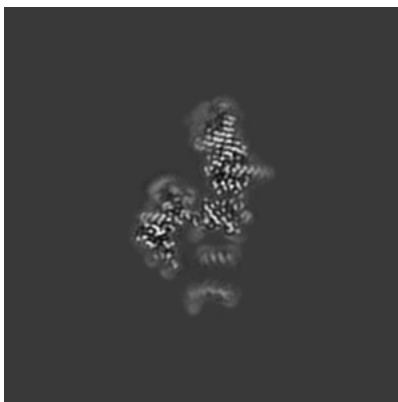
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

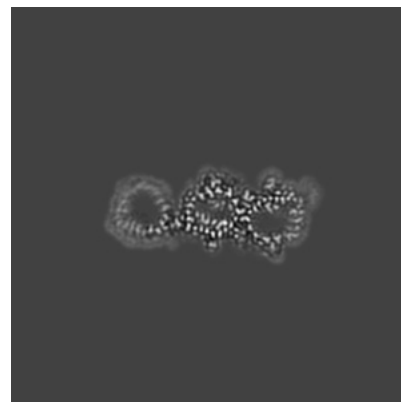
6.3.1 Primary map



X Index: 172

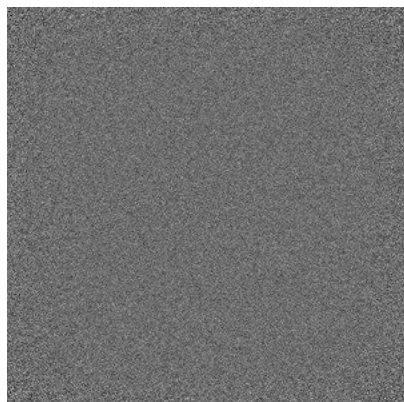


Y Index: 199

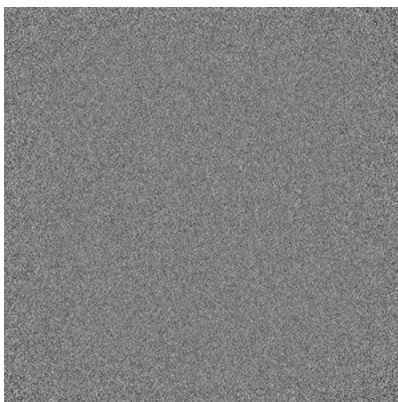


Z Index: 215

