



Full wwPDB EM Validation Report ⓘ

Nov 10, 2024 – 05:05 PM EST

PDB ID : 8U1H
EMDB ID : EMD-41811
Title : Axle-less Bacillus sp. PS3 F1 ATPase mutant
Authors : Furlong, E.J.; Zeng, Y.C.; Brown, S.H.J.; Sobti, M.; Stewart, A.G.
Deposited on : 2023-09-01
Resolution : 3.00 Å (reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.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) : 2.39

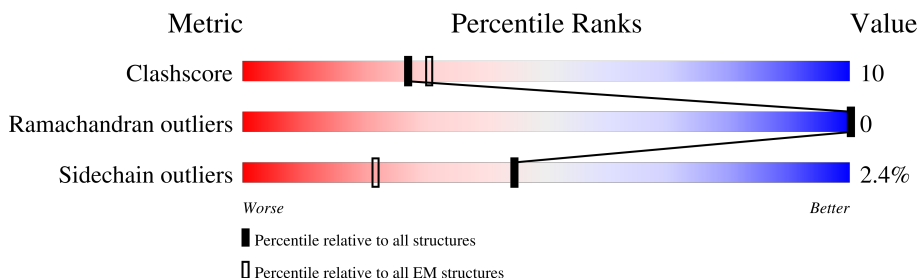
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.00 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	502	
1	B	502	
1	C	502	
2	D	484	
2	E	484	
2	F	484	
3	G	263	

2 Entry composition i

There are 7 unique types of molecules in this entry. The entry contains 22713 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 ATP synthase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	474	Total	C	N	O	S	0	0
			3637	2305	637	686	9		
1	B	425	Total	C	N	O	S	0	0
			3239	2050	571	609	9		
1	C	473	Total	C	N	O	S	0	0
			3629	2298	636	686	9		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	193	SER	CYS	engineered mutation	UNP A0A0M3VGF9
A	463	PHE	TRP	engineered mutation	UNP A0A0M3VGF9
B	193	SER	CYS	engineered mutation	UNP A0A0M3VGF9
B	463	PHE	TRP	engineered mutation	UNP A0A0M3VGF9
C	193	SER	CYS	engineered mutation	UNP A0A0M3VGF9
C	463	PHE	TRP	engineered mutation	UNP A0A0M3VGF9

- Molecule 2 is a protein called ATP synthase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	469	Total	C	N	O	S	0	0
			3615	2282	626	694	13		
2	E	450	Total	C	N	O	S	0	0
			3485	2200	605	668	12		
2	F	468	Total	C	N	O	S	0	0
			3611	2279	625	694	13		

There are 33 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-10	MET	-	initiating methionine	UNP A0A0M4U1P9
D	-9	HIS	-	expression tag	UNP A0A0M4U1P9
D	-8	HIS	-	expression tag	UNP A0A0M4U1P9

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-7	HIS	-	expression tag	UNP A0A0M4U1P9
D	-6	HIS	-	expression tag	UNP A0A0M4U1P9
D	-5	HIS	-	expression tag	UNP A0A0M4U1P9
D	-4	HIS	-	expression tag	UNP A0A0M4U1P9
D	-3	HIS	-	expression tag	UNP A0A0M4U1P9
D	-2	HIS	-	expression tag	UNP A0A0M4U1P9
D	-1	HIS	-	expression tag	UNP A0A0M4U1P9
D	0	HIS	-	expression tag	UNP A0A0M4U1P9
E	-10	MET	-	initiating methionine	UNP A0A0M4U1P9
E	-9	HIS	-	expression tag	UNP A0A0M4U1P9
E	-8	HIS	-	expression tag	UNP A0A0M4U1P9
E	-7	HIS	-	expression tag	UNP A0A0M4U1P9
E	-6	HIS	-	expression tag	UNP A0A0M4U1P9
E	-5	HIS	-	expression tag	UNP A0A0M4U1P9
E	-4	HIS	-	expression tag	UNP A0A0M4U1P9
E	-3	HIS	-	expression tag	UNP A0A0M4U1P9
E	-2	HIS	-	expression tag	UNP A0A0M4U1P9
E	-1	HIS	-	expression tag	UNP A0A0M4U1P9
E	0	HIS	-	expression tag	UNP A0A0M4U1P9
F	-10	MET	-	initiating methionine	UNP A0A0M4U1P9
F	-9	HIS	-	expression tag	UNP A0A0M4U1P9
F	-8	HIS	-	expression tag	UNP A0A0M4U1P9
F	-7	HIS	-	expression tag	UNP A0A0M4U1P9
F	-6	HIS	-	expression tag	UNP A0A0M4U1P9
F	-5	HIS	-	expression tag	UNP A0A0M4U1P9
F	-4	HIS	-	expression tag	UNP A0A0M4U1P9
F	-3	HIS	-	expression tag	UNP A0A0M4U1P9
F	-2	HIS	-	expression tag	UNP A0A0M4U1P9
F	-1	HIS	-	expression tag	UNP A0A0M4U1P9
F	0	HIS	-	expression tag	UNP A0A0M4U1P9

- Molecule 3 is a protein called ATP synthase gamma chain.

Mol	Chain	Residues	Atoms				AltConf	Trace	
			Total	C	N	O			S
3	G	167	1332	839	242	245	6	0	0

There are 10 discrepancies between the modelled and reference sequences:

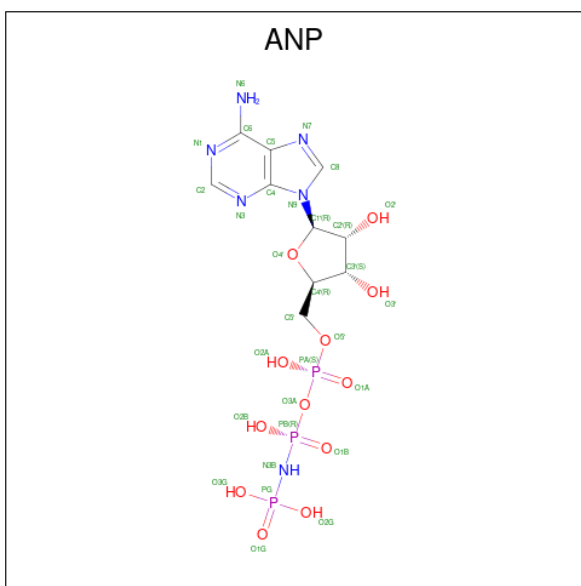
Chain	Residue	Modelled	Actual	Comment	Reference
G	4	MET	-	initiating methionine	UNP A0A0M4TPJ7
G	108	CYS	SER	engineered mutation	UNP A0A0M4TPJ7

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Chain	Residue	Modelled	Actual	Comment	Reference
G	188I	TRP	-	insertion	UNP A0A0M4TPJ7
G	188J	SER	-	insertion	UNP A0A0M4TPJ7
G	188K	HIS	-	insertion	UNP A0A0M4TPJ7
G	188L	PRO	-	insertion	UNP A0A0M4TPJ7
G	188M	GLN	-	insertion	UNP A0A0M4TPJ7
G	188N	PHE	-	insertion	UNP A0A0M4TPJ7
G	188O	GLU	-	insertion	UNP A0A0M4TPJ7
G	189D	CYS	ILE	engineered mutation	UNP A0A0M4TPJ7

- Molecule 4 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$).

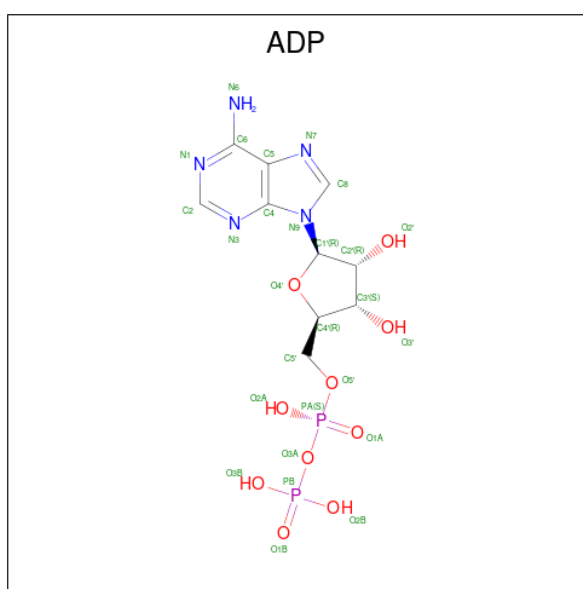


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
4	A	1	Total	C	N	O	P	0
			31	10	6	12	3	
4	B	1	Total	C	N	O	P	0
			31	10	6	12	3	
4	C	1	Total	C	N	O	P	0
			31	10	6	12	3	
4	F	1	Total	C	N	O	P	0
			31	10	6	12	3	

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
5	A	1	Total Mg 1 1	0
5	C	1	Total Mg 1 1	0
5	D	1	Total Mg 1 1	0
5	F	1	Total Mg 1 1	0

- Molecule 6 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					AltConf
6	D	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 7 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).

