Full wwPDB EM Validation Report ⓘ

Jan 2, 2025 – 02:34 PM EST

PDB ID	:	9DYM
EMDB ID	:	EMD-47309
Title	:	BEST1 + PABA intermediate state
Authors	:	Owji, A.P.; Kittredge, A.; Zhang, Y.; Yang, T.
Deposited on	:	2024-10-14
Resolution	:	2.67 Å(reported)
Based on initial model	:	8D1I

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:

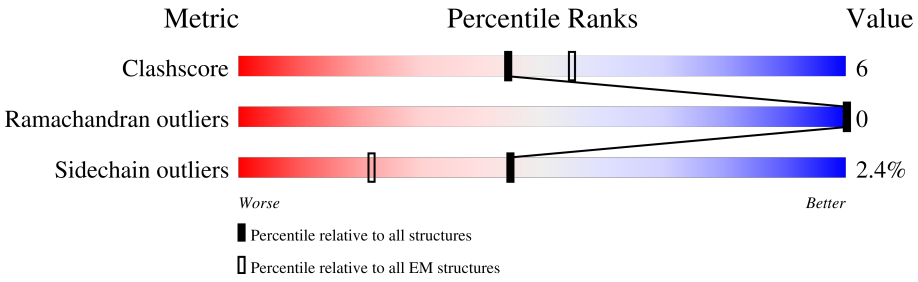
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 2.67 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	A	585	54% 10% 36%
1	B	585	55% 9% 36%
1	C	585	54% 9% 36%
1	D	585	52% 12% 36%
1	E	585	50% 14% 36%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 15629 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.

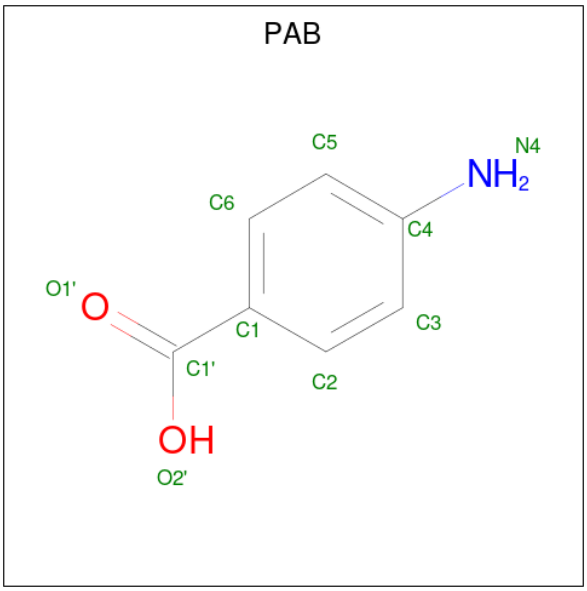
- Molecule 1 is a protein called Bestrophin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	D	376	Total	C	N	O	S	0	0
			3118	2052	510	540	16		
1	B	376	Total	C	N	O	S	0	0
			3118	2052	510	540	16		
1	E	376	Total	C	N	O	S	0	0
			3118	2052	510	540	16		
1	A	376	Total	C	N	O	S	0	0
			3118	2052	510	540	16		
1	C	376	Total	C	N	O	S	0	0
			3118	2052	510	540	16		

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
2	D	1	Total	Ca	0
			1	1	
2	B	1	Total	Ca	0
			1	1	
2	E	1	Total	Ca	0
			1	1	
2	A	1	Total	Ca	0
			1	1	
2	C	1	Total	Ca	0
			1	1	

- Molecule 3 is 4-AMINOBENZOIC ACID (three-letter code: PAB) (formula: $C_7H_7NO_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	AltConf
3	D	1	Total C N O 10 7 1 2	0
3	B	1	Total C N O 10 7 1 2	0
3	A	1	Total C N O 10 7 1 2	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	AltConf
4	B	1	Total Cl 1 1	0
4	E	1	Total Cl 1 1	0

- Molecule 5 is water.

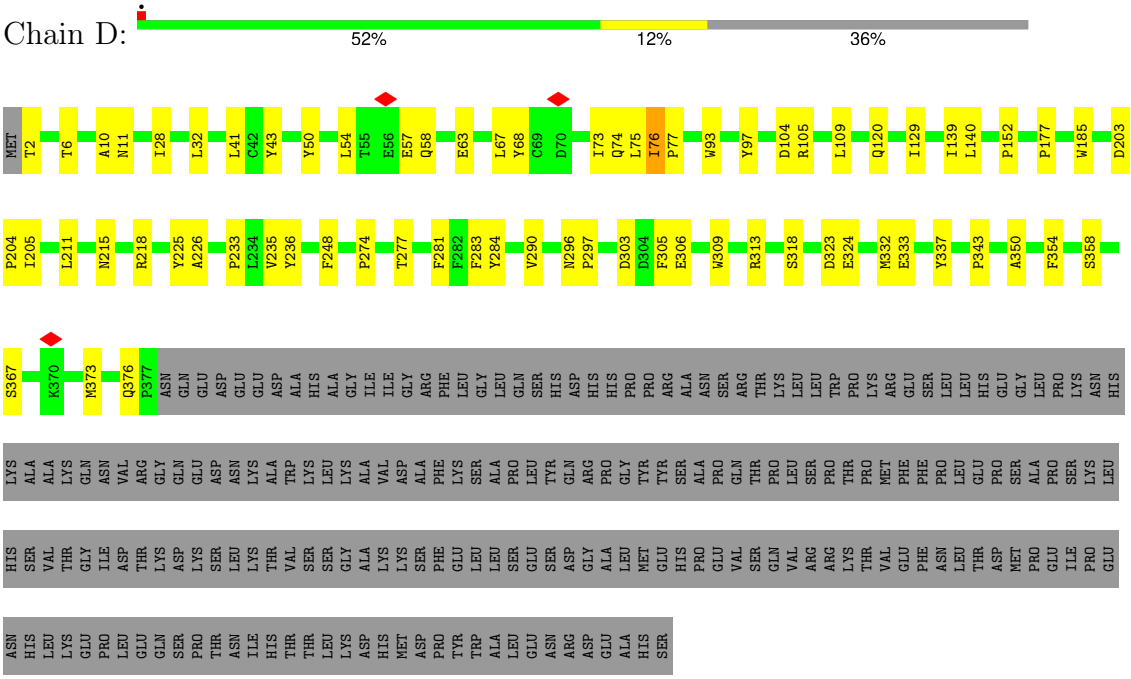
Mol	Chain	Residues	Atoms	AltConf
5	E	1	Total O 1 1	0
5	C	1	Total O 1 1	0

3 Residue-property plots (i)

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.

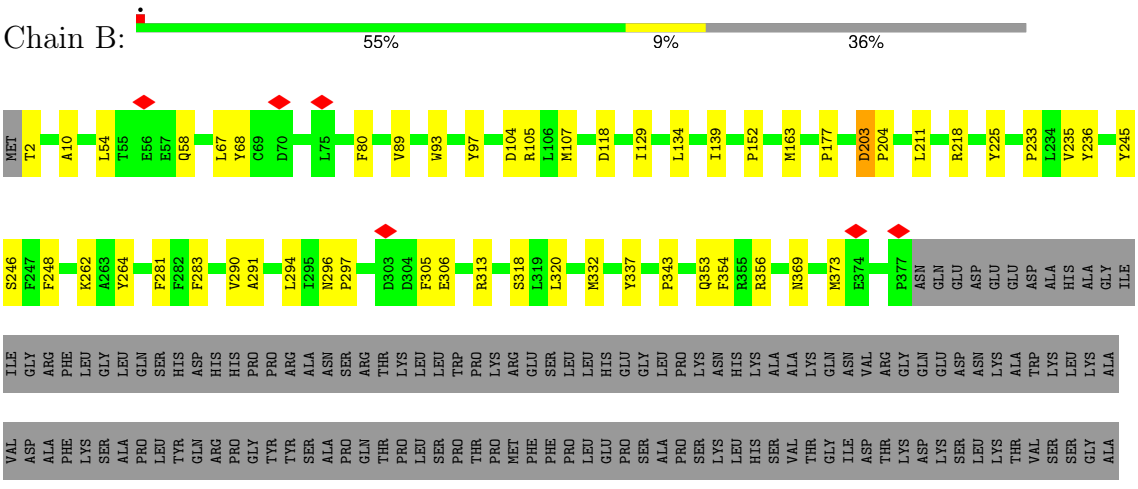
• Molecule 1: Bestrophin-1

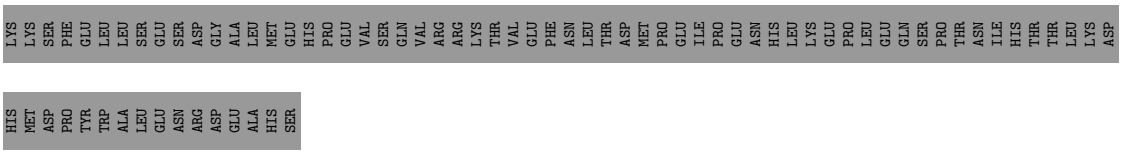
Chain D:



• Molecule 1: Bestrophin-1

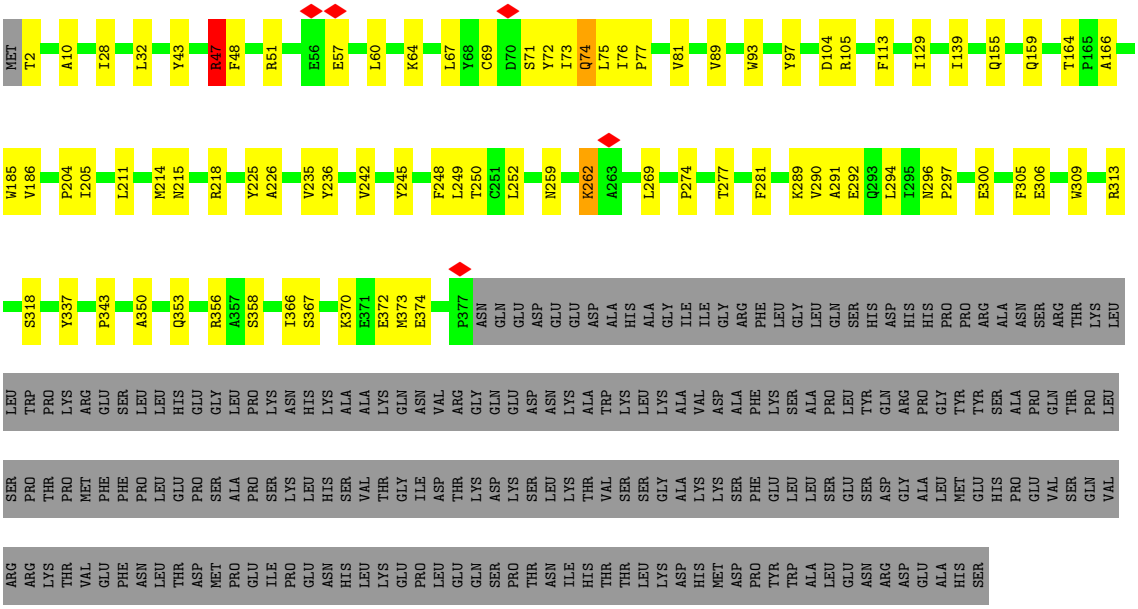
Chain B:





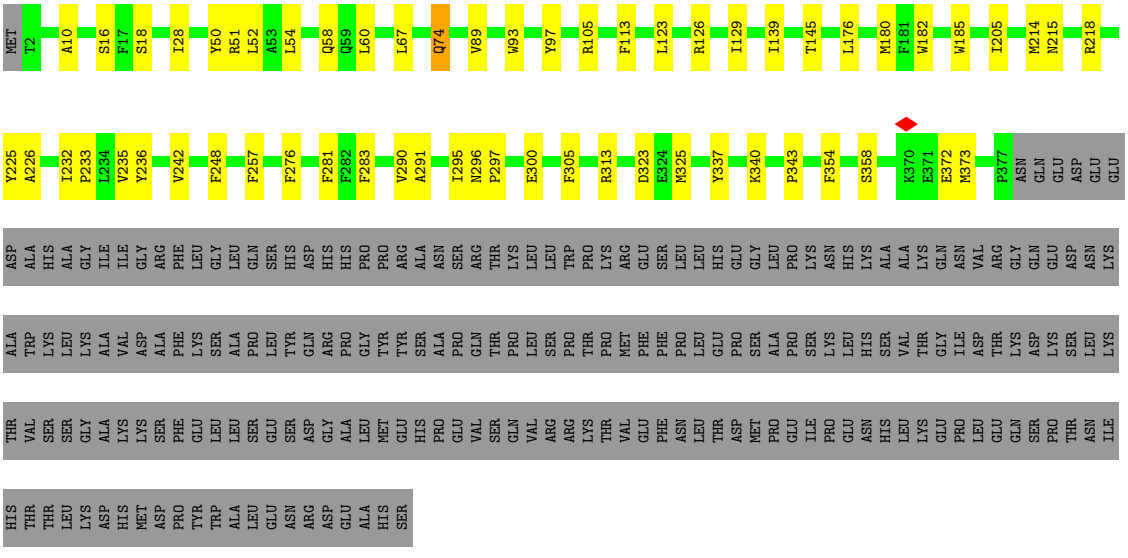
• Molecule 1: Bestrophin-1

Chain E:



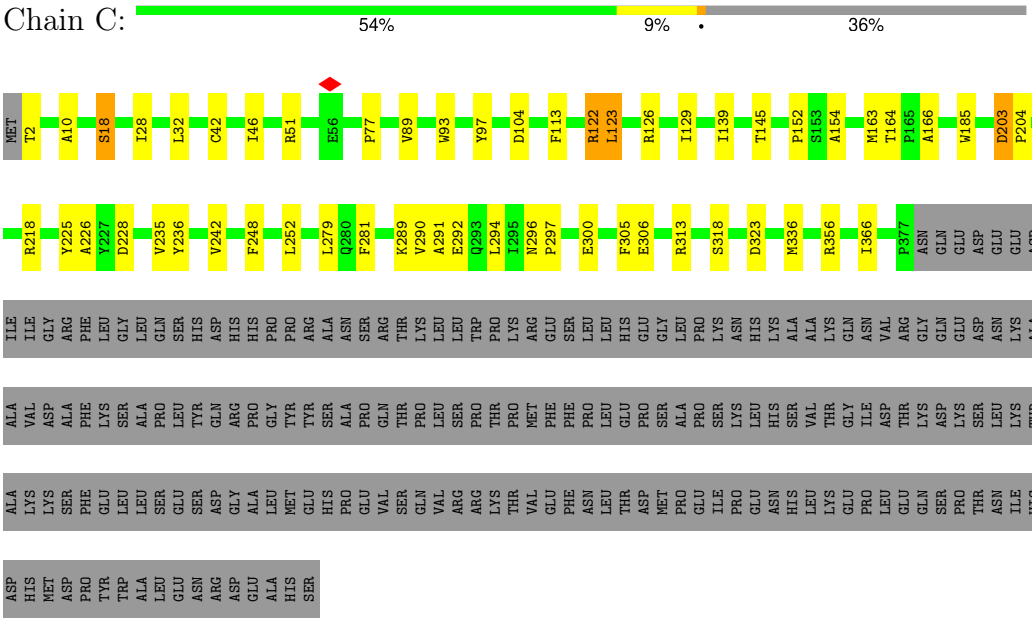
• Molecule 1: Bestrophin-1

Chain A:



• Molecule 1: Bestrophin-1

Chain C:


54%
9%
36%
MET T2 A10 S18 I28 L32 C42 I46 R51 E56 P77 V89 W93 Y97 D104 F113 R122 L123 R126 I129 I139 T145 P152 S153 A154 M163 T164 P165 A166 W185 D203 P204 L211 M214 N215
R218 Y225 A226 Y227 D228 V235 Y236 V242 F248 L252 L279 Q280 F281 K289 V290 A291 E292 Q293 L294 T295 N296 P297 E300 F305 E306 R313 S318 D323 M336 R356 I366 P377 ASN GLN GLU ASP GLU GLU ASP ALA HIS ALA GLY
ILE ILE GLY ARG PHE LEU GLY LEU GLN SER HIS ASP HIS HIS PRO PRO ARG ALA ASN SER ARG THR LYS LEU LEU LEU TRP PRO LYS ARG GLU SER LEU LEU HIS GLU GLY LEU PRO LYS ASN HIS LYS ALA ALA LYS GLN ASN VAL ARG GLY GLN GLU ASP ASN LYS ALA TRP LYS LEU LYS
ALA VAL ASP ALA PHE LYS SER ALA PRO LEU TYR GLN ARG PRO GLY TYR TYR SER ALA PRO GLN THR PRO LEU SER PRO THR PRO MET PHE PHE PRO LEU GLU PRO SER ALA PRO SER LYS LEU HIS SER VAL THR GLY ILE ASP THR LYS ASP LYS SER LEU LYS THR VAL SER SER GLY
ALA LYS LYS SER PHE GLU LEU LEU SER GLU SER ASP GLY ALA LEU MET GLU HIS PRO GLU VAL SER GLN VAL ARG ARG LYS THR VAL GLU PHE ASN LEU THR ASP MET PRO GLU ILE PRO GLU ASN HIS LEU LYS GLU PRO LEU GLU GLN SER PRO THR ASN ILE HIS THR THR LEU LYS
ASP HIS MET ASP PRO TYR TRP ALA LEU GLU ASN ARG ASP GLU ALA HIS SER

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	40311	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 ($e^-/Å^2$)	58	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	3.019	Depositor
Minimum map value	-1.498	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.094	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	332.0, 332.0, 332.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83, 0.83, 0.83	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.68	0/3213	0.68	0/4377
1	B	0.68	0/3213	0.68	0/4377
1	C	0.69	0/3213	0.67	0/4377
1	D	0.68	0/3213	0.70	0/4377
1	E	0.68	0/3213	0.68	0/4377
All	All	0.68	0/16065	0.68	0/21885

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1
1	E	0	2
All	All	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	122	ARG	Sidechain
1	E	47	ARG	Sidechain
1	E	51	ARG	Sidechain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3118	0	3089	58	0
1	B	3118	0	3089	42	0
1	C	3118	0	3089	47	0
1	D	3118	0	3089	53	0
1	E	3118	0	3089	70	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
3	A	10	0	6	0	0
3	B	10	0	6	0	0
3	D	10	0	6	0	0
4	B	1	0	0	0	0
4	E	1	0	0	0	0
5	C	1	0	0	0	0
5	E	1	0	0	0	0
All	All	15629	0	15463	192	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 6.