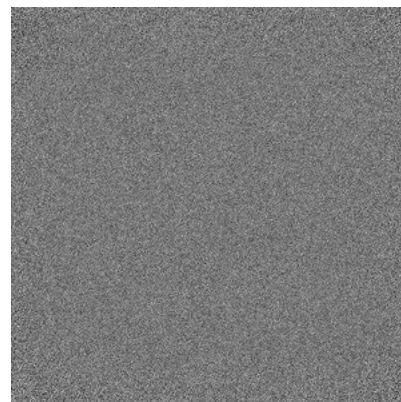
6.3.2 Raw map



X Index: 0



Y Index: 0

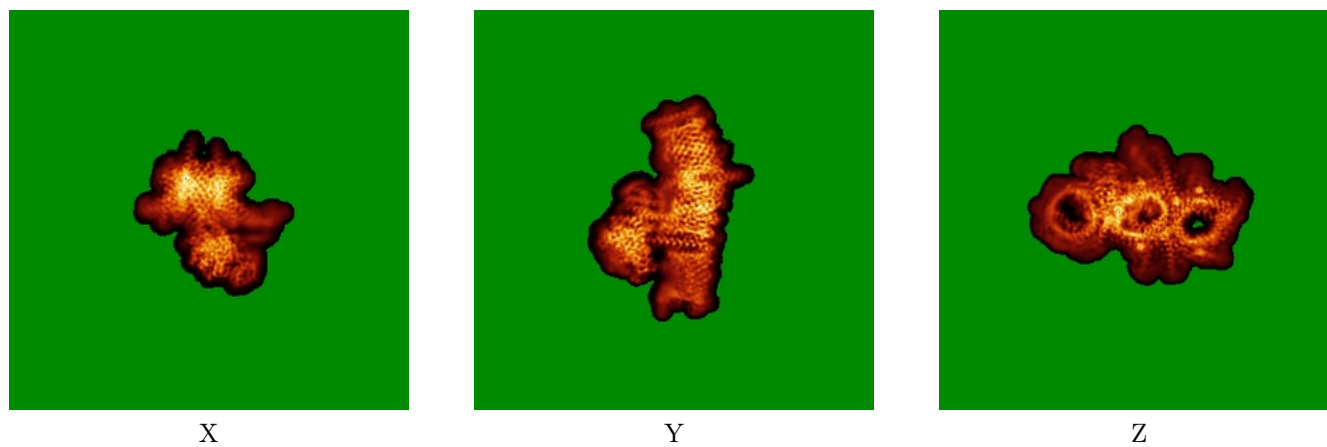


Z Index: 0

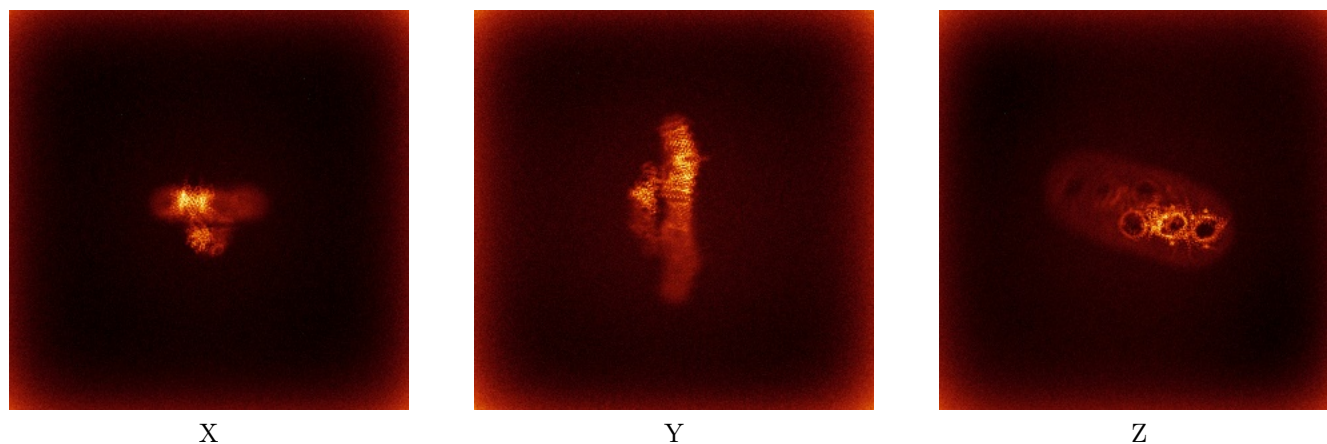
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



6.4.2 Raw map



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.