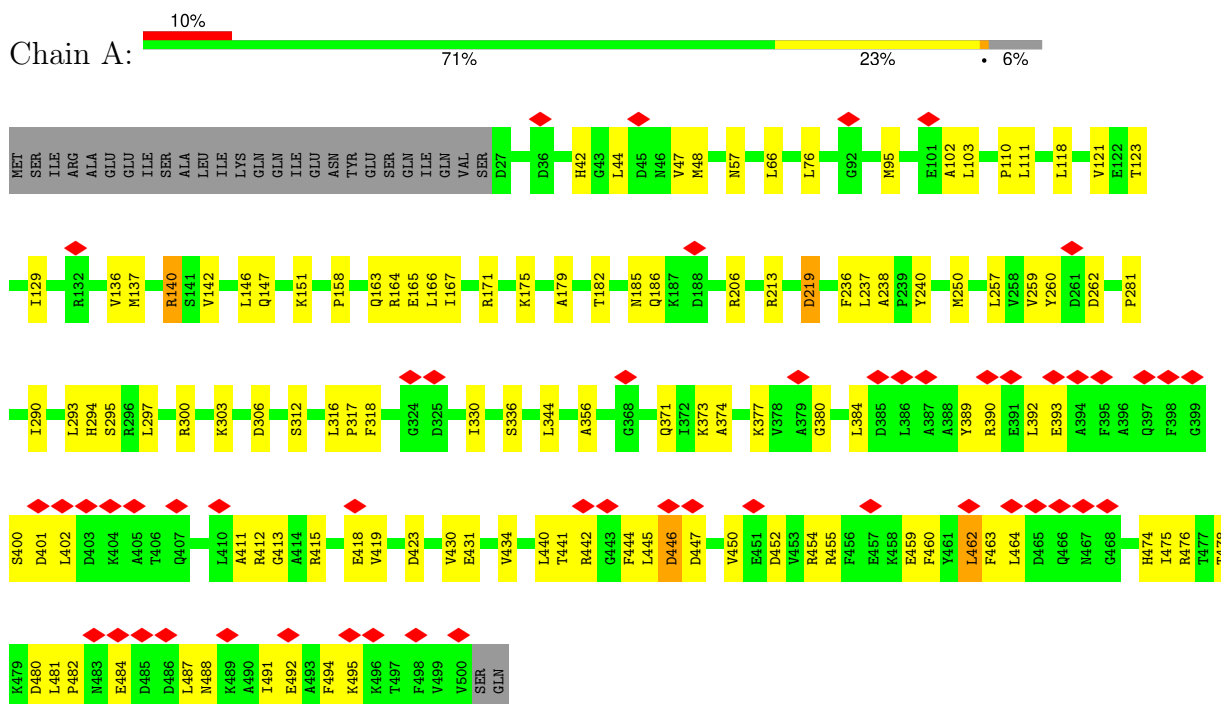


Mol	Chain	Residues	Atoms			AltConf
			Total	O	P	
7	D	1	5	4	1	0
7	E	1	5	4	1	0

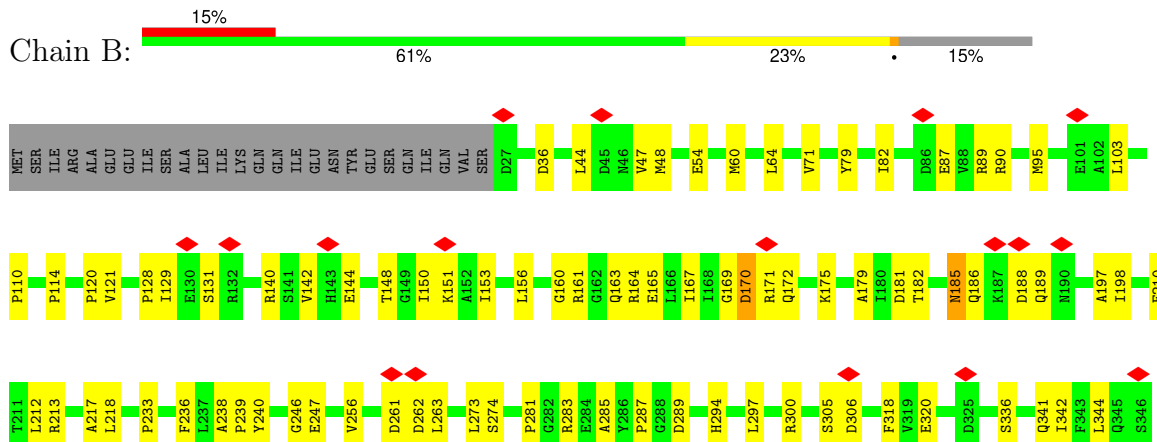
3 Residue-property plots

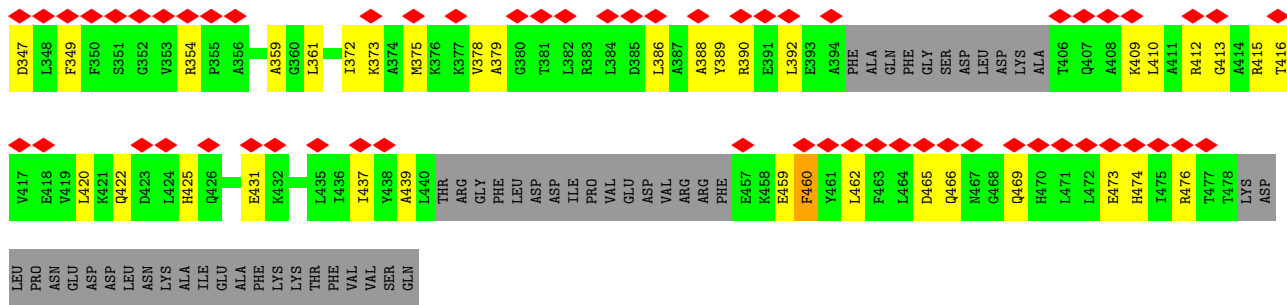
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

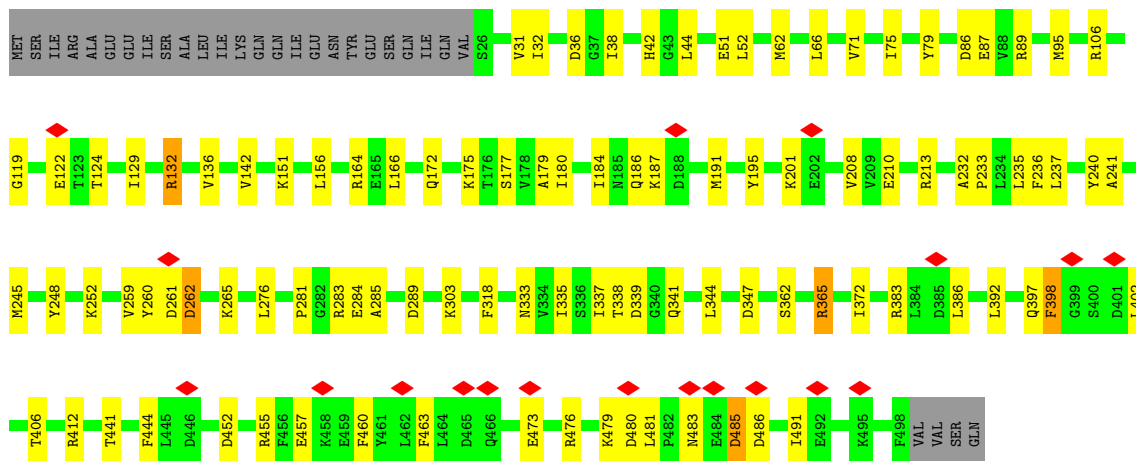


- Molecule 1: ATP synthase subunit alpha

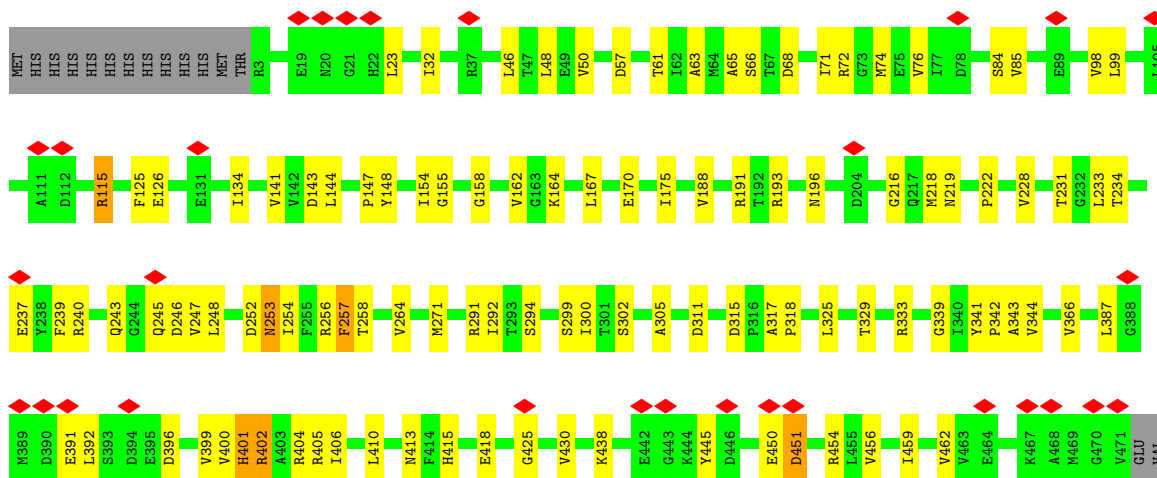
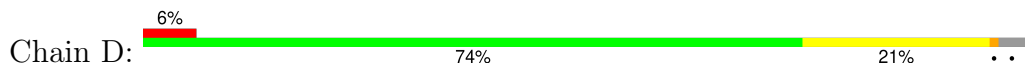




• Molecule 1: ATP synthase subunit alpha

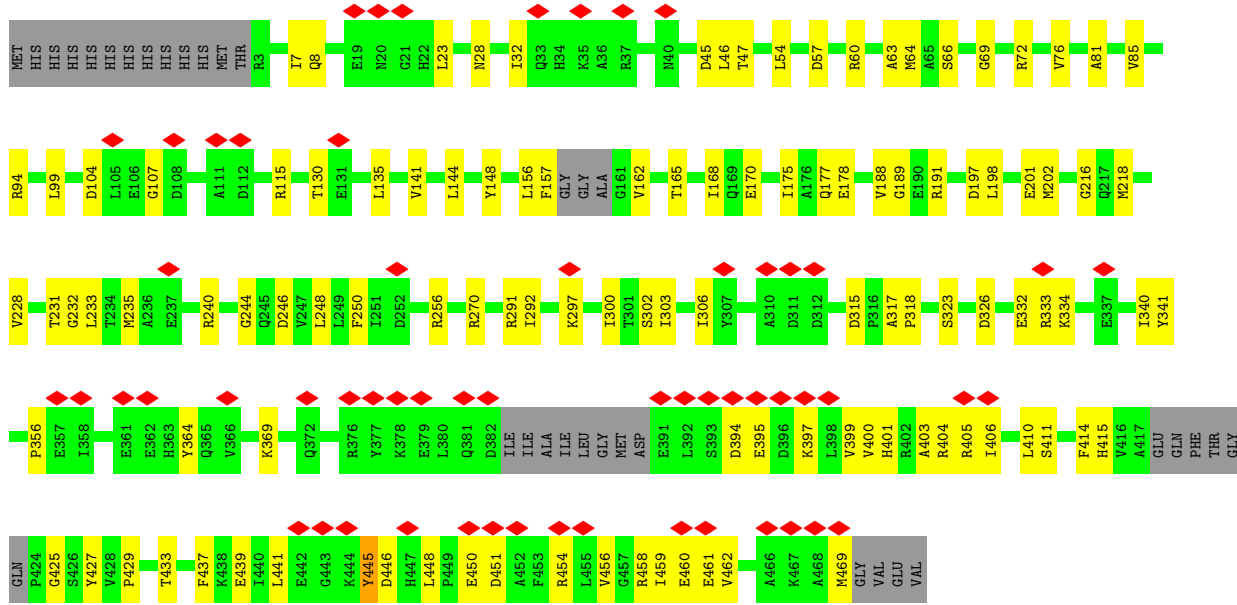


• Molecule 2: ATP synthase subunit beta

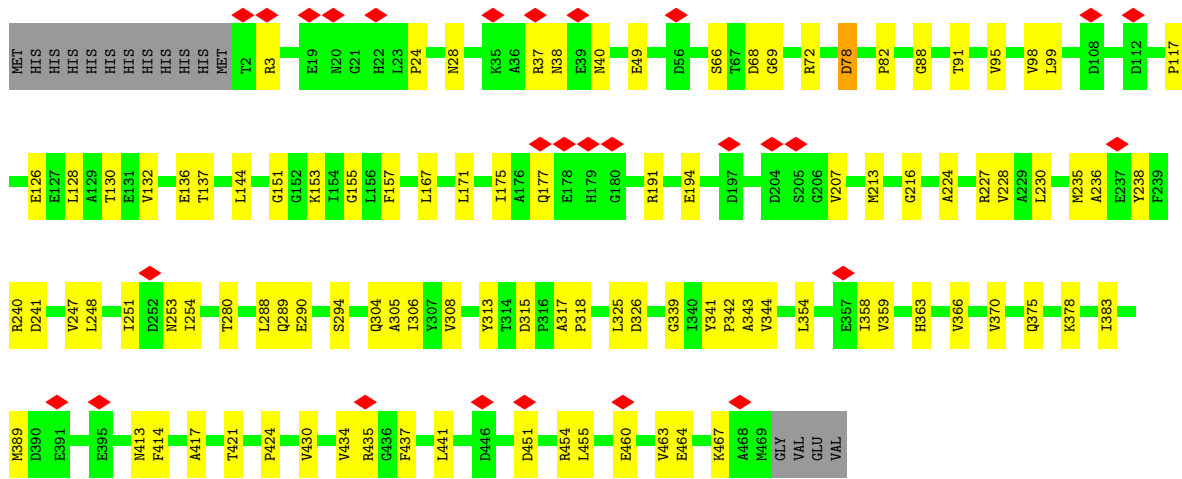
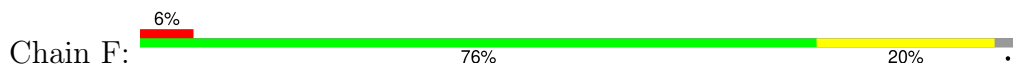