All (192) 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:C:42:CYS:O	1:C:46:ILE:HD12	1.83	0.78
1:E:57:GLU:N	1:E:57:GLU:OE2	2.17	0.75
1:E:245:TYR:HE2	1:A:18:SER:HB3	1.52	0.74
1:B:233:PRO:HG2	1:C:294:LEU:HD21	1.74	0.69
1:A:51:ARG:NH2	1:A:257:PHE:O	2.19	0.69
1:E:81:VAL:HB	1:A:283:PHE:HZ	1.58	0.69
1:E:77:PRO:HD2	1:A:283:PHE:CE2	2.28	0.69
1:B:218:ARG:NH2	1:C:104:ASP:OD2	2.26	0.68
1:E:292:GLU:OE1	1:A:16:SER:OG	2.09	0.68
1:D:54:LEU:HD12	1:D:58:GLN:HB3	1.76	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:218:ARG:NH2	1:E:104:ASP:OD2	2.28	0.66
1:D:358:SER:OG	1:B:177:PRO:O	2.09	0.66
1:B:283:PHE:HE1	1:A:242:VAL:HG12	1.59	0.66
1:B:104:ASP:OD2	1:A:218:ARG:NH2	2.28	0.65
1:D:104:ASP:CG	1:C:218:ARG:HH21	2.00	0.65
1:D:233:PRO:HG2	1:E:294:LEU:HD21	1.80	0.64
1:E:155:GLN:HG3	1:E:159:GLN:HE21	1.63	0.64
1:D:290:VAL:HG22	1:C:235:VAL:HG13	1.80	0.63
1:B:290:VAL:HG22	1:A:235:VAL:HG13	1.81	0.63
1:E:373:MET:HG2	1:C:152:PRO:HG3	1.80	0.63
1:D:50:TYR:HA	1:D:54:LEU:HD23	1.81	0.63
1:E:77:PRO:HD2	1:A:283:PHE:CD2	2.34	0.62
1:D:354:PHE:CZ	1:C:300:GLU:HG2	2.35	0.61
1:D:235:VAL:HG13	1:E:290:VAL:HG22	1.83	0.59
1:E:69:CYS:O	1:E:73:ILE:HG23	2.04	0.58
1:D:10:ALA:HA	1:C:296:ASN:HD22	1.69	0.57
1:D:75:LEU:HB2	1:D:284:TYR:OH	2.05	0.56
1:D:283:PHE:CD2	1:C:77:PRO:HD2	2.41	0.56
1:B:104:ASP:HA	1:B:107:MET:SD	2.46	0.56
1:B:10:ALA:HA	1:A:296:ASN:ND2	2.22	0.55
1:D:10:ALA:HA	1:C:296:ASN:ND2	2.22	0.55
1:C:185:TRP:CD1	1:C:214:MET:HG3	2.42	0.55
1:B:10:ALA:HA	1:A:296:ASN:HD22	1.72	0.53
1:A:185:TRP:CD1	1:A:214:MET:HG3	2.44	0.53
1:E:235:VAL:HG13	1:A:290:VAL:HG22	1.92	0.52
1:B:134:LEU:HD11	1:B:163:MET:HE2	1.91	0.52
1:E:72:TYR:HA	1:E:74:GLN:OE1	2.10	0.52
1:E:259:ASN:HD22	1:E:262:LYS:HE3	1.75	0.52
1:B:306:GLU:OE1	1:C:356:ARG:NH1	2.43	0.51
1:B:97:TYR:CE2	1:A:226:ALA:HB1	2.44	0.51
1:B:235:VAL:HG13	1:C:290:VAL:HG22	1.91	0.51
1:E:185:TRP:CD1	1:E:214:MET:HG3	2.46	0.51
1:B:246:SER:HB2	1:C:279:LEU:HD13	1.93	0.51
1:D:76:ILE:N	1:D:77:PRO:HD2	2.26	0.50
1:B:296:ASN:ND2	1:C:10:ALA:HA	2.26	0.50
1:D:11:ASN:ND2	1:C:300:GLU:H	2.09	0.50
1:A:50:TYR:HA	1:A:54:LEU:HD22	1.93	0.50
1:B:97:TYR:HB2	1:B:305:PHE:CZ	2.47	0.50
1:E:60:LEU:O	1:E:64:LYS:HG3	2.12	0.50
1:E:43:TYR:CZ	1:E:274:PRO:HG3	2.47	0.49
1:E:249:LEU:HD23	1:E:252:LEU:HD12	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:309:TRP:NE1	1:E:358:SER:HA	2.27	0.49
1:D:152:PRO:HG3	1:A:373:MET:HG2	1.95	0.49
1:E:259:ASN:HB2	1:E:262:LYS:HD2	1.95	0.49
1:B:245:TYR:HE2	1:C:18:SER:HG	1.58	0.49
1:E:204:PRO:HB2	1:A:205:ILE:HG21	1.95	0.49
1:B:320:LEU:HD23	1:A:182:TRP:HH2	1.78	0.49
1:C:185:TRP:HD1	1:C:214:MET:HG3	1.77	0.49
1:E:93:TRP:HD1	1:E:297:PRO:HB3	1.77	0.48
1:C:93:TRP:HD1	1:C:297:PRO:HB3	1.77	0.48
1:B:294:LEU:HD21	1:A:233:PRO:HG2	1.94	0.48
1:B:283:PHE:CE1	1:A:242:VAL:HG12	2.46	0.48
1:A:97:TYR:HB2	1:A:305:PHE:CZ	2.49	0.48
1:C:2:THR:N	1:C:306:GLU:OE2	2.46	0.48
1:D:177:PRO:O	1:A:358:SER:OG	2.15	0.48
1:C:97:TYR:HB2	1:C:305:PHE:CZ	2.49	0.48
1:D:2:THR:N	1:D:306:GLU:OE2	2.47	0.48
1:E:185:TRP:HD1	1:E:214:MET:HG3	1.79	0.48
1:A:139:ILE:HD11	1:A:225:TYR:HB2	1.97	0.47
1:E:250:THR:CG2	1:A:276:PHE:HZ	2.27	0.47
1:D:43:TYR:CZ	1:D:274:PRO:HG3	2.49	0.47
1:D:211:LEU:HD12	1:E:113:PHE:CZ	2.50	0.47
1:E:2:THR:N	1:E:306:GLU:OE2	2.47	0.47
1:B:2:THR:N	1:B:306:GLU:OE2	2.48	0.47
1:B:93:TRP:HD1	1:B:297:PRO:HB3	1.78	0.47
1:E:89:VAL:HG11	1:E:291:ALA:HA	1.96	0.47
1:E:215:ASN:HB3	1:A:105:ARG:CZ	2.45	0.47
1:E:350:ALA:HB2	1:A:372:GLU:HB3	1.96	0.47
1:D:63:GLU:O	1:D:67:LEU:HG	2.15	0.47
1:D:350:ALA:HB2	1:E:372:GLU:HB3	1.96	0.47
1:E:97:TYR:HB2	1:E:305:PHE:CZ	2.49	0.47
1:E:226:ALA:HB1	1:A:97:TYR:CE2	2.49	0.47
1:A:248:PHE:CZ	1:A:281:PHE:HA	2.50	0.47
1:B:296:ASN:HD22	1:C:10:ALA:HA	1.78	0.47
1:D:28:ILE:HD11	1:D:32:LEU:HD23	1.95	0.47
1:D:105:ARG:CZ	1:C:215:ASN:HB3	2.45	0.47
1:D:185:TRP:CD1	1:D:218:ARG:HB2	2.50	0.46
1:B:129:ILE:HD12	1:B:129:ILE:HA	1.84	0.46
1:E:73:ILE:HG22	1:E:250:THR:CG2	2.45	0.46
1:A:145:THR:HG22	1:C:366:ILE:HD11	1.96	0.46
1:E:309:TRP:HE1	1:A:358:SER:HB3	1.80	0.46
1:A:185:TRP:HD1	1:A:214:MET:HG3	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:81:VAL:HB	1:A:283:PHE:CZ	2.45	0.46
1:E:245:TYR:CE2	1:A:18:SER:HB3	2.42	0.46
1:D:74:GLN:HB2	1:D:76:ILE:HD12	1.96	0.46
1:D:6:THR:HG21	1:C:228:ASP:OD1	2.16	0.46
1:E:185:TRP:CD1	1:E:218:ARG:HB2	2.51	0.46
1:E:353:GLN:O	1:E:356:ARG:NH1	2.48	0.46
1:A:89:VAL:HG11	1:A:291:ALA:HA	1.98	0.46
1:B:353:GLN:O	1:B:356:ARG:NH1	2.48	0.46
1:C:89:VAL:HG11	1:C:291:ALA:HA	1.98	0.46
1:D:274:PRO:HB2	1:D:277:THR:HB	1.98	0.45
1:B:89:VAL:HG11	1:B:291:ALA:HA	1.98	0.45
1:D:373:MET:HG2	1:B:152:PRO:HG3	1.98	0.45
1:D:376:GLN:NE2	1:D:376:GLN:HA	2.31	0.45
1:E:274:PRO:HB2	1:E:277:THR:HB	1.98	0.45
1:D:57:GLU:H	1:D:57:GLU:CD	2.20	0.45
1:C:126:ARG:HD2	1:C:323:ASP:OD1	2.16	0.45
1:B:354:PHE:CZ	1:A:300:GLU:HG2	2.52	0.45
1:B:105:ARG:CZ	1:A:215:ASN:HB3	2.47	0.45
1:C:164:THR:HG22	1:C:166:ALA:H	1.82	0.45
1:D:296:ASN:ND2	1:E:10:ALA:HA	2.31	0.45
1:B:211:LEU:HD12	1:C:113:PHE:CZ	2.52	0.45
1:D:93:TRP:HD1	1:D:297:PRO:HB3	1.81	0.45
1:B:139:ILE:HD11	1:B:225:TYR:HB2	1.99	0.45
1:B:248:PHE:CZ	1:B:281:PHE:HA	2.52	0.45
1:E:72:TYR:HB3	1:E:75:LEU:HD12	1.98	0.45
1:E:300:GLU:HG2	1:A:354:PHE:CZ	2.52	0.45
1:A:185:TRP:CD1	1:A:218:ARG:HB2	2.52	0.44
1:C:248:PHE:CZ	1:C:281:PHE:HA	2.52	0.44
1:E:235:VAL:HG23	1:A:28:ILE:CG2	2.47	0.44
1:C:289:LYS:HA	1:C:292:GLU:HB2	2.00	0.44
1:D:333:GLU:OE2	1:C:164:THR:HG23	2.18	0.43
1:B:369:ASN:O	1:B:373:MET:HG3	2.18	0.43
1:E:248:PHE:CZ	1:E:281:PHE:HA	2.52	0.43
1:D:97:TYR:HB2	1:D:305:PHE:CZ	2.52	0.43
1:E:73:ILE:HG22	1:E:250:THR:HG22	2.00	0.43
1:C:139:ILE:HD11	1:C:225:TYR:HB2	2.00	0.43
1:E:186:VAL:HB	1:A:325:MET:HE1	2.00	0.43
1:D:97:TYR:CE2	1:C:226:ALA:HB1	2.53	0.43
1:E:47:ARG:HG2	1:E:48:PHE:HD2	1.83	0.43
1:C:185:TRP:CD1	1:C:218:ARG:HB2	2.53	0.43
1:C:203:ASP:OD1	1:C:204:PRO:HD2	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:77:PRO:HD2	1:A:283:PHE:HE2	1.80	0.43
1:E:164:THR:HG22	1:E:166:ALA:H	1.83	0.43
1:A:93:TRP:HD1	1:A:297:PRO:HB3	1.84	0.43
1:D:215:ASN:HB3	1:E:105:ARG:CZ	2.49	0.43
1:E:74:GLN:OE1	1:E:75:LEU:HG	2.19	0.43
1:D:129:ILE:HG12	1:D:318:SER:HB2	2.01	0.43
1:E:211:LEU:HD12	1:A:113:PHE:CZ	2.54	0.43
1:D:226:ALA:HB1	1:E:97:TYR:CE2	2.54	0.43
1:B:203:ASP:OD1	1:B:204:PRO:HD2	2.19	0.43
1:C:154:ALA:HB1	1:C:163:MET:HE1	2.01	0.43
1:E:370:LYS:N	1:E:370:LYS:HD3	2.34	0.42
1:D:283:PHE:HE1	1:C:242:VAL:HG12	1.84	0.42
1:E:81:VAL:HG21	1:A:283:PHE:HE1	1.84	0.42
1:A:232:ILE:HD12	1:A:295:ILE:HD12	2.01	0.42
1:C:129:ILE:HD12	1:C:129:ILE:HA	1.84	0.42
1:A:74:GLN:H	1:A:74:GLN:HG3	1.74	0.42
1:C:28:ILE:O	1:C:32:LEU:HG	2.20	0.42
1:E:129:ILE:CG1	1:E:318:SER:HB2	2.49	0.42
1:A:176:LEU:HB2	1:A:180:MET:CE	2.49	0.42
1:C:129:ILE:CG1	1:C:318:SER:HB2	2.50	0.42
1:D:54:LEU:HD12	1:D:58:GLN:CB	2.48	0.42
1:D:248:PHE:CZ	1:D:281:PHE:HA	2.54	0.42
1:B:54:LEU:HG	1:B:58:GLN:HB3	2.01	0.42
1:D:204:PRO:HB2	1:E:205:ILE:HG21	2.01	0.42
1:E:139:ILE:HD11	1:E:225:TYR:HB2	2.01	0.42
1:E:28:ILE:O	1:E:32:LEU:HG	2.20	0.42
1:E:250:THR:HG21	1:A:276:PHE:HZ	1.85	0.42
1:E:296:ASN:ND2	1:A:10:ALA:HA	2.35	0.42
1:D:129:ILE:HD12	1:D:129:ILE:HA	1.88	0.41
1:E:289:LYS:HA	1:E:292:GLU:HB2	2.01	0.41
1:B:139:ILE:HD12	1:B:139:ILE:HA	1.88	0.41
1:D:109:LEU:CD2	1:C:211:LEU:HD23	2.50	0.41
1:E:269:LEU:H	1:E:269:LEU:HD23	1.85	0.41
1:D:140:LEU:HD23	1:D:140:LEU:HA	1.91	0.41
1:B:118:ASP:OD1	1:B:118:ASP:N	2.54	0.41
1:B:337:TYR:CG	1:B:343:PRO:HB3	2.56	0.41
1:A:54:LEU:HG	1:A:58:GLN:HB3	2.03	0.41
1:A:126:ARG:NH1	1:A:323:ASP:OD2	2.52	0.41
1:A:337:TYR:CG	1:A:343:PRO:HB3	2.55	0.41
1:D:139:ILE:HD11	1:D:225:TYR:HB2	2.01	0.41
1:D:296:ASN:HD22	1:E:10:ALA:HA	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:139:ILE:HD12	1:D:139:ILE:HA	1.88	0.41
1:D:323:ASP:HB3	1:D:324:GLU:OE1	2.21	0.41
1:B:129:ILE:CG1	1:B:318:SER:HB2	2.51	0.41
1:E:205:ILE:HD12	1:E:205:ILE:HA	1.90	0.41
1:E:250:THR:HG21	1:A:276:PHE:CZ	2.56	0.41
1:E:337:TYR:CG	1:E:343:PRO:HB3	2.56	0.41
1:B:97:TYR:HE2	1:A:226:ALA:HB1	1.85	0.41
1:B:332:MET:HG2	1:A:123:LEU:HG	2.02	0.41
1:D:332:MET:HG2	1:C:123:LEU:HG	2.02	0.40
1:D:337:TYR:CG	1:D:343:PRO:HB3	2.57	0.40
1:E:366:ILE:HD11	1:C:145:THR:HG22	2.03	0.40
1:E:204:PRO:HB2	1:A:205:ILE:CG2	2.50	0.40
1:C:122:ARG:HE	1:C:122:ARG:HB3	1.72	0.40
1:C:336:MET:HB3	1:C:336:MET:HE2	1.97	0.40
1:A:129:ILE:HD12	1:A:129:ILE:HA	1.84	0.40
1:B:67:LEU:HD11	1:B:264:TYR:CD1	2.57	0.40
1:C:252:LEU:HD23	1:C:252:LEU:HA	1.97	0.40
1:A:176:LEU:HB2	1:A:180:MET:HE1	2.04	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	374/585 (64%)	368 (98%)	6 (2%)	0	100	100
1	B	374/585 (64%)	370 (99%)	4 (1%)	0	100	100
1	C	374/585 (64%)	368 (98%)	6 (2%)	0	100	100
1	D	374/585 (64%)	368 (98%)	6 (2%)	0	100	100
1	E	374/585 (64%)	368 (98%)	6 (2%)	0	100	100
All	All	1870/2925 (64%)	1842 (98%)	28 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	339/524 (65%)	332 (98%)	7 (2%)	48	74
1	B	339/524 (65%)	333 (98%)	6 (2%)	54	78
1	C	339/524 (65%)	333 (98%)	6 (2%)	54	78
1	D	339/524 (65%)	328 (97%)	11 (3%)	34	60
1	E	339/524 (65%)	328 (97%)	11 (3%)	34	60
All	All	1695/2620 (65%)	1654 (98%)	41 (2%)	45	70