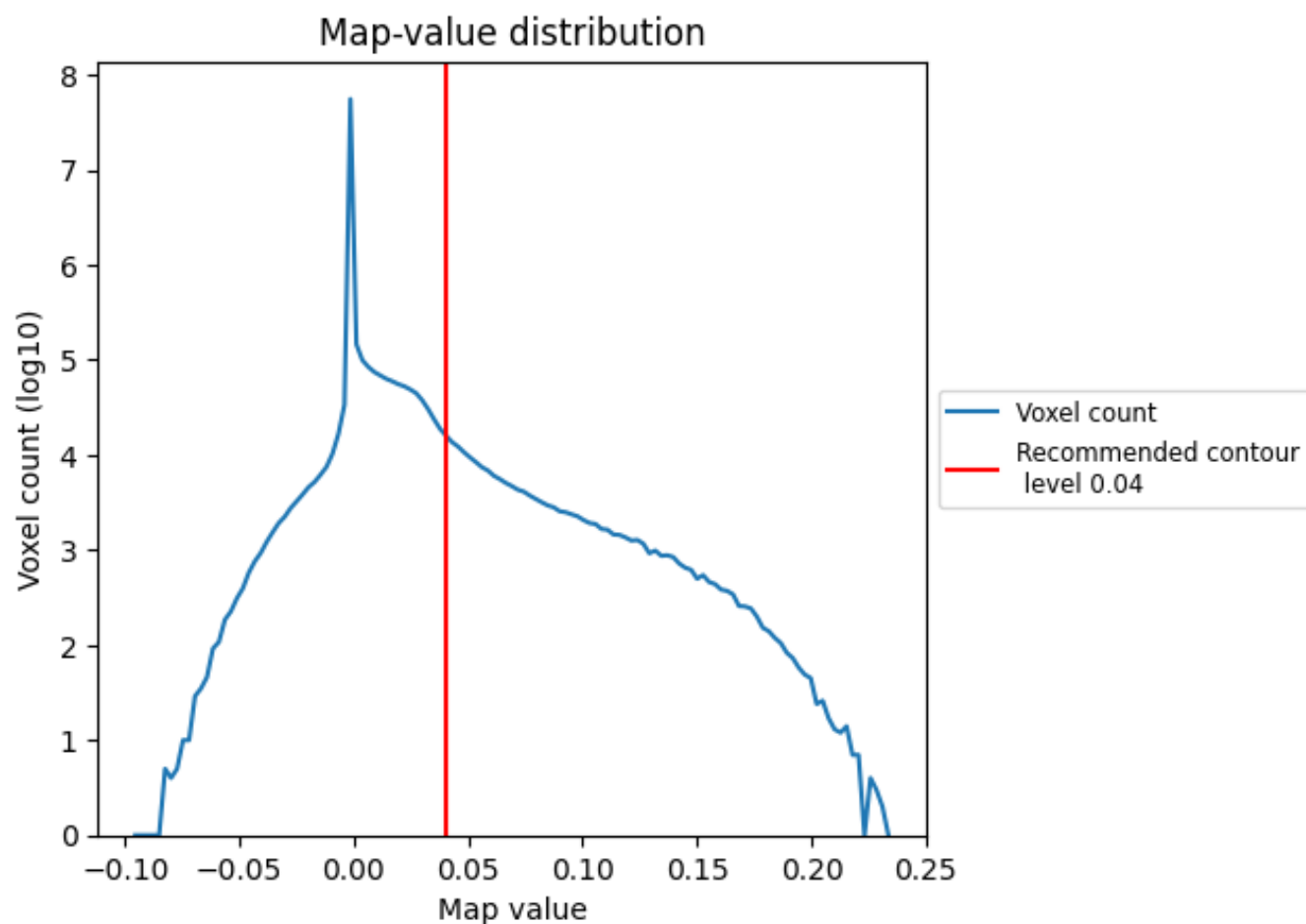
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