• Molecule 2: ATP synthase subunit beta

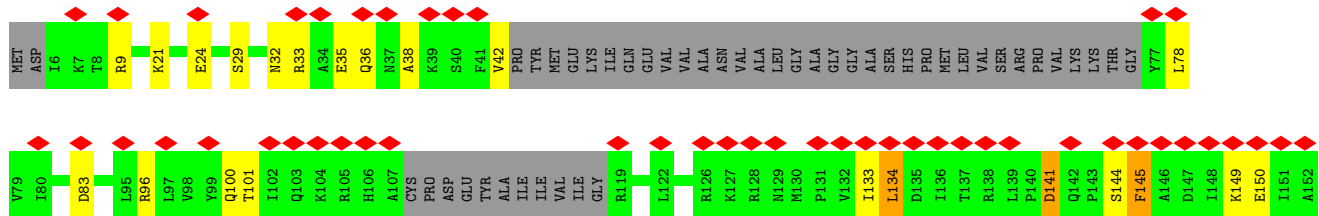


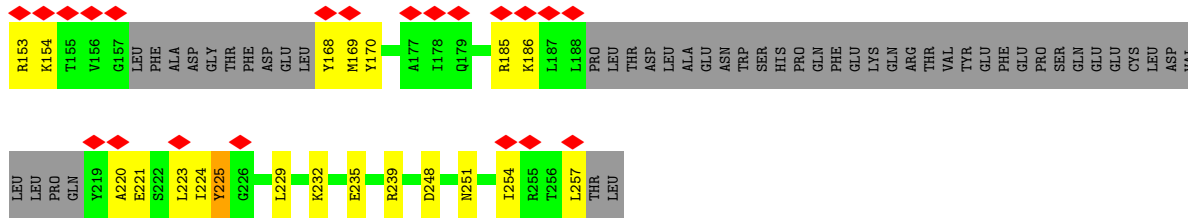


• Molecule 2: ATP synthase subunit beta



• Molecule 3: ATP synthase gamma chain





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	23813	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 ($e^-/\text{\AA}^2$)	59	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.736	Depositor
Minimum map value	-0.408	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.039	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	205.0, 205.0, 205.0	wwPDB
Map dimensions	250, 250, 250	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.82, 0.82, 0.82	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ANP, PO4, ADP

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	0.27	0/3696	0.52	0/5006
1	B	0.27	0/3288	0.52	0/4453
1	C	0.28	0/3688	0.51	0/4994
2	D	0.29	0/3678	0.52	0/4982
2	E	0.28	0/3544	0.54	0/4796
2	F	0.28	0/3674	0.51	0/4977
3	G	0.27	0/1346	0.56	0/1806
All	All	0.28	0/22914	0.52	0/31014

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3637	0	3714	73	0
1	B	3239	0	3323	75	0
1	C	3629	0	3700	66	0
2	D	3615	0	3626	76	0
2	E	3485	0	3495	78	0
2	F	3611	0	3620	64	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	G	1332	0	1377	30	0
4	A	31	0	13	1	0
4	B	31	0	13	4	0
4	C	31	0	13	4	0
4	F	31	0	13	0	0
5	A	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
5	F	1	0	0	0	0
6	D	27	0	12	2	0
7	D	5	0	0	1	0
7	E	5	0	0	0	0
All	All	22713	0	22919	437	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 10.