All (41) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	41	LEU
1	D	68	TYR
1	D	73	ILE
1	D	76	ILE
1	D	120	GLN
1	D	203	ASP
1	D	205	ILE
1	D	236	TYR
1	D	303	ASP
1	D	313	ARG
1	D	367	SER
1	B	68	TYR
1	B	80	PHE
1	B	203	ASP
1	B	236	TYR
1	B	262	LYS
1	B	313	ARG
1	E	47	ARG
1	E	67	LEU
1	E	71	SER
1	E	74	GLN

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Mol	Chain	Res	Type
1	E	76	ILE
1	E	236	TYR
1	E	242	VAL
1	E	262	LYS
1	E	313	ARG
1	E	367	SER
1	E	374	GLU
1	A	52	LEU
1	A	60	LEU
1	A	67	LEU
1	A	74	GLN
1	A	236	TYR
1	A	313	ARG
1	A	340	LYS
1	C	18	SER
1	C	51	ARG
1	C	123	LEU
1	C	203	ASP
1	C	236	TYR
1	C	313	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	11	ASN
1	D	208	GLN
1	B	208	GLN
1	E	159	GLN
1	E	208	GLN
1	A	208	GLN
1	A	267	HIS
1	A	369	ASN
1	C	208	GLN
1	C	369	ASN

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 10 ligands modelled in this entry, 7 are monoatomic - leaving 3 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	PAB	D	602	-	10,10,10	0.97	0	13,13,13	1.48	4 (30%)
3	PAB	B	602	-	10,10,10	1.08	1 (10%)	13,13,13	0.98	2 (15%)
3	PAB	A	602	-	10,10,10	1.08	0	13,13,13	1.34	1 (7%)

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	PAB	D	602	-	-	4/4/4/4	0/1/1/1
3	PAB	B	602	-	-	4/4/4/4	0/1/1/1
3	PAB	A	602	-	-	4/4/4/4	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	602	PAB	C4-N4	2.10	1.45	1.38

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	602	PAB	O2'-C1'-C1	2.62	121.56	114.84
3	B	602	PAB	O2'-C1'-C1	2.34	120.84	114.84
3	D	602	PAB	C5-C4-N4	-2.28	116.70	120.90
3	A	602	PAB	C3-C2-C1	-2.12	118.54	120.80
3	B	602	PAB	O2'-C1'-O1'	-2.07	118.90	123.35
3	D	602	PAB	C5-C4-C3	2.06	121.25	118.16
3	D	602	PAB	O2'-C1'-O1'	-2.03	118.98	123.35

There are no chirality outliers.

All (12) torsion outliers are listed below:

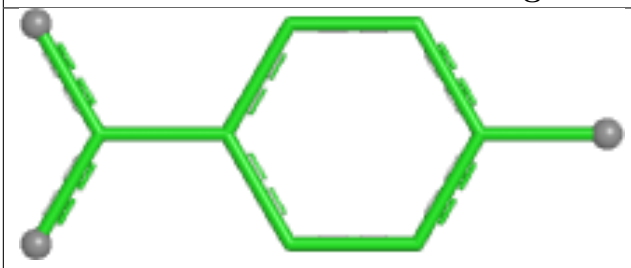
Mol	Chain	Res	Type	Atoms
3	B	602	PAB	C6-C1-C1'-O2'
3	A	602	PAB	C2-C1-C1'-O2'
3	D	602	PAB	C2-C1-C1'-O1'
3	B	602	PAB	C2-C1-C1'-O1'
3	B	602	PAB	C6-C1-C1'-O1'
3	A	602	PAB	C6-C1-C1'-O1'
3	D	602	PAB	C2-C1-C1'-O2'
3	B	602	PAB	C2-C1-C1'-O2'
3	A	602	PAB	C6-C1-C1'-O2'
3	D	602	PAB	C6-C1-C1'-O1'
3	A	602	PAB	C2-C1-C1'-O1'
3	D	602	PAB	C6-C1-C1'-O2'

There are no ring outliers.

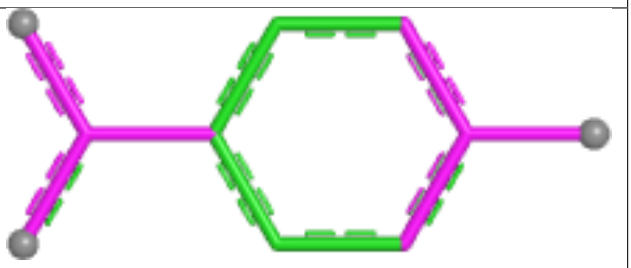
No monomer is involved in short contacts.

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 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.