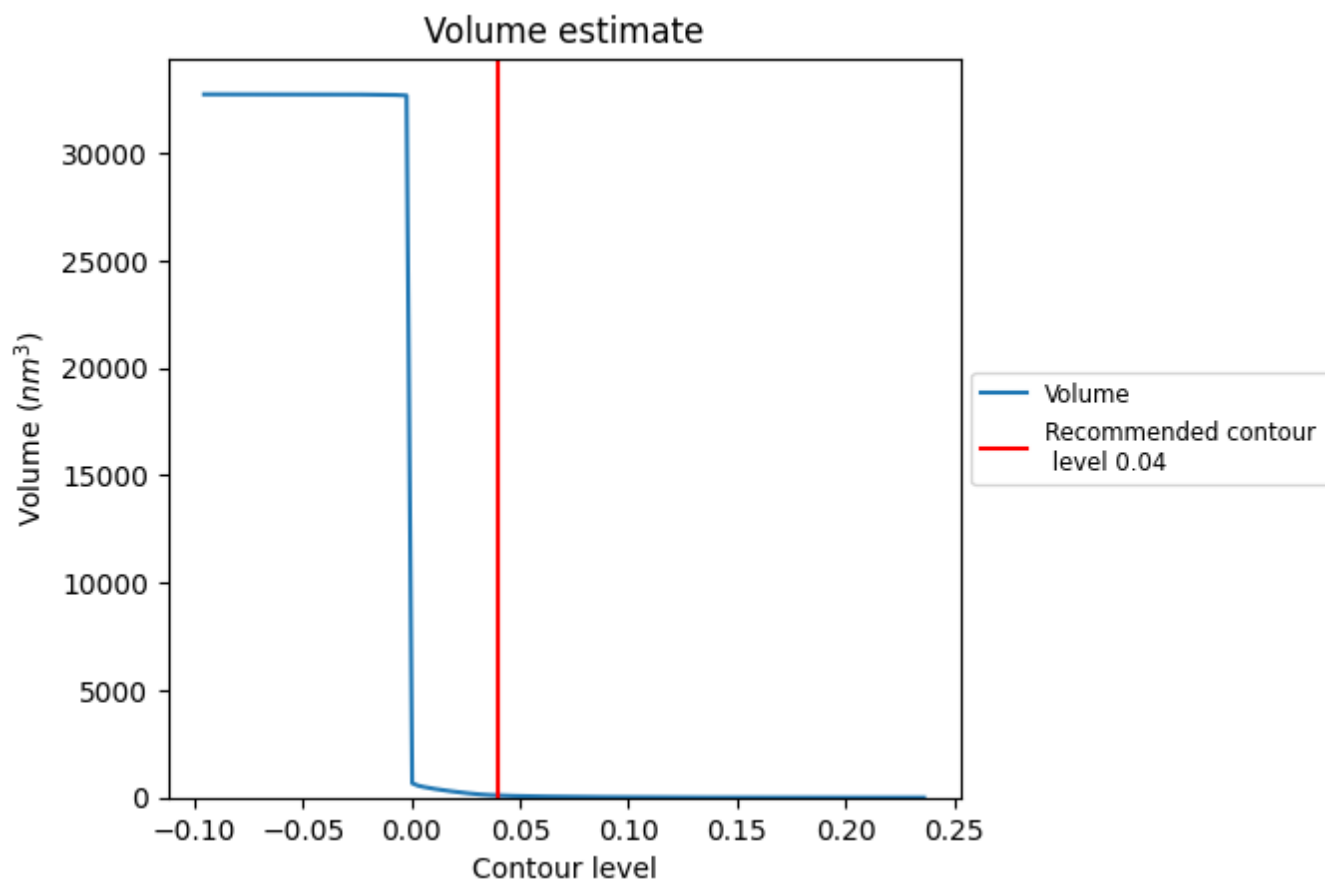
This section contains the results of statistical analysis of the map.

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.