All (437) 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:66:LEU:HB3	2:D:72:ARG:HD2	1.61	0.83
3:G:221:GLU:HA	3:G:224:ILE:HD12	1.62	0.80
1:C:397:GLN:HG2	2:F:383:ILE:HG12	1.64	0.80
1:C:172:GLN:H	4:C:601:ANP:HNB1	1.27	0.79
2:D:400:VAL:HG12	2:D:404:ARG:HH21	1.49	0.77
1:C:106:ARG:NH2	1:C:119:GLY:O	2.20	0.74
3:G:9:ARG:HE	3:G:257:LEU:HD21	1.53	0.72
1:C:75:ILE:HG21	1:C:79:TYR:HB3	1.71	0.72
2:E:156:LEU:HD13	2:E:303:ILE:HG23	1.72	0.70
1:C:480:ASP:OD1	1:C:481:LEU:N	2.25	0.69
1:B:431:GLU:HG2	1:B:476:ARG:HG2	1.73	0.68
1:B:175:LYS:HG2	1:B:344:LEU:HD12	1.75	0.68
1:C:38:ILE:HD13	1:C:276:LEU:HB3	1.75	0.68
2:E:233:LEU:HD21	2:E:291:ARG:HB2	1.76	0.67
1:B:188:ASP:OD2	1:B:189:GLN:NE2	2.27	0.67
2:D:402:ARG:O	2:D:406:ILE:HG13	1.94	0.67
1:A:475:ILE:HD11	1:A:482:PRO:HD3	1.77	0.67
2:D:50:VAL:HA	2:D:61:THR:HG22	1.76	0.66
1:A:137:MET:HG3	2:E:104:ASP:HA	1.78	0.65
1:A:206:ARG:NH1	2:D:125:PHE:O	2.28	0.65
1:C:476:ARG:O	1:C:479:LYS:NZ	2.23	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:140:ARG:NH1	1:A:306:ASP:OD1	2.26	0.65
2:F:98:VAL:HG12	2:F:99:LEU:HD23	1.79	0.65
2:D:339:GLY:HA3	2:D:454:ARG:HH22	1.62	0.64
3:G:185:ARG:HE	3:G:186:LYS:N	1.95	0.64
1:C:166:LEU:HB2	1:C:338:THR:HG21	1.79	0.64
2:E:401:HIS:O	2:E:405:ARG:HG3	1.97	0.64
1:B:336:SER:O	2:F:191:ARG:NH1	2.31	0.64
1:A:147:GLN:O	1:A:185:ASN:ND2	2.30	0.64
1:B:185:ASN:O	1:B:185:ASN:ND2	2.27	0.64
2:E:7:ILE:HD12	2:E:8:GLN:HG3	1.80	0.64
2:D:164:LYS:N	6:D:501:ADP:O2B	2.27	0.64
2:D:170:GLU:OE1	2:D:415:HIS:N	2.30	0.64
1:C:156:LEU:O	1:C:383:ARG:NH2	2.30	0.63
1:A:447:ASP:OD2	1:A:495:LYS:NZ	2.30	0.63
1:B:129:ILE:O	1:B:300:ARG:NH2	2.30	0.63
2:F:254:ILE:HD11	2:F:288:LEU:HD21	1.80	0.63
2:D:243:GLN:HE22	2:D:245:GLN:HB3	1.62	0.62
2:D:126:GLU:OE1	2:D:126:GLU:N	2.21	0.62
1:A:110:PRO:HB3	1:A:238:ALA:HA	1.81	0.62
1:A:142:VAL:HA	1:A:303:LYS:HD3	1.80	0.62
1:C:179:ALA:HB2	1:C:318:PHE:HZ	1.63	0.62
2:E:94:ARG:NH2	2:E:107:GLY:O	2.28	0.62
1:C:186:GLN:HB3	1:C:191:MET:HB3	1.82	0.62
1:A:478:THR:OG1	1:A:480:ASP:OD1	2.15	0.61
1:A:151:LYS:NZ	1:A:419:VAL:O	2.33	0.61
1:C:392:LEU:HD13	1:C:406:THR:HG23	1.82	0.61
2:F:137:THR:HG22	2:F:175:ILE:HD11	1.82	0.61
1:B:151:LYS:HD2	1:B:420:LEU:HA	1.83	0.60
1:A:484:GLU:O	1:A:488:ASN:ND2	2.30	0.60
1:C:142:VAL:HA	1:C:303:LYS:HD3	1.83	0.60
2:E:403:ALA:HA	2:E:406:ILE:HD12	1.82	0.60
1:B:281:PRO:HB2	1:B:285:ALA:HA	1.83	0.60
2:D:84:SER:HB3	2:D:115:ARG:HB3	1.83	0.60
2:E:188:VAL:HG22	2:E:228:VAL:HG23	1.83	0.60
1:A:455:ARG:NH1	1:A:459:GLU:OE2	2.34	0.60
1:C:201:LYS:NZ	2:F:326:ASP:OD2	2.34	0.60
2:E:170:GLU:HG3	2:E:414:PHE:CD2	2.36	0.60
1:C:365:ARG:HH22	2:D:191:ARG:NH2	2.00	0.59
1:C:164:ARG:NH2	1:C:339:ASP:OD1	2.35	0.59
1:A:240:TYR:OH	1:A:293:LEU:O	2.19	0.59
1:C:362:SER:O	2:D:333:ARG:NH2	2.35	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:142:VAL:HG11	1:B:160:GLY:HA3	1.84	0.59
3:G:220:ALA:HA	3:G:223:LEU:HD23	1.85	0.59
1:A:102:ALA:HB3	1:A:123:THR:HG23	1.84	0.59
2:D:451:ASP:N	2:D:451:ASP:OD1	2.35	0.59
1:B:79:TYR:HA	1:B:82:ILE:HD12	1.84	0.59
1:B:163:GLN:NE2	1:B:165:GLU:OE1	2.36	0.59
2:D:243:GLN:NE2	2:D:245:GLN:HB3	2.19	0.58
1:C:210:GLU:OE1	1:C:213:ARG:NH1	2.36	0.58
2:E:162:VAL:HG22	2:E:333:ARG:HG2	1.83	0.58
1:A:66:LEU:HB3	2:E:72:ARG:HD3	1.84	0.58
2:E:141:VAL:HB	2:E:410:LEU:HD22	1.84	0.58
1:C:87:GLU:OE2	1:C:89:ARG:NH1	2.35	0.58
2:D:292:ILE:HG21	2:D:302:SER:HB2	1.85	0.58
1:A:402:LEU:HA	3:G:32:ASN:HD21	1.68	0.58
4:C:601:ANP:O2A	4:C:601:ANP:O2B	2.22	0.58
1:C:483:ASN:ND2	1:C:486:ASP:OD2	2.37	0.58
1:C:180:ILE:HD11	1:C:208:VAL:HG22	1.85	0.57
2:D:188:VAL:HG11	2:D:257:PHE:HB2	1.86	0.57
1:A:446:ASP:N	1:A:446:ASP:OD1	2.35	0.57
1:B:179:ALA:HB2	1:B:318:PHE:HZ	1.69	0.57
1:A:219:ASP:OD1	1:A:219:ASP:N	2.36	0.57
1:A:240:TYR:HE1	1:A:297:LEU:HB2	1.70	0.56
2:D:451:ASP:HA	2:D:454:ARG:HG2	1.86	0.56
3:G:145:PHE:O	3:G:149:LYS:HB2	2.05	0.56
1:A:171:ARG:O	4:A:601:ANP:N3B	2.39	0.56
2:E:177:GLN:HG3	2:E:178:GLU:HG2	1.87	0.56
2:E:340:ILE:HG22	2:E:340:ILE:O	2.06	0.56
2:E:395:GLU:O	2:E:399:VAL:HG12	2.06	0.56
2:E:240:ARG:HG3	2:E:300:ILE:HG13	1.87	0.56
1:C:452:ASP:OD2	1:C:455:ARG:NH2	2.33	0.55
6:D:501:ADP:H8	6:D:501:ADP:H5'1	1.72	0.55
3:G:150:GLU:O	3:G:154:LYS:HG2	2.06	0.55
1:A:281:PRO:HD3	2:D:271:MET:HE1	1.89	0.55
2:F:24:PRO:HB3	2:F:28:ASN:HD22	1.71	0.55
3:G:144:SER:O	3:G:225:TYR:OH	2.25	0.55
1:B:341:GLN:HE21	1:B:361:LEU:HD12	1.70	0.55
2:F:153:LYS:NZ	2:F:289:GLN:O	2.37	0.55
1:B:181:ASP:OD1	1:B:425:HIS:ND1	2.40	0.55
1:B:140:ARG:NH1	1:B:306:ASP:OD1	2.39	0.55
2:F:82:PRO:HG2	2:F:117:PRO:HB3	1.89	0.54
1:C:339:ASP:OD2	2:D:193:ARG:NE	2.37	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:439:GLU:OE1	2:E:445:TYR:OH	2.16	0.54
2:F:155:GLY:HA3	2:F:325:LEU:HD13	1.89	0.54
1:B:129:ILE:HG23	1:B:240:TYR:HB3	1.90	0.53
1:B:167:ILE:HG13	1:B:342:ILE:HD12	1.90	0.53
4:B:601:ANP:O2B	4:B:601:ANP:O3G	2.25	0.53
2:D:392:LEU:HB3	2:D:396:ASP:HB2	1.90	0.53
2:E:244:GLY:HA3	2:E:297:LYS:HE3	1.89	0.53
2:D:155:GLY:HA3	2:D:325:LEU:HD13	1.90	0.53
2:E:165:THR:HG22	2:E:198:LEU:HD13	1.90	0.53
3:G:221:GLU:OE2	3:G:221:GLU:N	2.27	0.53
1:B:44:LEU:O	2:F:72:ARG:NH2	2.42	0.53
2:E:458:ARG:O	2:E:460:GLU:N	2.38	0.53
1:B:156:LEU:HD21	1:B:359:ALA:HB2	1.90	0.53
1:C:232:ALA:HA	1:C:235:LEU:HD12	1.90	0.53
2:E:292:ILE:HG21	2:E:302:SER:HB2	1.90	0.53
2:D:253:ASN:HB3	2:D:256:ARG:HG3	1.91	0.53
1:C:262:ASP:HB3	1:C:265:LYS:HG3	1.90	0.53
2:D:341:TYR:HA	2:D:343:ALA:H	1.74	0.53
2:F:95:VAL:HG22	2:F:213:MET:HB2	1.90	0.52
1:A:240:TYR:CE1	1:A:297:LEU:HB2	2.44	0.52
1:B:169:GLY:O	1:B:320:GLU:HA	2.09	0.52
1:B:54:GLU:OE2	1:B:60:MET:HG2	2.09	0.52
2:D:175:ILE:HG21	2:D:248:LEU:HD13	1.92	0.52
1:A:95:MET:HE1	1:A:237:LEU:HD13	1.92	0.52
2:D:66:SER:OG	2:D:68:ASP:OD2	2.23	0.52
1:A:295:SER:HB2	2:E:218:MET:HB3	1.92	0.52
2:D:237:GLU:HA	2:D:300:ILE:HD11	1.90	0.52
2:F:126:GLU:OE2	2:F:126:GLU:N	2.27	0.52
1:B:44:LEU:HD13	1:B:47:VAL:HG21	1.92	0.52
1:B:185:ASN:HD22	1:B:185:ASN:C	2.11	0.52
1:A:377:LYS:HD2	1:A:481:LEU:HD23	1.91	0.51
2:D:233:LEU:HD21	2:D:291:ARG:HB2	1.92	0.51
2:D:245:GLN:HG2	2:D:246:ASP:N	2.25	0.51
2:F:49:GLU:OE2	2:F:227:ARG:NE	2.41	0.51
1:B:213:ARG:HG3	1:B:218:LEU:HD12	1.93	0.51
2:E:175:ILE:HG13	2:E:248:LEU:HD11	1.92	0.51
1:A:374:ALA:HA	1:A:481:LEU:HD22	1.93	0.51
1:A:430:VAL:O	1:A:434:VAL:HG13	2.11	0.51
2:F:463:VAL:O	2:F:467:LYS:HG3	2.11	0.51
1:C:483:ASN:ND2	1:C:485:ASP:OD2	2.41	0.51
2:D:85:VAL:HG21	2:D:231:THR:HG23	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:96:ARG:O	3:G:100:GLN:HG2	2.10	0.51
1:C:175:LYS:HG2	1:C:344:LEU:HD12	1.93	0.50
2:D:317:ALA:HB3	2:D:318:PRO:HD3	1.93	0.50
3:G:33:ARG:NH2	3:G:36:GLN:OE1	2.40	0.50
2:E:54:LEU:HD11	2:E:60:ARG:HB2	1.93	0.50
1:A:175:LYS:HB3	1:A:318:PHE:CE2	2.46	0.50
1:C:335:ILE:HG12	1:C:341:GLN:HG2	1.94	0.50
2:D:222:PRO:HB2	2:D:264:VAL:HG23	1.94	0.50
2:E:405:ARG:NH1	2:E:446:ASP:HA	2.26	0.50
1:A:336:SER:O	2:E:191:ARG:NH2	2.44	0.50
1:B:361:LEU:HD12	1:B:361:LEU:O	2.12	0.50
2:F:227:ARG:HD2	2:F:230:LEU:HD12	1.93	0.50
1:A:259:VAL:HG22	1:A:316:LEU:HD12	1.93	0.49
1:A:401:ASP:O	3:G:32:ASN:ND2	2.45	0.49
2:F:315:ASP:HB3	2:F:318:PRO:HD2	1.95	0.49
1:A:463:PHE:CE2	1:A:494:PHE:HB2	2.47	0.49
2:F:359:VAL:HG23	2:F:363:HIS:HB3	1.93	0.49
1:C:172:GLN:N	4:C:601:ANP:HNB1	2.01	0.49
2:D:141:VAL:HB	2:D:410:LEU:HB3	1.95	0.49
2:E:405:ARG:NH2	2:E:445:TYR:O	2.43	0.49
1:A:48:MET:HE3	2:E:69:GLY:HA2	1.94	0.49
2:D:71:ILE:O	2:D:74:MET:HG2	2.11	0.49
3:G:9:ARG:HH21	3:G:257:LEU:HD11	1.77	0.49
1:C:179:ALA:HB2	1:C:318:PHE:CZ	2.46	0.49
2:D:341:TYR:HA	2:D:343:ALA:N	2.28	0.49
2:E:456:VAL:HG23	2:E:461:GLU:CD	2.33	0.49
2:F:175:ILE:HG22	2:F:248:LEU:HD21	1.93	0.49
1:A:103:LEU:HD12	1:A:121:VAL:HG11	1.95	0.49
2:D:164:LYS:HD2	2:D:305:ALA:HB1	1.94	0.49
2:E:394:ASP:N	2:E:394:ASP:OD1	2.46	0.49
2:D:401:HIS:HE1	2:D:405:ARG:HH22	1.61	0.49
2:F:366:VAL:HG21	2:F:434:VAL:HG13	1.94	0.49
1:B:128:PRO:HG2	1:B:131:SER:HB2	1.95	0.48
1:C:129:ILE:HG12	1:C:240:TYR:HB3	1.95	0.48
2:E:23:LEU:HD11	2:E:57:ASP:HA	1.93	0.48
2:D:415:HIS:HD2	2:D:425:GLY:HA3	1.78	0.48
2:E:404:ARG:NH2	2:E:450:GLU:OE2	2.37	0.48
3:G:133:ILE:HB	3:G:134:LEU:HD12	1.93	0.48
1:C:281:PRO:HB3	1:C:285:ALA:HA	1.95	0.48
2:E:315:ASP:HB3	2:E:318:PRO:HD2	1.95	0.48
1:B:233:PRO:HG3	1:B:273:LEU:HD13	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:158:GLY:HA3	2:D:162:VAL:HG21	1.95	0.48
2:E:178:GLU:HG3	2:E:427:TYR:CD2	2.48	0.48
2:E:228:VAL:HA	2:E:231:THR:HG22	1.95	0.48
2:D:450:GLU:H	2:D:450:GLU:CD	2.17	0.48
2:E:170:GLU:HG3	2:E:414:PHE:CG	2.48	0.48
2:E:197:ASP:O	2:E:201:GLU:HG3	2.14	0.48
2:E:415:HIS:CD2	2:E:425:GLY:HA3	2.48	0.48
2:F:136:GLU:HG3	2:F:430:VAL:HG23	1.96	0.48
1:A:423:ASP:OD1	1:A:454:ARG:NH2	2.46	0.48
1:A:411:ALA:O	1:A:415:ARG:HG2	2.14	0.48
2:D:239:PHE:HB3	2:D:247:VAL:HG21	1.94	0.48
2:E:232:GLY:O	2:E:235:MET:HB2	2.14	0.48
3:G:78:LEU:HB3	3:G:169:MET:HB2	1.96	0.48
2:F:167:LEU:O	2:F:171:LEU:HD23	2.13	0.48
3:G:185:ARG:HE	3:G:186:LYS:H	1.60	0.48
2:D:240:ARG:HD3	2:D:300:ILE:HG13	1.96	0.47
3:G:21:LYS:O	3:G:24:GLU:HG3	2.13	0.47
1:B:44:LEU:HD12	1:B:71:VAL:HG11	1.95	0.47
1:C:151:LYS:NZ	1:C:457:GLU:OE2	2.34	0.47
2:F:435:ARG:NH2	2:F:460:GLU:OE2	2.46	0.47
1:A:158:PRO:HB3	1:A:371:GLN:HG3	1.97	0.47
2:F:98:VAL:HG21	2:F:224:ALA:HA	1.95	0.47
2:D:252:ASP:OD2	2:D:256:ARG:NH2	2.47	0.47
1:A:389:TYR:CG	1:A:413:GLY:HA3	2.50	0.47
1:C:365:ARG:HH22	2:D:191:ARG:CZ	2.27	0.47
2:E:341:TYR:O	2:E:411:SER:OG	2.24	0.47
2:E:458:ARG:O	2:E:458:ARG:HG3	2.14	0.47
2:F:308:VAL:HG21	2:F:313:TYR:CE2	2.49	0.47
2:F:342:PRO:HG3	2:F:414:PHE:CZ	2.50	0.47
1:C:195:TYR:OH	1:C:261:ASP:OD2	2.12	0.47
1:B:283:ARG:NH1	2:F:315:ASP:OD2	2.48	0.47
1:C:289:ASP:OD1	1:C:289:ASP:N	2.45	0.47
2:D:445:TYR:CD2	2:D:459:ILE:HD11	2.49	0.47
1:A:459:GLU:O	1:A:462:LEU:HD12	2.15	0.47
1:C:62:MET:HE1	1:C:237:LEU:HD21	1.97	0.47
2:E:28:ASN:OD1	2:E:81:ALA:N	2.48	0.47
2:E:216:GLY:HA3	2:E:228:VAL:HG11	1.96	0.47
1:C:44:LEU:HB2	1:C:71:VAL:HG21	1.97	0.46
2:E:85:VAL:O	2:E:115:ARG:HA	2.14	0.46
2:F:177:GLN:HG2	2:F:207:VAL:HG21	1.97	0.46
1:A:373:LYS:HG2	1:A:377:LYS:HE3	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:388:ALA:HB1	1:B:409:LYS:HZ1	1.80	0.46