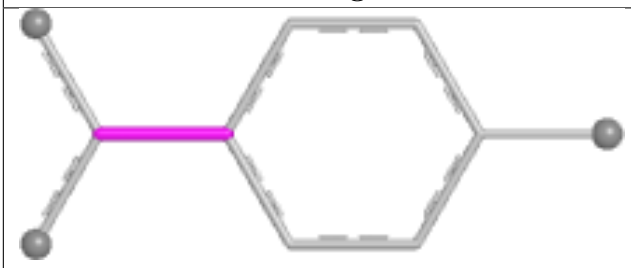
Ligand PAB D 602



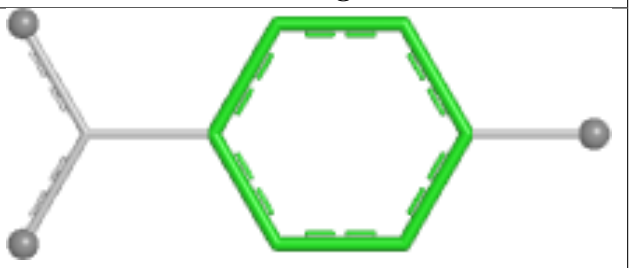
Bond lengths



Bond angles

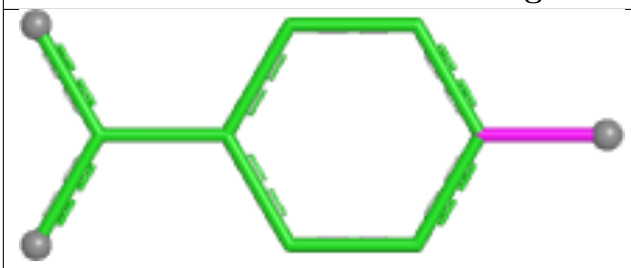


Torsions

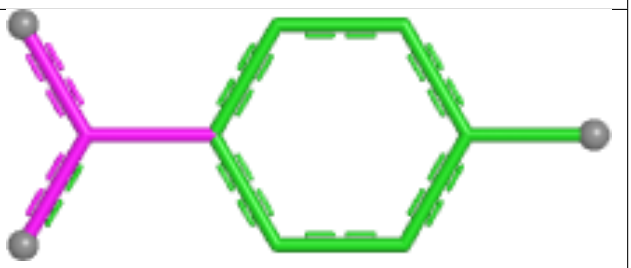


Rings

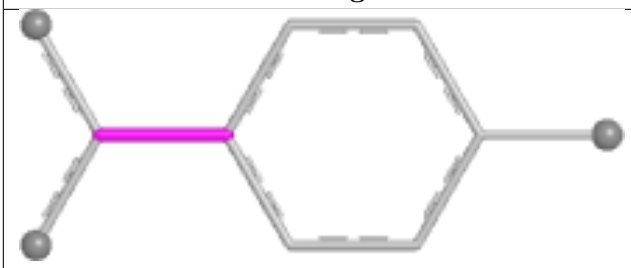
Ligand PAB B 602



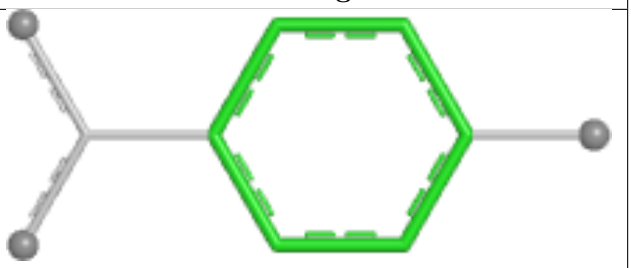
Bond lengths



Bond angles

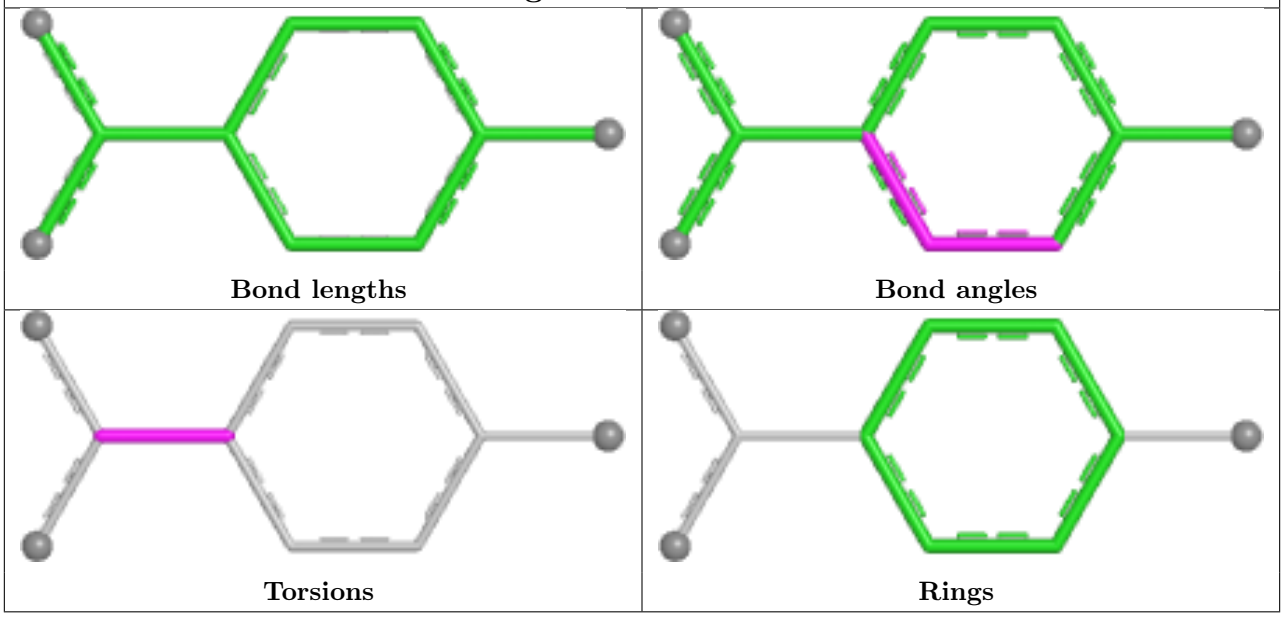


Torsions



Rings

Ligand PAB A 602



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.

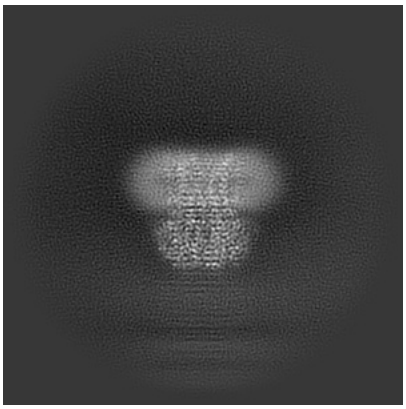
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-47309. These allow visual inspection of the internal detail of the map and identification of artifacts.

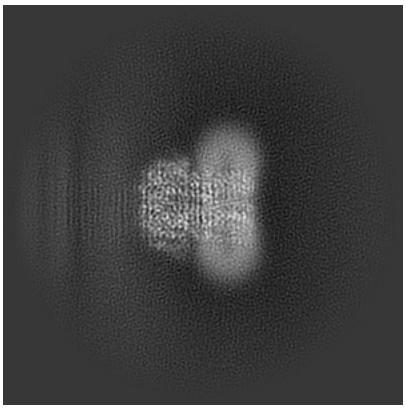
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

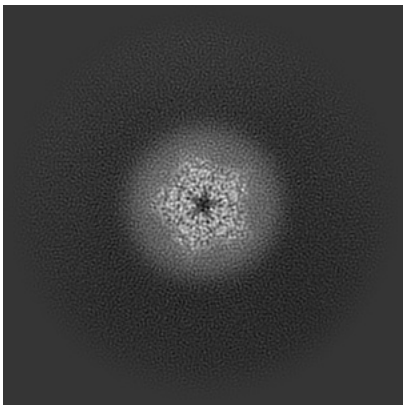
6.1.1 Primary map



X

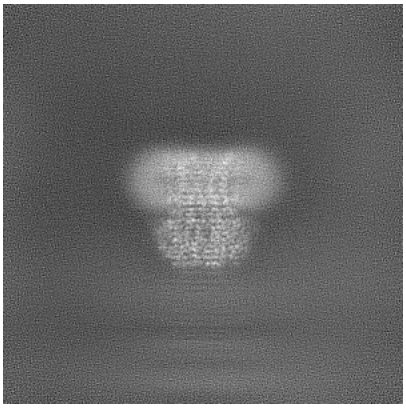


Y

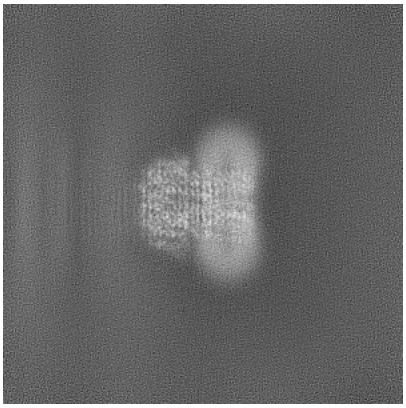


Z

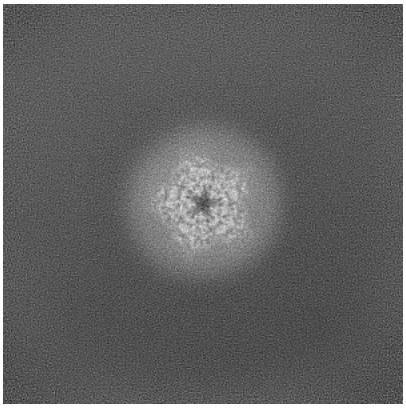
6.1.2 Raw map



X



Y

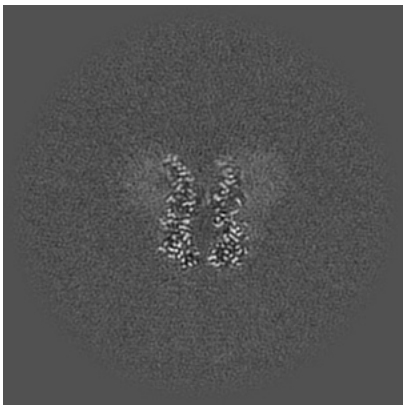


Z

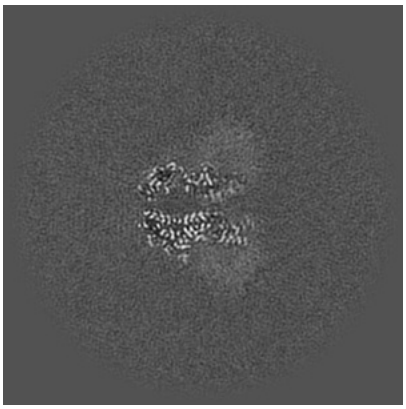
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

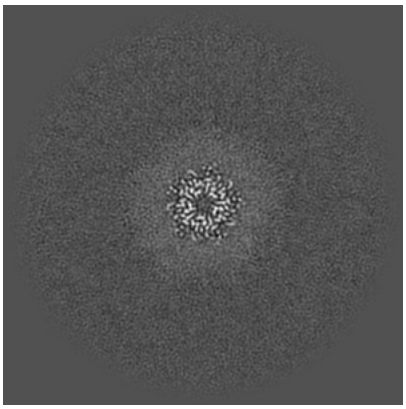
6.2.1 Primary map



X Index: 200

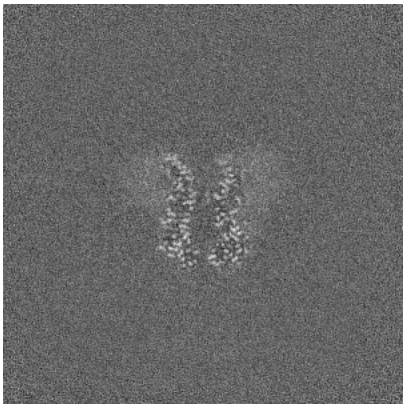


Y Index: 200

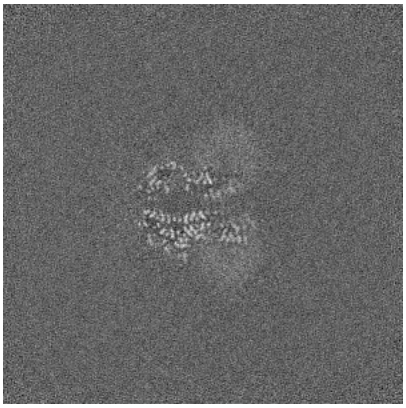


Z Index: 200

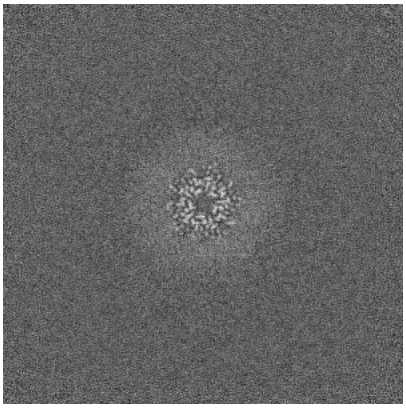
6.2.2 Raw map



X Index: 200



Y Index: 200

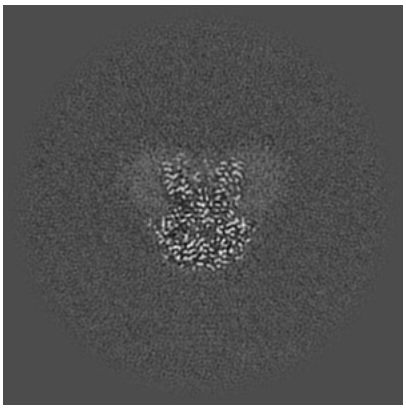


Z Index: 200

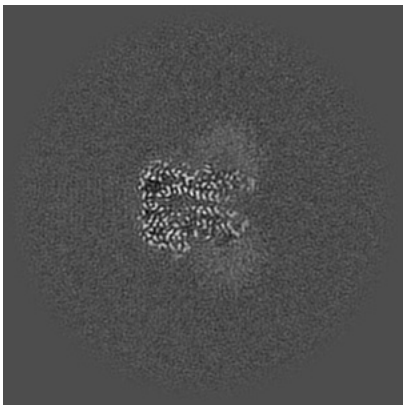
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