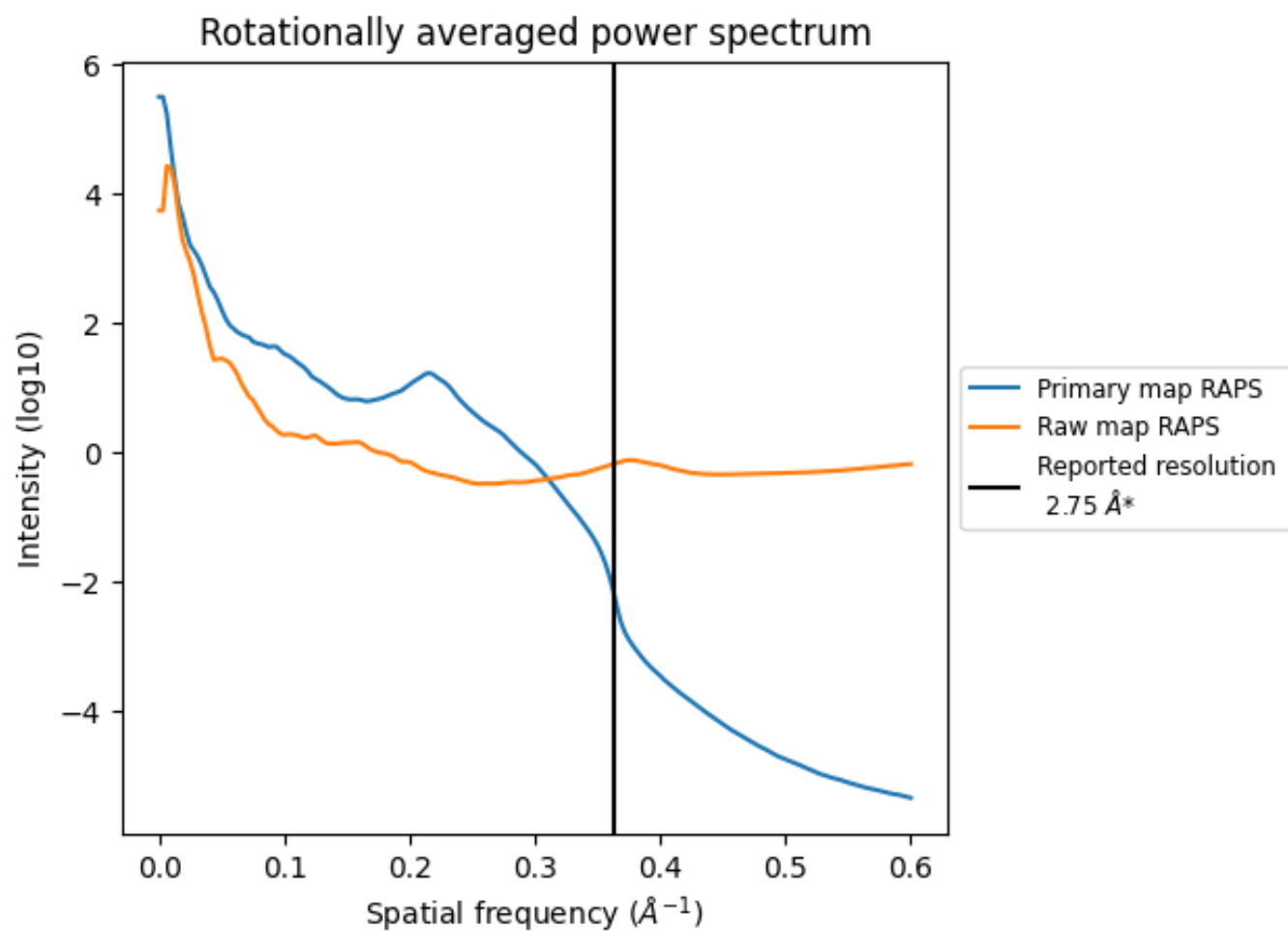
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 99 nm³; this corresponds to an approximate mass of 89 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 ⓘ