2:D:239:PHE:O	2:D:243:GLN:HB3	2.15	0.46
1:A:418:GLU:HG3	1:A:450:VAL:HG13	1.96	0.46
1:B:349:PHE:HA	1:B:354:ARG:NH2	2.31	0.46
1:B:144:GLU:HG3	1:B:161:ARG:HG3	1.96	0.46
1:A:167:ILE:O	1:A:318:PHE:HA	2.16	0.46
1:A:431:GLU:OE1	1:A:476:ARG:NH1	2.49	0.46
1:B:153:ILE:HD11	1:B:342:ILE:HD13	1.97	0.46
1:C:122:GLU:HA	1:C:122:GLU:OE1	2.15	0.46
2:F:191:ARG:NH2	2:F:194:GLU:OE2	2.47	0.46
2:F:413:ASN:ND2	2:F:424:PRO:O	2.49	0.46
1:A:129:ILE:O	1:A:300:ARG:NH1	2.47	0.46
1:C:248:TYR:O	1:C:252:LYS:HG2	2.15	0.46
1:A:48:MET:HB3	2:E:69:GLY:HA2	1.98	0.46
1:B:247:GLU:OE2	1:B:300:ARG:NH1	2.49	0.46
1:B:392:LEU:HD12	1:B:409:LYS:NZ	2.31	0.46
1:C:177:SER:OG	4:C:601:ANP:O1A	2.21	0.46
1:C:283:ARG:HG2	1:C:284:GLU:HG3	1.98	0.46
1:C:398:PHE:HB2	1:C:402:LEU:HD21	1.97	0.46
2:E:156:LEU:CD1	2:E:303:ILE:HG23	2.42	0.46
1:B:150:ILE:HB	1:B:153:ILE:HG22	1.98	0.46
4:B:601:ANP:O2B	4:B:601:ANP:O2A	2.34	0.46
1:A:390:ARG:HD3	1:A:393:GLU:OE2	2.16	0.45
1:C:51:GLU:HG2	1:C:52:LEU:H	1.81	0.45
2:D:46:LEU:HD12	2:D:65:ALA:HB3	1.98	0.45
1:A:163:GLN:NE2	1:A:165:GLU:OE1	2.50	0.45
1:A:182:THR:O	1:A:186:GLN:HG2	2.16	0.45
2:E:429:PRO:O	2:E:433:THR:HG23	2.16	0.45
3:G:225:TYR:O	3:G:229:LEU:HG	2.16	0.45
2:F:317:ALA:HB3	2:F:318:PRO:HD3	1.98	0.45
3:G:235:GLU:OE2	3:G:239:ARG:NH2	2.41	0.45
1:B:95:MET:HB3	1:B:129:ILE:HB	1.99	0.45
1:B:179:ALA:HB2	1:B:318:PHE:CZ	2.50	0.45
1:C:124:THR:O	1:C:124:THR:OG1	2.31	0.45
2:F:342:PRO:HB2	2:F:344:VAL:HG23	1.98	0.45
1:C:75:ILE:HD13	1:C:75:ILE:HA	1.81	0.45
1:B:172:GLN:N	4:B:601:ANP:HNB1	2.14	0.45
1:B:210:GLU:OE2	2:E:130:THR:OG1	2.27	0.45
2:D:148:TYR:CZ	2:D:154:ILE:HG21	2.52	0.45
2:D:234:THR:O	2:D:237:GLU:HG2	2.16	0.45
2:D:438:LYS:HB3	2:D:438:LYS:HE2	1.66	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:146:LEU:HD21	1:A:257:LEU:HD13	1.98	0.45
2:E:47:THR:HG23	2:E:64:MET:HB2	1.98	0.45
3:G:168:TYR:CE1	3:G:186:LYS:HD2	2.52	0.45
1:A:475:ILE:HD13	1:A:480:ASP:O	2.17	0.44
1:C:444:PHE:CG	1:C:491:ILE:HG21	2.52	0.44
1:A:118:LEU:HD11	1:A:213:ARG:NH2	2.33	0.44
2:D:253:ASN:ND2	7:D:503:PO4:O3	2.50	0.44
2:E:198:LEU:O	2:E:202:MET:HG3	2.17	0.44
2:F:240:ARG:NE	2:F:241:ASP:OD1	2.29	0.44
1:C:473:GLU:OE2	1:C:476:ARG:NH2	2.47	0.44
2:D:329:THR:HG23	2:D:344:VAL:HG13	1.99	0.44
1:A:491:ILE:HG13	1:A:492:GLU:N	2.31	0.44
1:B:379:ALA:HB2	1:B:437:ILE:HG21	1.99	0.44
2:D:134:ILE:HD12	2:D:147:PRO:HB2	1.98	0.44
2:E:47:THR:HG21	2:E:99:LEU:HD21	2.00	0.44
2:F:375:GLN:HE22	2:F:378:LYS:HD2	1.81	0.44
1:A:166:LEU:HA	1:A:317:PRO:HG2	2.00	0.44
1:B:469:GLN:O	1:B:473:GLU:HG2	2.17	0.44
1:A:487:LEU:O	1:A:491:ILE:HG23	2.18	0.44
2:F:66:SER:OG	2:F:68:ASP:OD2	2.32	0.43
2:F:464:GLU:HA	2:F:467:LYS:HE3	2.00	0.43
1:A:175:LYS:HB3	1:A:318:PHE:CD2	2.53	0.43
1:A:294:HIS:O	1:A:297:LEU:HB3	2.18	0.43
1:B:90:ARG:NH2	2:F:40:ASN:HB3	2.33	0.43
2:D:23:LEU:HD11	2:D:57:ASP:HA	2.00	0.43
2:D:315:ASP:HB3	2:D:318:PRO:HD2	1.99	0.43
2:E:32:ILE:HG12	2:E:76:VAL:HG22	1.99	0.43
1:B:64:LEU:HD23	1:B:64:LEU:HA	1.83	0.43
2:D:144:LEU:HD11	2:D:366:VAL:HG12	1.99	0.43
3:G:38:ALA:O	3:G:42:VAL:N	2.43	0.43
1:A:380:GLY:O	1:A:384:LEU:HG	2.18	0.43
1:A:474:HIS:ND1	1:A:482:PRO:HA	2.33	0.43
1:A:474:HIS:CE1	1:A:482:PRO:HA	2.54	0.43
1:B:459:GLU:HG2	1:B:460:PHE:N	2.32	0.43
1:C:372:ILE:HG23	1:C:479:LYS:HB3	2.01	0.43
2:D:143:ASP:HB3	2:D:430:VAL:HG13	2.00	0.43
3:G:145:PHE:HA	3:G:225:TYR:CZ	2.53	0.43
2:E:170:GLU:OE2	2:E:415:HIS:N	2.51	0.43
2:E:177:GLN:HE21	2:E:178:GLU:HG2	1.83	0.43
2:F:38:ASN:N	2:F:38:ASN:OD1	2.51	0.43
1:B:103:LEU:HD12	1:B:121:VAL:HG11	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:294:HIS:O	1:B:297:LEU:HB3	2.18	0.43
1:B:151:LYS:HB2	1:B:422:GLN:HE21	1.84	0.43
1:B:212:LEU:HB3	1:B:217:ALA:HB3	2.01	0.43
1:B:409:LYS:HD2	2:F:451:ASP:OD2	2.18	0.43
2:F:339:GLY:HA3	2:F:454:ARG:HH22	1.84	0.43
3:G:101:THR:HG21	3:G:170:TYR:CE1	2.53	0.43
1:A:412:ARG:NH2	1:A:441:THR:O	2.52	0.43
1:B:462:LEU:HB2	1:B:466:GLN:OE1	2.19	0.43
1:C:179:ALA:HB1	1:C:259:VAL:HG11	2.01	0.43
2:D:396:ASP:O	2:D:399:VAL:HG12	2.19	0.43
1:A:76:LEU:HD13	1:A:111:LEU:HD21	2.00	0.42
1:B:114:PRO:HG3	1:B:120:PRO:HA	2.01	0.42
1:C:180:ILE:O	1:C:184:ILE:HG12	2.18	0.42
2:D:253:ASN:HA	2:D:305:ALA:O	2.18	0.42
2:D:415:HIS:O	2:D:418:GLU:HG2	2.19	0.42
2:E:317:ALA:HB3	2:E:318:PRO:HD3	2.01	0.42
1:C:412:ARG:NH2	1:C:441:THR:O	2.46	0.42
2:E:397:LYS:O	2:E:400:VAL:HG12	2.19	0.42
2:F:341:TYR:HA	2:F:343:ALA:N	2.33	0.42
3:G:33:ARG:HA	3:G:33:ARG:HE	1.84	0.42
2:D:292:ILE:HG23	2:D:300:ILE:HG22	2.00	0.42
2:E:189:GLY:O	2:E:256:ARG:HG3	2.19	0.42
2:F:88:GLY:HA2	2:F:238:TYR:CE1	2.54	0.42
2:F:253:ASN:HA	2:F:305:ALA:O	2.19	0.42
2:F:413:ASN:HA	2:F:455:LEU:HD12	2.01	0.42
1:A:392:LEU:O	1:A:392:LEU:HD12	2.20	0.42
1:B:48:MET:HE3	2:F:69:GLY:HA2	2.00	0.42
1:C:232:ALA:N	1:C:233:PRO:HD2	2.35	0.42
2:D:252:ASP:O	2:D:305:ALA:HB3	2.19	0.42
2:D:387:LEU:HB3	2:D:391:GLU:HG3	2.01	0.42
2:D:401:HIS:HE1	2:D:405:ARG:NH2	2.16	0.42
2:F:91:THR:HG21	2:F:235:MET:HG2	2.00	0.42
2:F:157:PHE:HB3	2:F:313:TYR:HE2	1.84	0.42
2:F:414:PHE:HB2	2:F:417:ALA:HB2	2.01	0.42
1:A:260:TYR:HD2	1:A:317:PRO:HA	1.84	0.42
1:B:36:ASP:OD1	2:E:270:ARG:NH1	2.53	0.42
1:B:439:ALA:HB2	1:B:460:PHE:HE2	1.84	0.42
2:D:254:ILE:O	2:D:258:THR:HG23	2.20	0.42
2:E:451:ASP:O	2:E:454:ARG:HG2	2.20	0.42
1:A:344:LEU:HA	1:A:356:ALA:O	2.19	0.42
1:B:170:ASP:OD1	1:B:170:ASP:N	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:198:ILE:HD12	1:B:239:PRO:HD3	2.02	0.42
1:C:184:ILE:HG23	1:C:187:LYS:HZ1	1.85	0.42
2:E:178:GLU:HG3	2:E:427:TYR:CE2	2.54	0.42
2:E:410:LEU:HD23	2:E:410:LEU:HA	1.80	0.42
2:F:78:ASP:OD1	2:F:78:ASP:N	2.46	0.42
2:F:216:GLY:HA3	2:F:228:VAL:HG11	2.02	0.42
2:F:460:GLU:O	2:F:463:VAL:HG22	2.20	0.42
1:A:179:ALA:HB1	1:A:259:VAL:HG11	2.01	0.42
1:A:250:MET:HG3	1:A:312:SER:C	2.40	0.42
1:A:400:SER:HB2	3:G:29:SER:HB3	2.01	0.42
1:B:246:GLY:O	1:B:256:VAL:HG21	2.20	0.42
1:C:491:ILE:HD13	1:C:491:ILE:HA	1.82	0.42
2:E:415:HIS:HD2	2:E:425:GLY:HA3	1.84	0.42
2:F:254:ILE:HG22	2:F:306:ILE:HG13	2.01	0.42
2:F:290:GLU:OE1	2:F:290:GLU:HA	2.19	0.42
2:F:354:LEU:HD12	2:F:354:LEU:HA	1.93	0.42
3:G:141:ASP:O	3:G:232:LYS:NZ	2.49	0.42
1:C:386:LEU:HD23	1:C:386:LEU:HA	1.83	0.42
2:D:167:LEU:HD13	2:D:342:PRO:HB3	2.02	0.42
1:B:172:GLN:H	4:B:601:ANP:HNB1	1.68	0.42
1:B:392:LEU:HD13	1:B:410:LEU:HD21	2.02	0.42
1:C:52:LEU:HD11	1:C:95:MET:HE2	2.01	0.42
2:D:32:ILE:HG12	2:D:76:VAL:HG22	2.02	0.42
1:B:372:ILE:HG13	1:B:375:MET:H	1.85	0.42
2:E:456:VAL:HG13	2:E:462:VAL:HG22	2.02	0.42
2:F:98:VAL:HG22	2:F:228:VAL:HG13	2.02	0.42
2:F:251:ILE:HD12	2:F:304:GLN:HG2	2.02	0.42
1:A:290:ILE:HG12	1:A:330:ILE:HD11	2.01	0.41
1:A:440:LEU:HA	1:A:445:LEU:HD13	2.01	0.41
1:B:148:THR:HG23	1:B:182:THR:HG23	2.01	0.41
1:B:389:TYR:CD1	1:B:413:GLY:HA3	2.55	0.41
2:E:356:PRO:HD3	2:E:364:TYR:CE2	2.55	0.41
3:G:149:LYS:O	3:G:153:ARG:HG3	2.20	0.41
1:B:197:ALA:HA	1:B:261:ASP:HB2	2.01	0.41
2:D:48:LEU:HD23	2:D:63:ALA:HA	2.02	0.41
2:D:413:ASN:OD1	2:D:413:ASN:N	2.53	0.41
2:E:135:LEU:N	2:E:148:TYR:O	2.42	0.41
2:F:132:VAL:HG11	2:F:358:ILE:HD13	2.02	0.41
1:C:31:VAL:HG12	1:C:86:ASP:O	2.20	0.41
1:C:132:ARG:HB3	1:C:132:ARG:CZ	2.49	0.41
2:E:405:ARG:NH2	2:E:448:LEU:O	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:144:LEU:HD22	2:F:437:PHE:CD2	2.55	0.41
2:F:370:VAL:HG23	2:F:441:LEU:HD11	2.03	0.41
1:A:44:LEU:HB3	1:A:47:VAL:HB	2.03	0.41
1:C:32:ILE:HD13	1:C:42:HIS:CE1	2.55	0.41
2:D:456:VAL:HG21	2:D:462:VAL:CG2	2.51	0.41
2:F:236:ALA:HB1	2:F:247:VAL:HG11	2.02	0.41
1:B:110:PRO:HG3	1:B:238:ALA:HB2	2.01	0.41
1:C:136:VAL:O	2:D:196:ASN:ND2	2.35	0.41
2:E:168:ILE:HG23	2:E:250:PHE:CE2	2.56	0.41
2:F:37:ARG:HA	2:F:37:ARG:HD3	1.74	0.41
1:B:171:ARG:HD2	2:E:323:SER:HA	2.02	0.41
1:B:182:THR:O	1:B:186:GLN:HG2	2.20	0.41
2:E:332:GLU:HG3	2:E:334:LYS:H	1.84	0.41
2:E:441:LEU:HD23	2:E:441:LEU:HA	1.85	0.41
1:C:333:ASN:O	1:C:337:ILE:HG12	2.21	0.41
2:E:451:ASP:OD1	2:E:451:ASP:N	2.53	0.41
1:B:375:MET:HA	1:B:378:VAL:HG22	2.03	0.41
1:C:36:ASP:OD1	2:F:280:THR:HG21	2.20	0.41
2:D:216:GLY:N	2:D:228:VAL:HG21	2.36	0.41
2:E:144:LEU:HD22	2:E:437:PHE:CD2	2.56	0.41
2:F:417:ALA:O	2:F:421:THR:N	2.54	0.41
3:G:145:PHE:HA	3:G:225:TYR:OH	2.21	0.41
1:A:460:PHE:CE1	1:A:464:LEU:HD21	2.56	0.41
1:B:386:LEU:O	1:B:390:ARG:HG2	2.21	0.41
1:C:241:ALA:O	1:C:245:MET:HG3	2.20	0.41
2:E:46:LEU:HD11	2:E:63:ALA:HB1	2.03	0.41
2:F:151:GLY:O	2:F:294:SER:OG	2.34	0.41
3:G:168:TYR:N	3:G:186:LYS:HA	2.36	0.41
1:C:460:PHE:O	1:C:463:PHE:HB3	2.21	0.41
2:D:71:ILE:HB	2:D:74:MET:HE3	2.03	0.41
2:E:47:THR:HG21	2:E:99:LEU:HD11	2.02	0.41
1:A:442:ARG:HB2	1:A:444:PHE:CE2	2.56	0.40
1:B:412:ARG:O	1:B:416:THR:HG23	2.21	0.40
2:D:294:SER:HA	2:D:299:SER:HA	2.03	0.40
2:D:456:VAL:HG21	2:D:462:VAL:HG23	2.03	0.40
1:B:175:LYS:HB2	1:B:175:LYS:HE2	1.75	0.40
1:B:274:SER:OG	1:B:287:PRO:HG3	2.20	0.40
2:E:157:PHE:CZ	2:E:306:ILE:HD12	2.56	0.40
2:E:292:ILE:HD13	2:E:302:SER:HB2	2.03	0.40
1:B:263:LEU:HD23	1:B:263:LEU:HA	1.85	0.40
2:D:98:VAL:HG13	2:D:99:LEU:HG	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:459:ILE:HD13	2:E:459:ILE:N	2.36	0.40
1:A:136:VAL:HG23	1:A:137:MET:HE2	2.03	0.40
1:B:87:GLU:HG3	1:B:89:ARG:HE	1.86	0.40
2:E:246:ASP:N	2:E:246:ASP:OD1	2.54	0.40
1:B:44:LEU:HB2	1:B:71:VAL:HG11	2.03	0.40
3:G:251:ASN:O	3:G:254:ILE:HG22	2.22	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	472/502 (94%)	448 (95%)	24 (5%)	0	100	100
1	B	419/502 (84%)	391 (93%)	28 (7%)	0	100	100
1	C	471/502 (94%)	456 (97%)	15 (3%)	0	100	100
2	D	467/484 (96%)	446 (96%)	21 (4%)	0	100	100
2	E	442/484 (91%)	418 (95%)	24 (5%)	0	100	100
2	F	466/484 (96%)	446 (96%)	20 (4%)	0	100	100
3	G	157/263 (60%)	150 (96%)	7 (4%)	0	100	100
All	All	2894/3221 (90%)	2755 (95%)	139 (5%)	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	386/412 (94%)	376 (97%)	10 (3%)	41	72
1	B	343/412 (83%)	330 (96%)	13 (4%)	28	62
1	C	385/412 (93%)	377 (98%)	8 (2%)	48	77
2	D	385/400 (96%)	376 (98%)	9 (2%)	45	75
2	E	373/400 (93%)	367 (98%)	6 (2%)	58	82
2	F	385/400 (96%)	380 (99%)	5 (1%)	65	85
3	G	143/226 (63%)	136 (95%)	7 (5%)	21	54
All	All	2400/2662 (90%)	2342 (98%)	58 (2%)	45	74