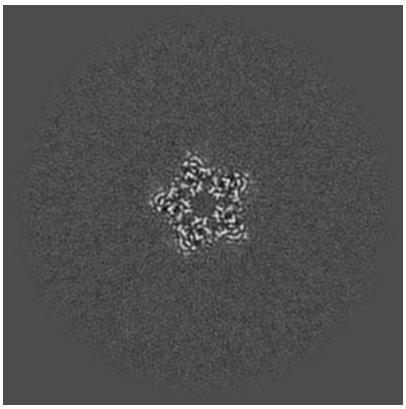
6.3.1 Primary map



X Index: 187

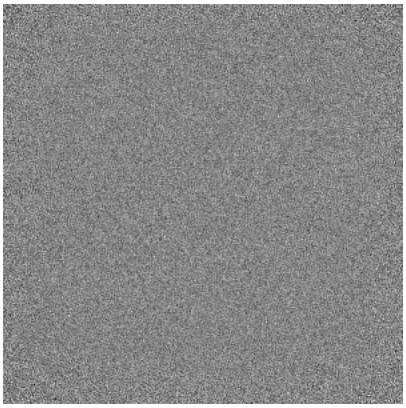


Y Index: 210

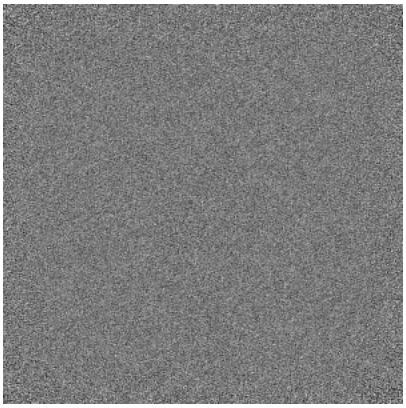


Z Index: 176

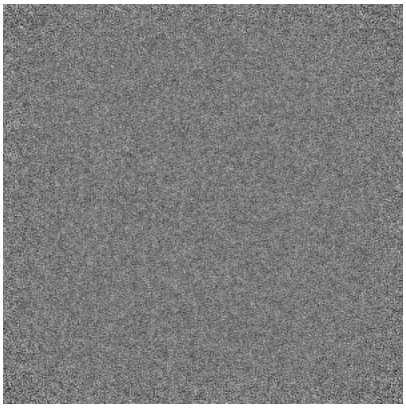
6.3.2 Raw map



X Index: 0



Y Index: 0

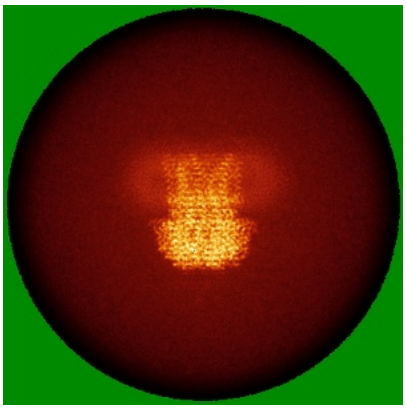


Z Index: 0

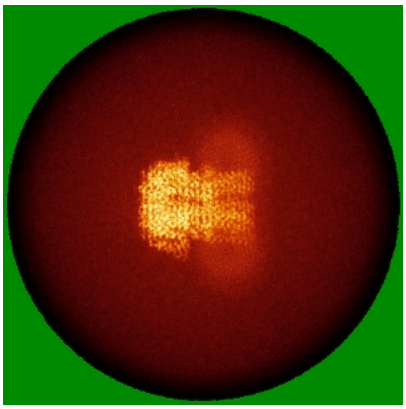
The images above show the largest variance slices of the map in three orthogonal directions.

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

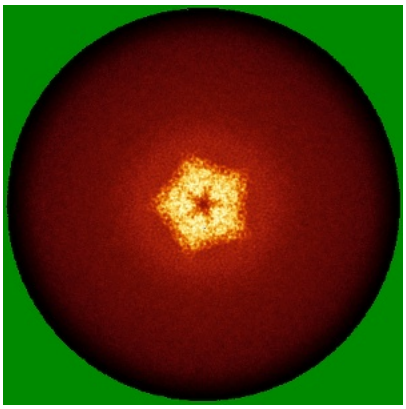
6.4.1 Primary map



X

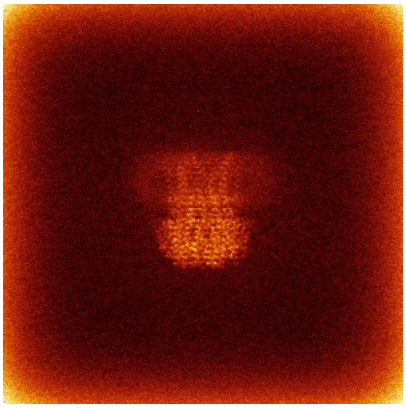


Y

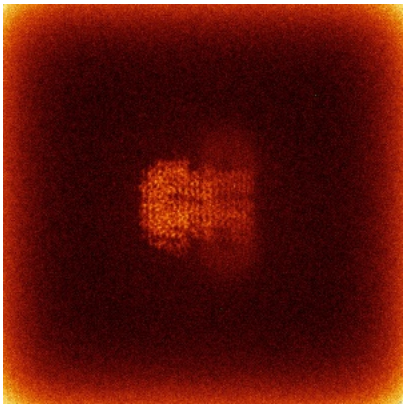


Z

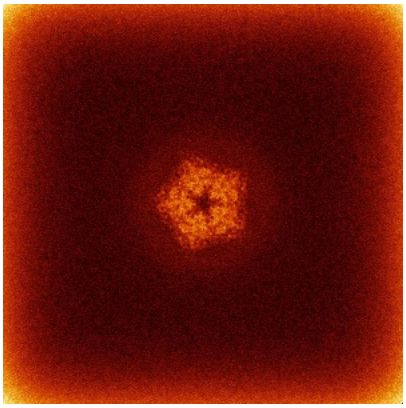
6.4.2 Raw map



X



Y



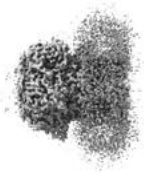
Z

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.

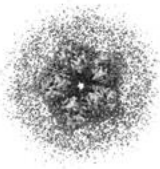
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X



Y

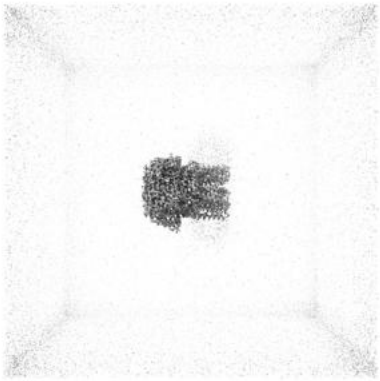


Z

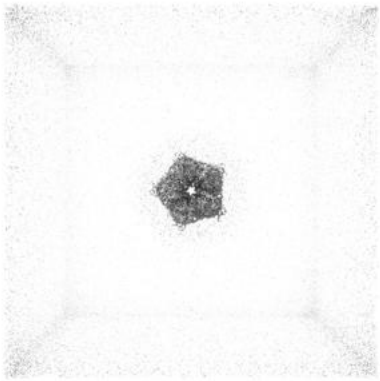
The images above show the 3D surface view of the map at the recommended contour level 0.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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.

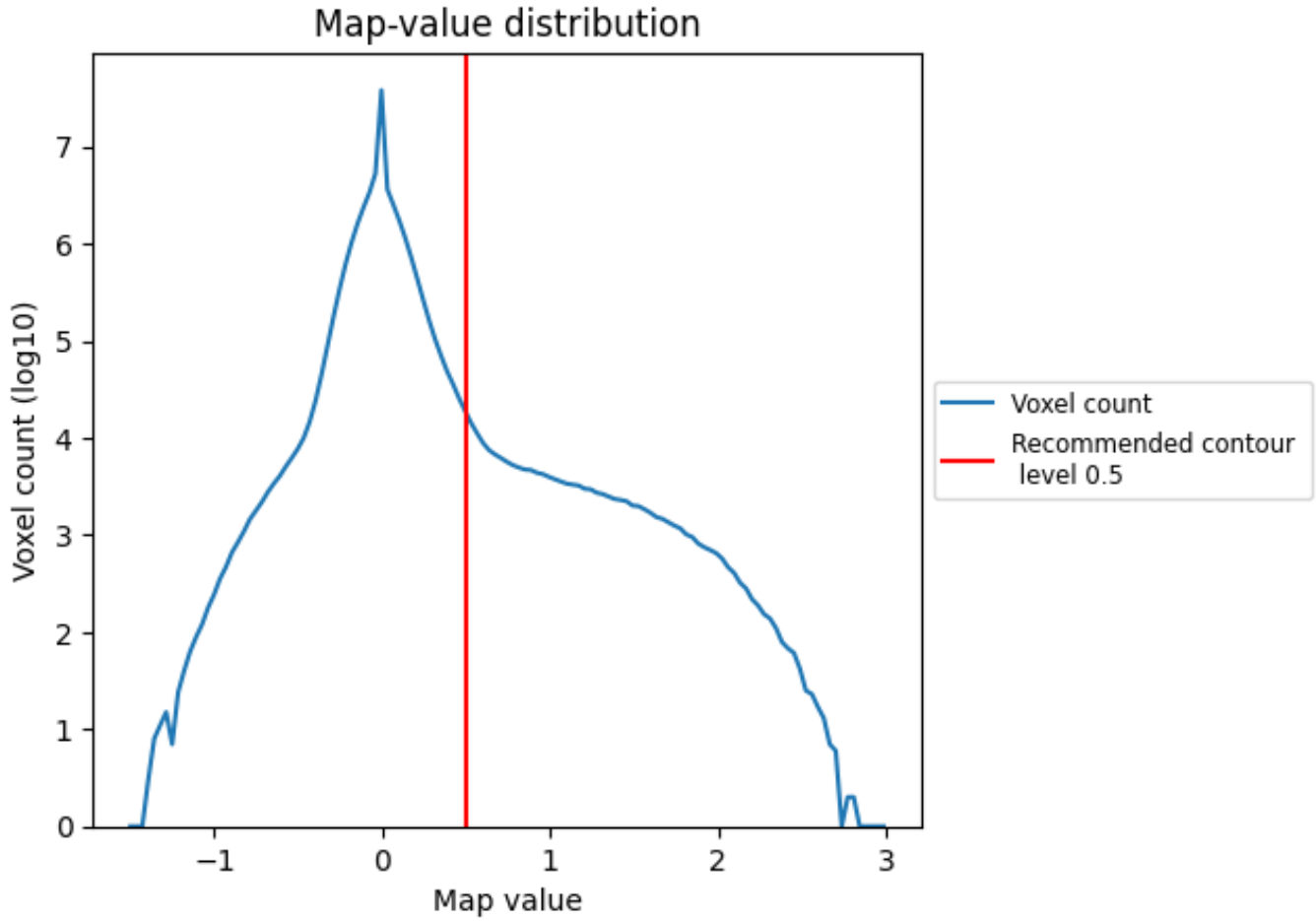
6.6 Mask visualisation (i)