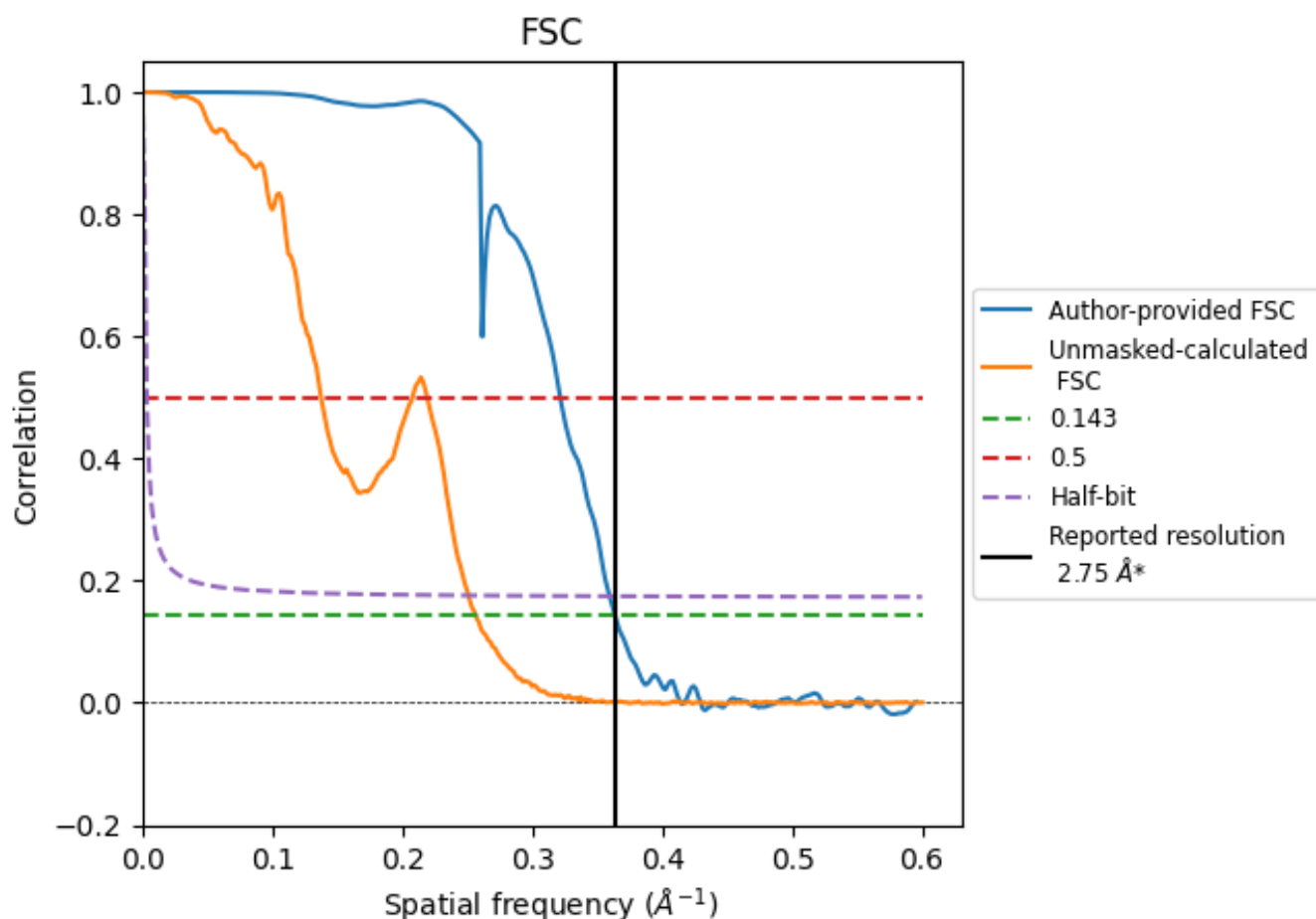


*Reported resolution corresponds to spatial frequency of 0.364 Å⁻¹

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 $0.364 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

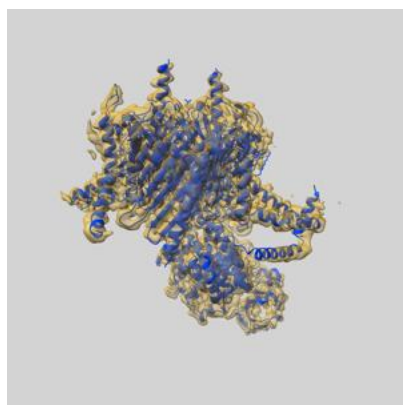
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.75	-	-
Author-provided FSC curve	2.75	3.11	2.78
Unmasked-calculated*	3.90	7.27	3.98

*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 3.90 differs from the reported value 2.75 by more than 10 %

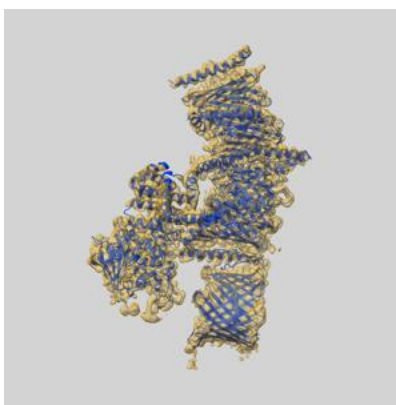
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-48084 and PDB model 9EII. Per-residue inclusion information can be found in section [3](#) on page [7](#).