All (58) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	42	HIS
1	A	57	ASN
1	A	140	ARG
1	A	164	ARG
1	A	219	ASP
1	A	236	PHE
1	A	262	ASP
1	A	446	ASP
1	A	452	ASP
1	A	462	LEU
1	B	164	ARG
1	B	170	ASP
1	B	185	ASN
1	B	236	PHE
1	B	262	ASP
1	B	289	ASP
1	B	305	SER
1	B	347	ASP
1	B	373	LYS
1	B	415	ARG
1	B	460	PHE
1	B	465	ASP
1	B	474	HIS
1	C	132	ARG
1	C	236	PHE
1	C	260	TYR

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Mol	Chain	Res	Type
1	C	262	ASP
1	C	347	ASP
1	C	365	ARG
1	C	398	PHE
1	C	485	ASP
2	D	115	ARG
2	D	218	MET
2	D	219	ASN
2	D	253	ASN
2	D	257	PHE
2	D	311	ASP
2	D	401	HIS
2	D	402	ARG
2	D	451	ASP
2	E	45	ASP
2	E	66	SER
2	E	326	ASP
2	E	369	LYS
2	E	445	TYR
2	E	469	MET
2	F	3	ARG
2	F	78	ASP
2	F	128	LEU
2	F	130	THR
2	F	389	MET
3	G	35	GLU
3	G	83	ASP
3	G	134	LEU
3	G	141	ASP
3	G	145	PHE
3	G	225	TYR
3	G	248	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	422	GLN
2	D	173	HIS
2	D	177	GLN
2	E	177	GLN
2	F	179	HIS
3	G	249	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 11 ligands modelled in this entry, 4 are monoatomic - leaving 7 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
4	ANP	C	601	5	29,33,33	1.16	4 (13%)	31,52,52	0.85	1 (3%)
7	PO4	E	501	-	4,4,4	0.99	0	6,6,6	0.49	0
4	ANP	B	601	-	29,33,33	1.11	4 (13%)	31,52,52	0.90	1 (3%)
4	ANP	F	501	5	29,33,33	1.11	4 (13%)	31,52,52	1.03	2 (6%)
7	PO4	D	503	5	4,4,4	1.08	0	6,6,6	0.45	0
6	ADP	D	501	5	24,29,29	0.86	0	29,45,45	1.17	2 (6%)
4	ANP	A	601	5	29,33,33	1.15	4 (13%)	31,52,52	0.86	1 (3%)

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
4	ANP	C	601	5	-	7/14/38/38	0/3/3/3
4	ANP	B	601	-	-	3/14/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	ANP	F	501	5	-	10/14/38/38	0/3/3/3
6	ADP	D	501	5	-	0/12/32/32	0/3/3/3
4	ANP	A	601	5	-	7/14/38/38	0/3/3/3

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	601	ANP	PB-O3A	-2.75	1.55	1.59
4	A	601	ANP	PB-O3A	-2.68	1.55	1.59
4	F	501	ANP	PB-O3A	-2.59	1.55	1.59
4	B	601	ANP	PG-O1G	2.55	1.50	1.46
4	B	601	ANP	PB-O3A	-2.53	1.55	1.59
4	A	601	ANP	PG-O1G	2.44	1.49	1.46
4	C	601	ANP	PG-O1G	2.42	1.49	1.46
4	A	601	ANP	PG-N3B	2.35	1.69	1.63
4	F	501	ANP	PG-N3B	2.35	1.69	1.63
4	F	501	ANP	PG-O1G	2.35	1.49	1.46
4	B	601	ANP	PG-N3B	2.31	1.69	1.63
4	A	601	ANP	PB-O1B	2.21	1.49	1.46
4	C	601	ANP	PB-O1B	2.16	1.49	1.46
4	C	601	ANP	PG-N3B	2.16	1.69	1.63
4	B	601	ANP	PB-O1B	2.13	1.49	1.46
4	F	501	ANP	PB-O1B	2.13	1.49	1.46

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	D	501	ADP	N3-C2-N1	-3.54	123.86	128.67
4	F	501	ANP	C4'-O4'-C1'	-2.76	107.39	109.92
4	C	601	ANP	C5-C6-N6	2.31	123.83	120.31
4	A	601	ANP	C5-C6-N6	2.30	123.82	120.31
4	F	501	ANP	C5-C6-N6	2.30	123.81	120.31
4	B	601	ANP	C5-C6-N6	2.29	123.80	120.31
6	D	501	ADP	C4-C5-N7	-2.12	107.10	109.34

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	601	ANP	PB-N3B-PG-O1G
4	A	601	ANP	PG-N3B-PB-O1B

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Mol	Chain	Res	Type	Atoms
4	A	601	ANP	PA-O3A-PB-O2B
4	B	601	ANP	PB-N3B-PG-O1G
4	B	601	ANP	PG-N3B-PB-O1B
4	B	601	ANP	PA-O3A-PB-O2B
4	C	601	ANP	PG-N3B-PB-O1B
4	C	601	ANP	PA-O3A-PB-O2B
4	C	601	ANP	C5'-O5'-PA-O2A
4	C	601	ANP	C5'-O5'-PA-O3A
4	F	501	ANP	PB-N3B-PG-O1G
4	F	501	ANP	PG-N3B-PB-O1B
4	F	501	ANP	PG-N3B-PB-O3A
4	F	501	ANP	PA-O3A-PB-O1B
4	F	501	ANP	PA-O3A-PB-O2B
4	C	601	ANP	O4'-C4'-C5'-O5'
4	C	601	ANP	C3'-C4'-C5'-O5'
4	F	501	ANP	C3'-C4'-C5'-O5'
4	F	501	ANP	O4'-C4'-C5'-O5'
4	A	601	ANP	O4'-C4'-C5'-O5'
4	A	601	ANP	C3'-C4'-C5'-O5'
4	A	601	ANP	C5'-O5'-PA-O3A
4	C	601	ANP	C5'-O5'-PA-O1A
4	F	501	ANP	C5'-O5'-PA-O1A
4	F	501	ANP	C5'-O5'-PA-O2A
4	F	501	ANP	C5'-O5'-PA-O3A
4	A	601	ANP	PA-O3A-PB-O1B