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

7 Map analysis

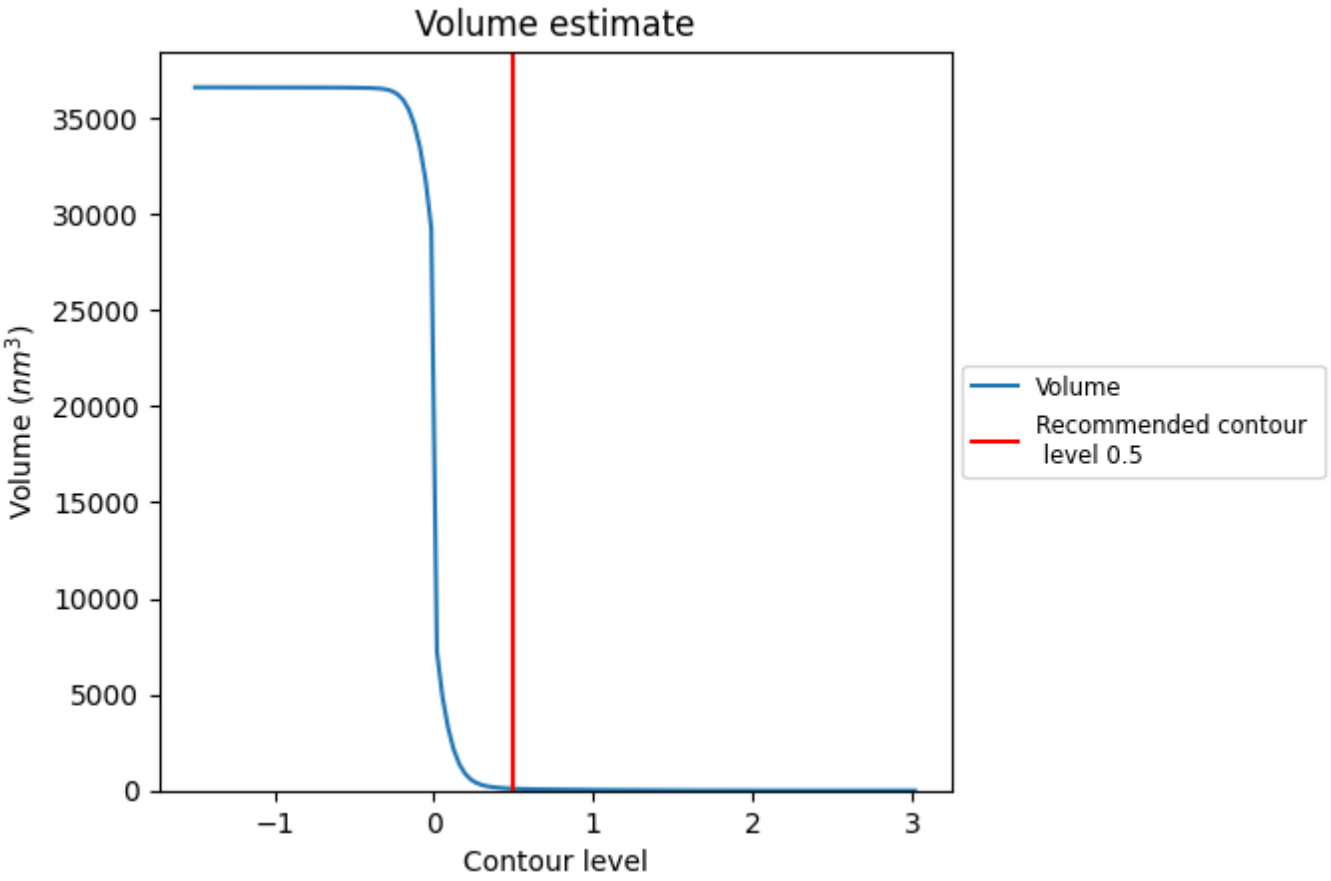
This section contains the results of statistical analysis of the map.

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.

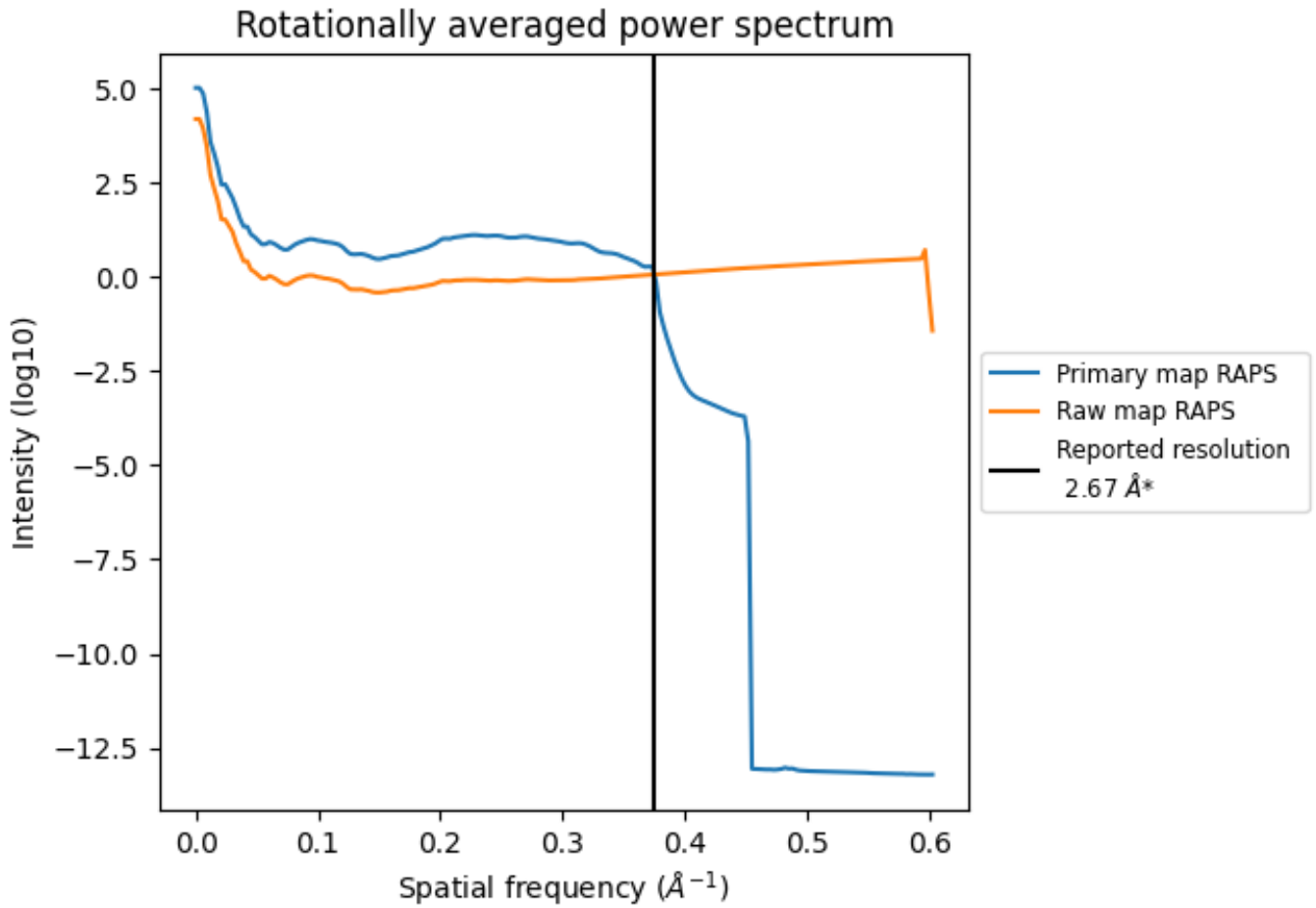
7.2 Volume estimate (i)



The volume at the recommended contour level is 96 nm^3; this corresponds to an approximate mass of 87 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)