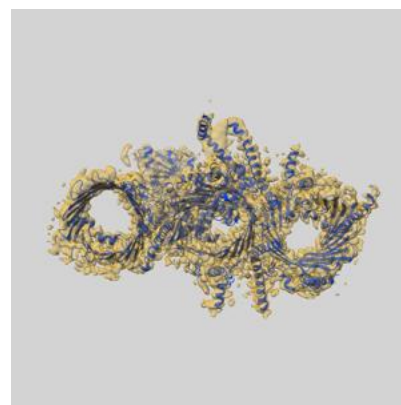
9.1 Map-model overlay [i](#)



X



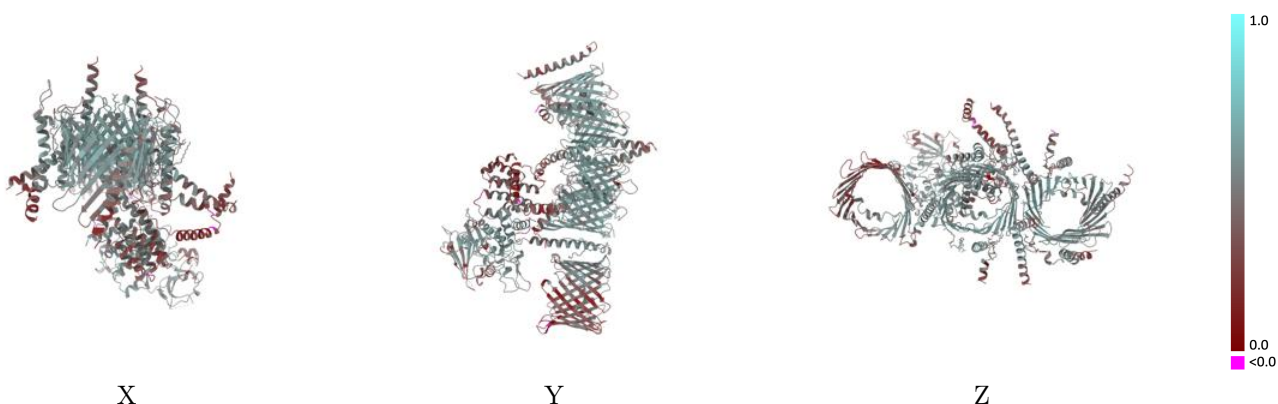
Y



Z

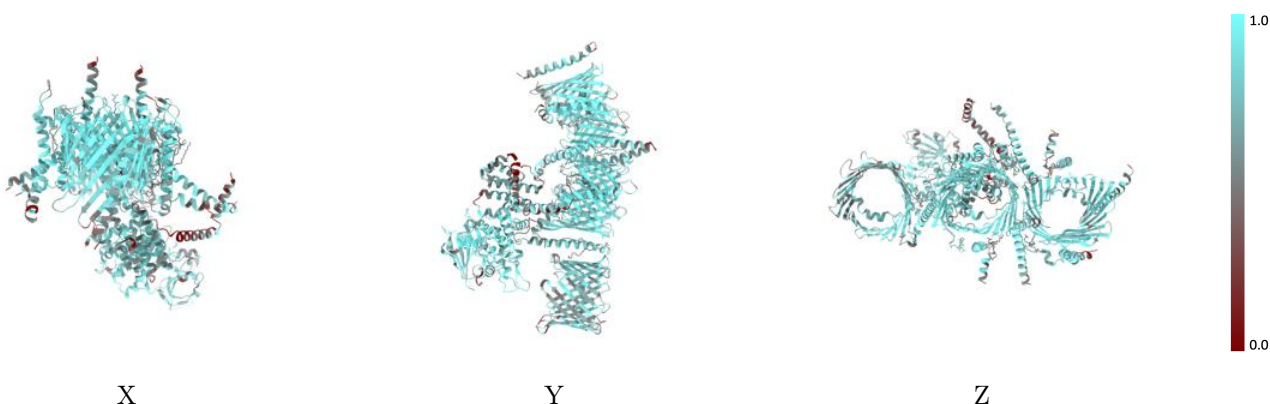
The images above show the 3D surface view of the map at the recommended contour level 0.04 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