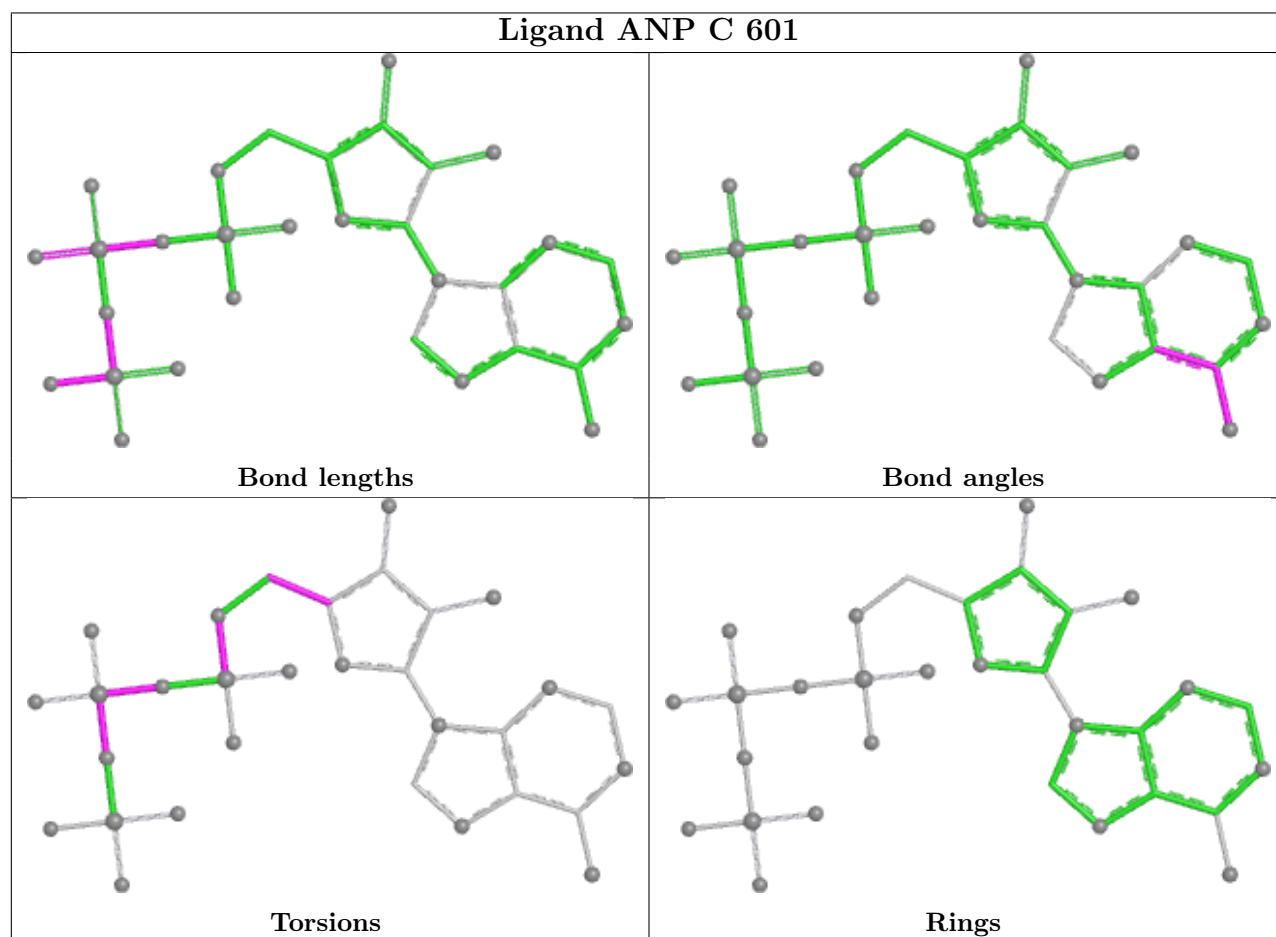
There are no ring outliers.

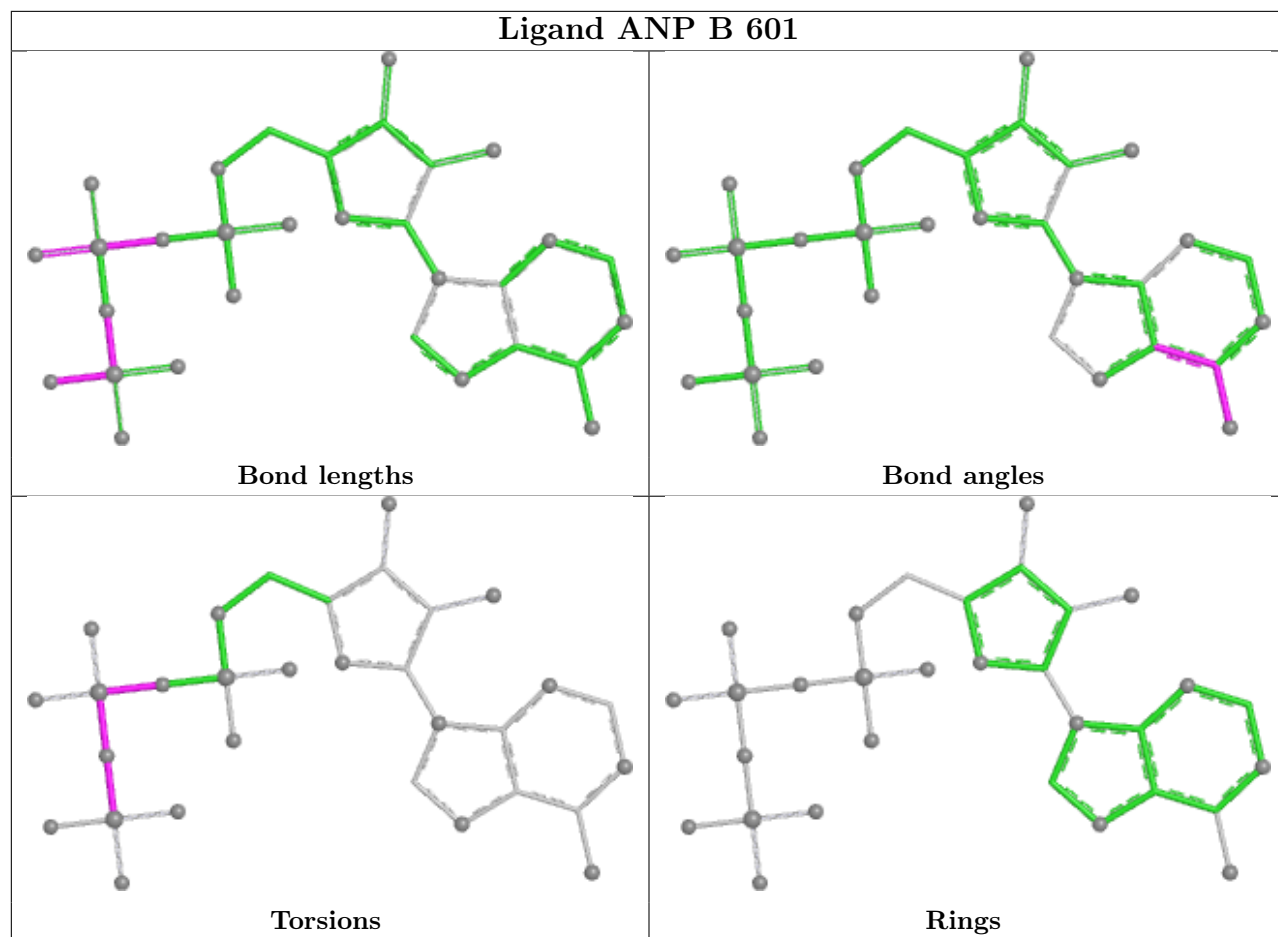
5 monomers are involved in 12 short contacts:

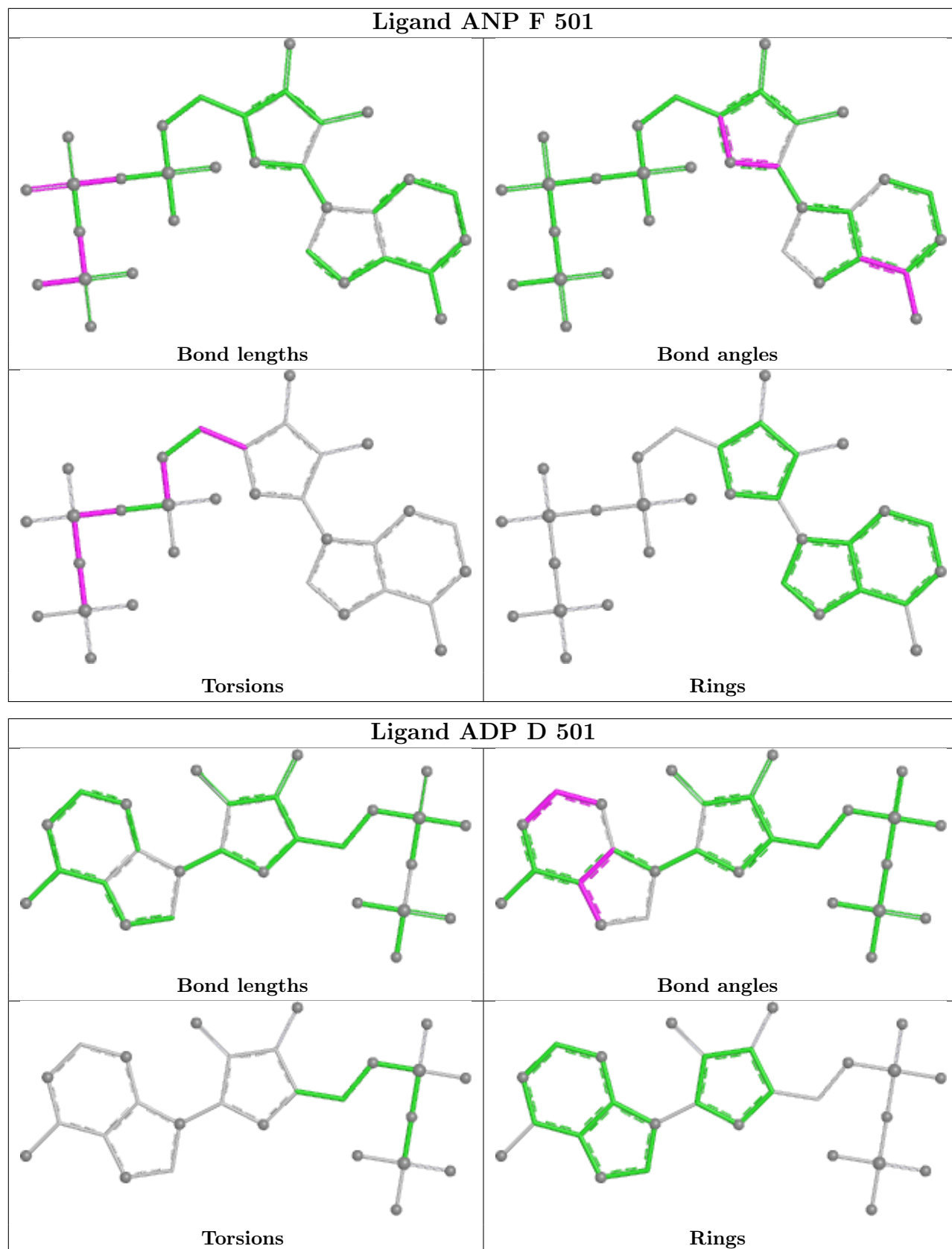
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	601	ANP	4	0
4	B	601	ANP	4	0
7	D	503	PO4	1	0
6	D	501	ADP	2	0
4	A	601	ANP	1	0