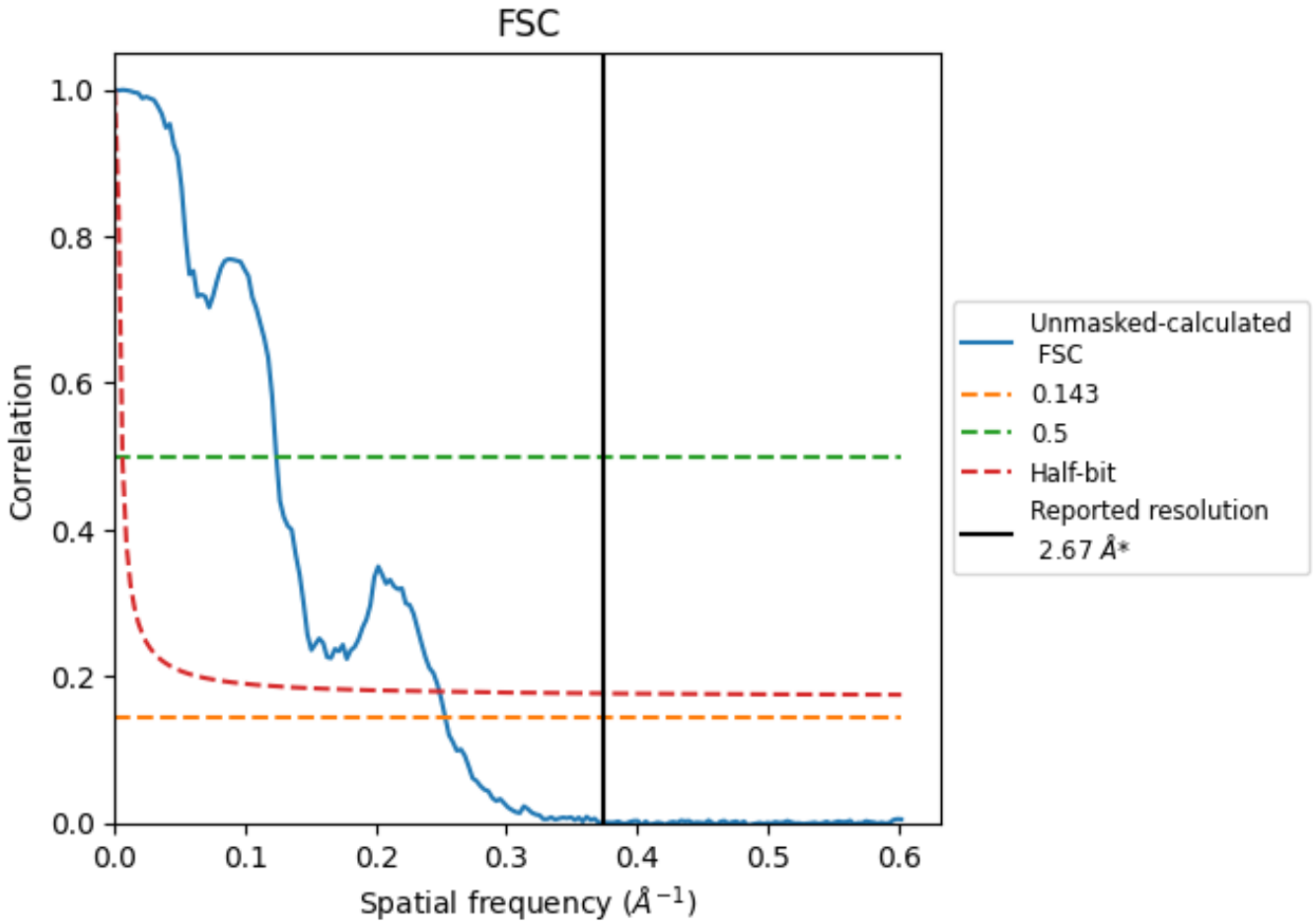


*Reported resolution corresponds to spatial frequency of 0.375 $Å^{-1}$

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 0.375 Å^{-1}

8.2 Resolution estimates (i)

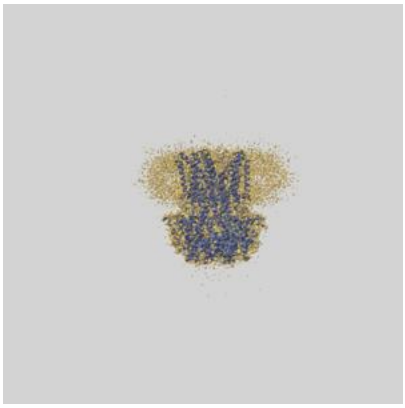
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.67	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.95	8.08	4.02

*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 3.95 differs from the reported value 2.67 by more than 10 %

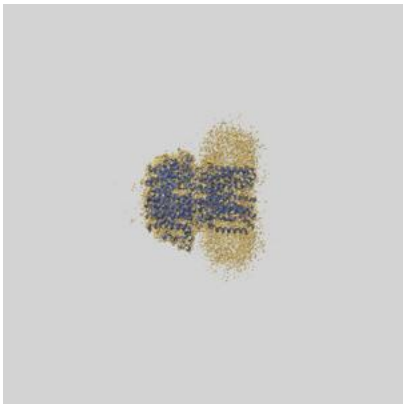
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-47309 and PDB model 9DYM. Per-residue inclusion information can be found in section 3 on page 5.

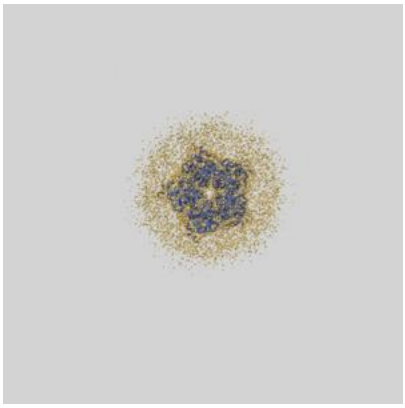
9.1 Map-model overlay



X



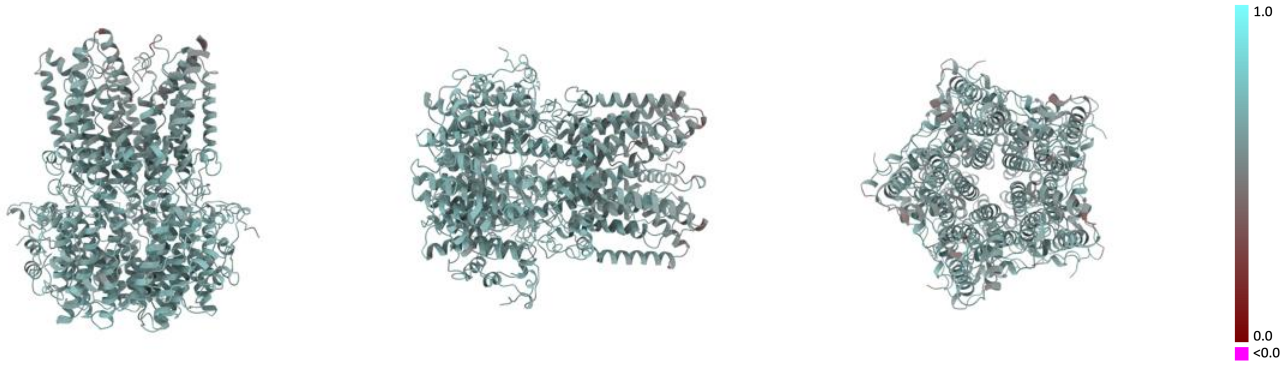
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.5 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.

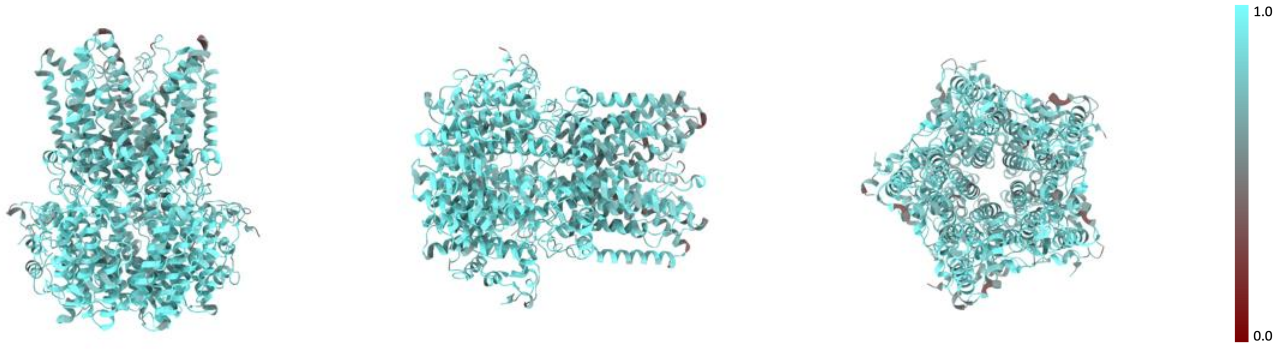
9.2 Q-score mapped to coordinate model (i)



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.

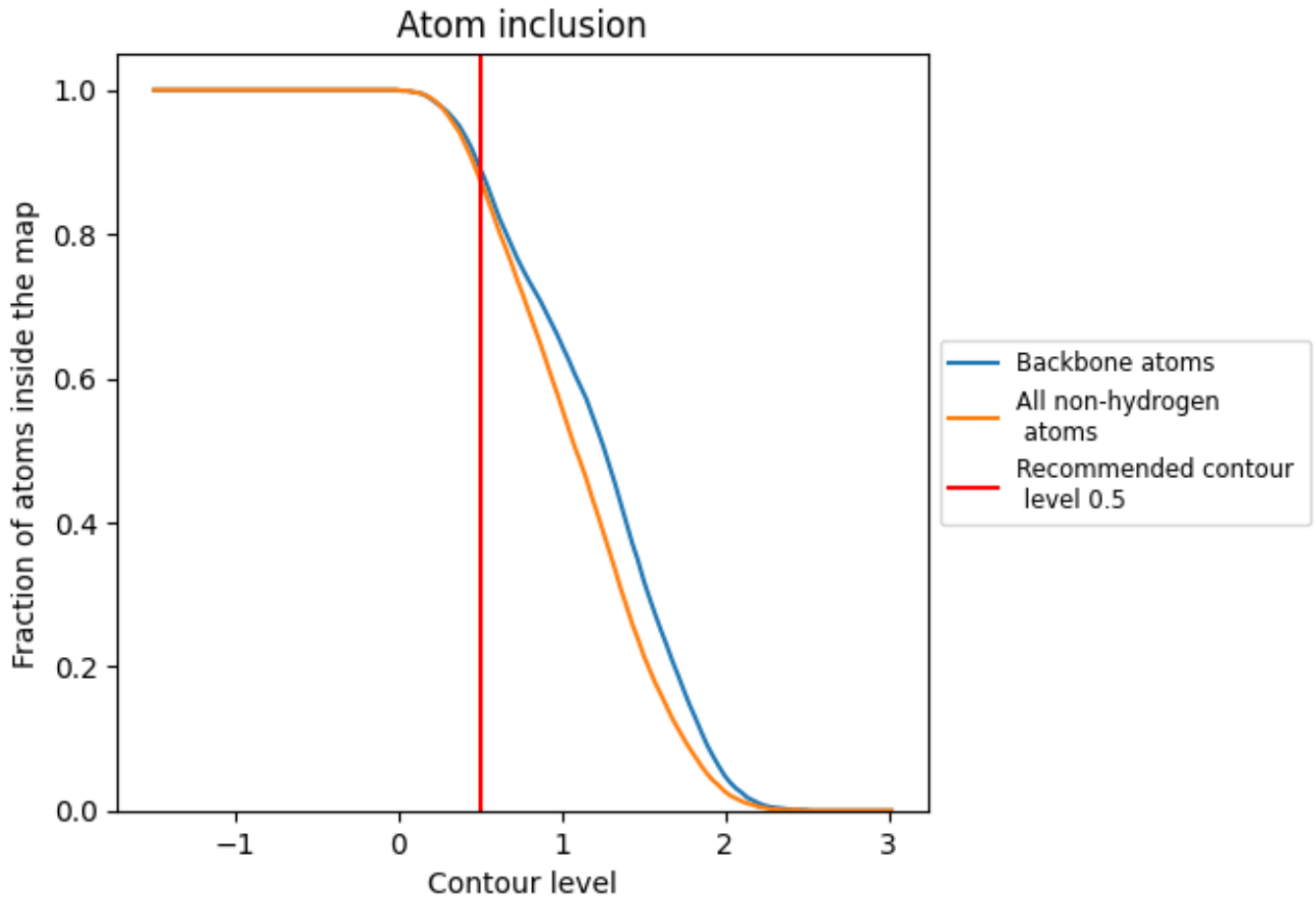
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.5).

9.4 Atom inclusion (i)



At the recommended contour level, 89% of all backbone atoms, 87% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8740	0.6100
A	0.8780	0.6100
B	0.8750	0.6100
C	0.8820	0.6140
D	0.8790	0.6100
E	0.8690	0.6060