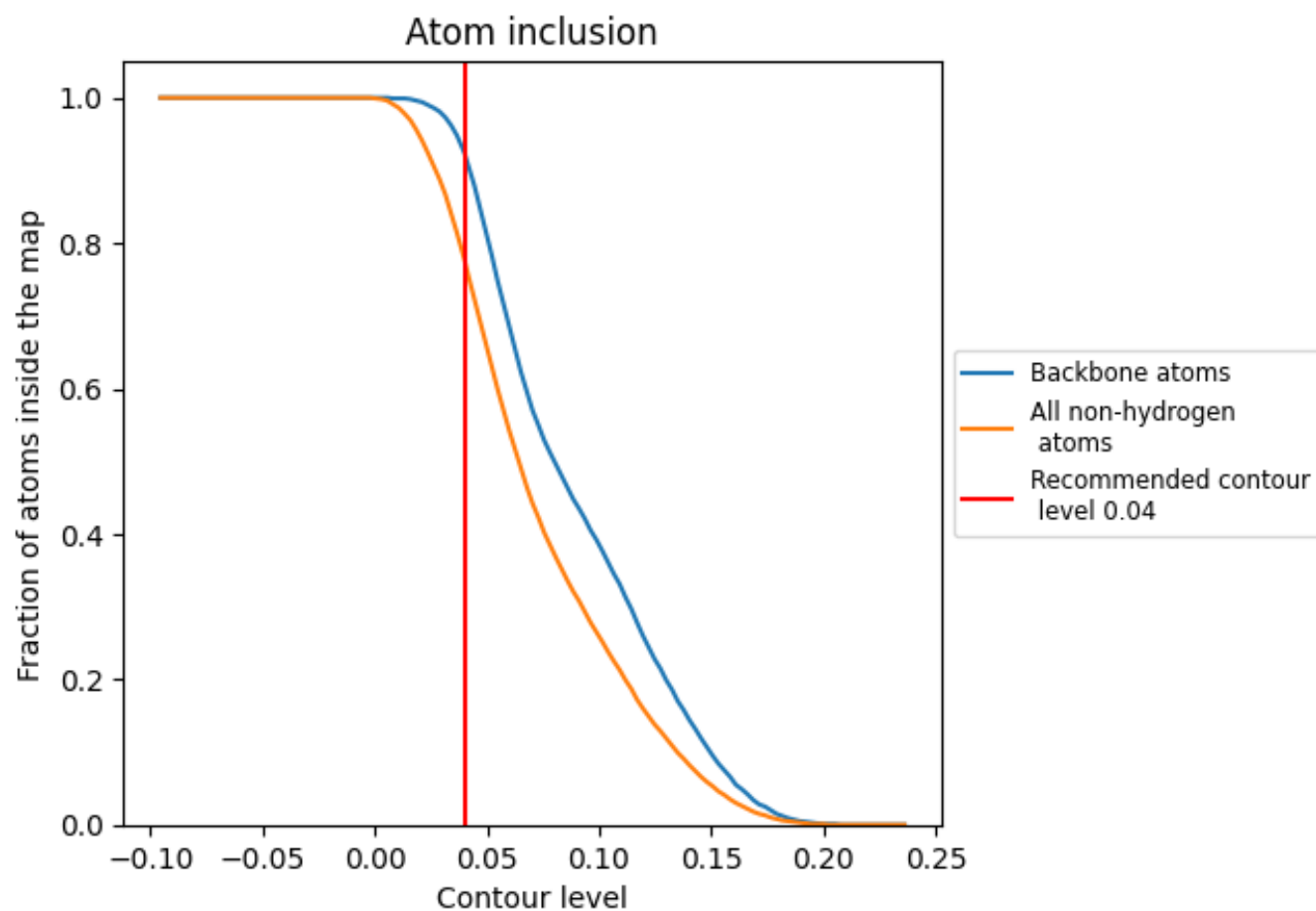
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.04).

9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 78% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7770	 0.4710
B	 0.8150	 0.4940
D	 0.5100	 0.2910
F	 0.6820	 0.3790
I	 0.8940	 0.5680
J	 0.8620	 0.5350
L	 0.7280	 0.4530
N	 0.7370	 0.4700
P	 0.8490	 0.4780
R	 0.7370	 0.4560
T	 0.7350	 0.4650
V	 0.7220	 0.4300
X	 0.7330	 0.4350
Z	 0.6490	 0.3610