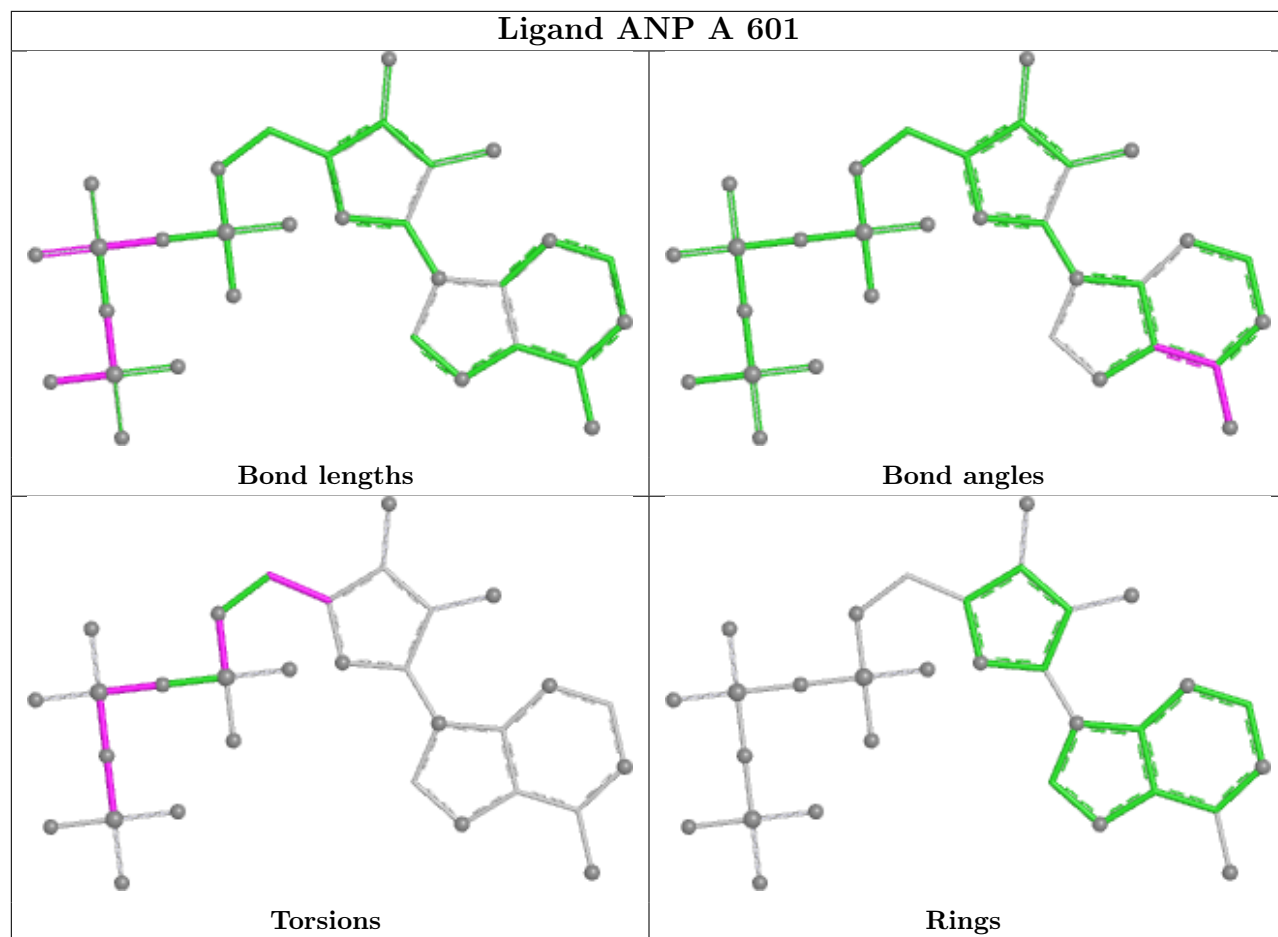
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

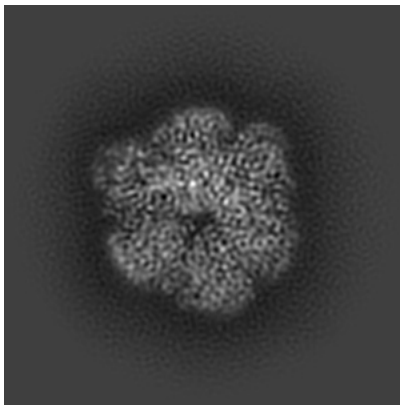
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-41811. These allow visual inspection of the internal detail of the map and identification of artifacts.

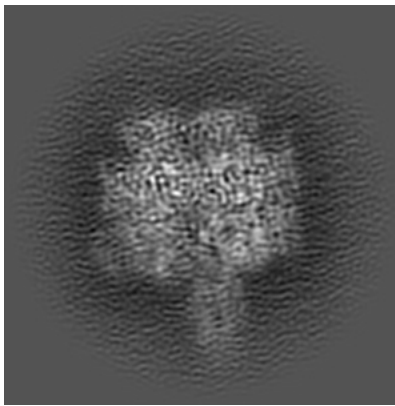
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

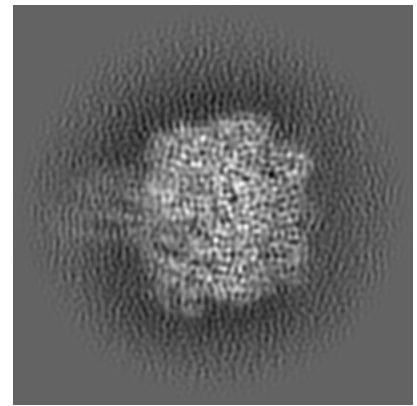
6.1.1 Primary map



X

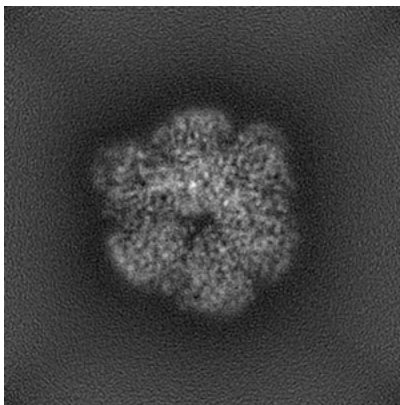


Y

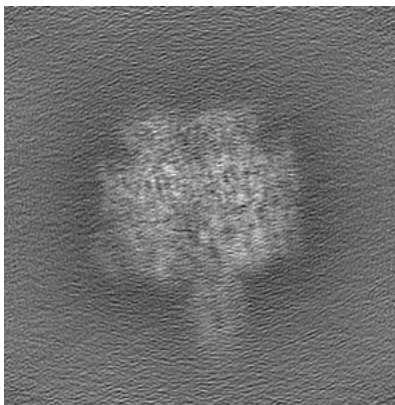


Z

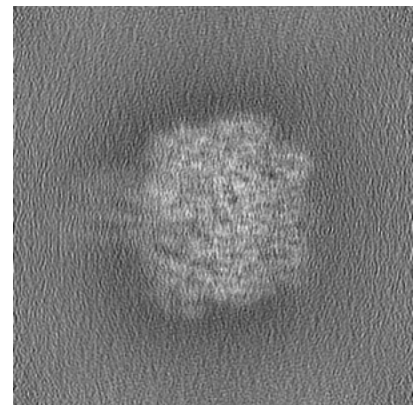
6.1.2 Raw map



X



Y

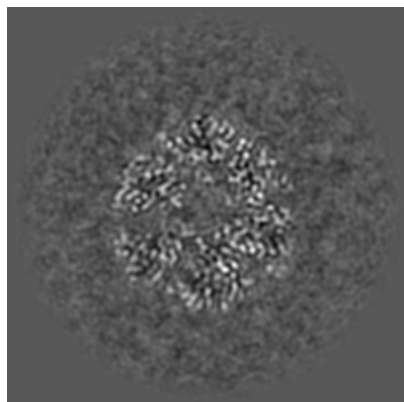


Z

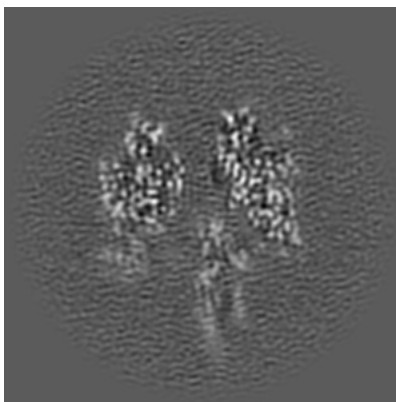
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

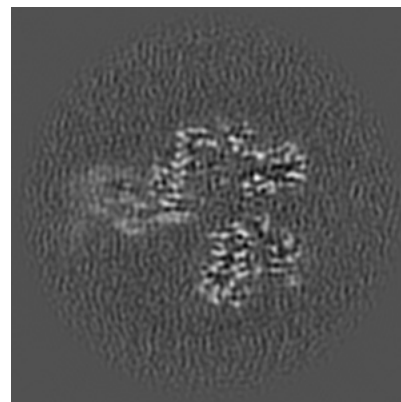
6.2.1 Primary map



X Index: 125

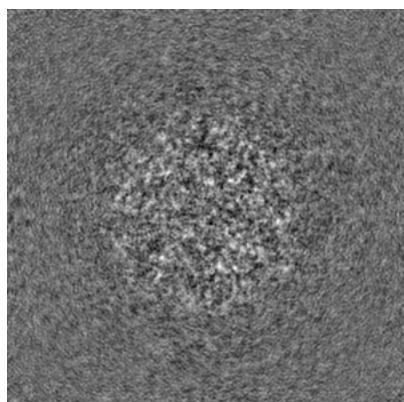


Y Index: 125

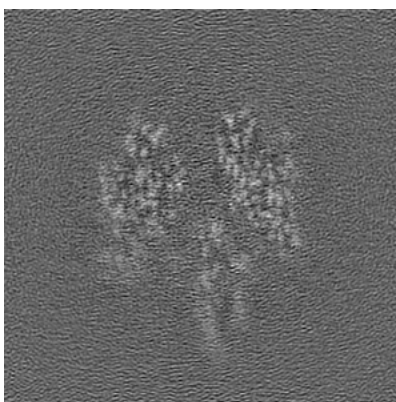


Z Index: 125

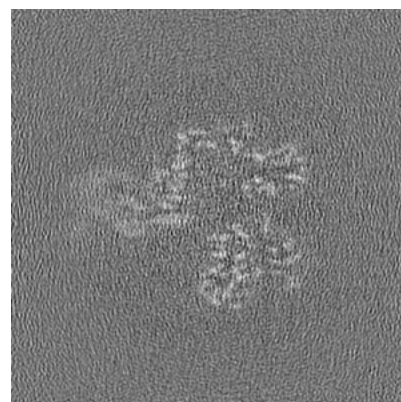
6.2.2 Raw map



X Index: 125



Y Index: 125

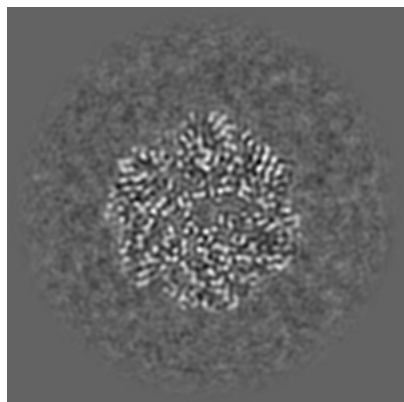


Z Index: 125

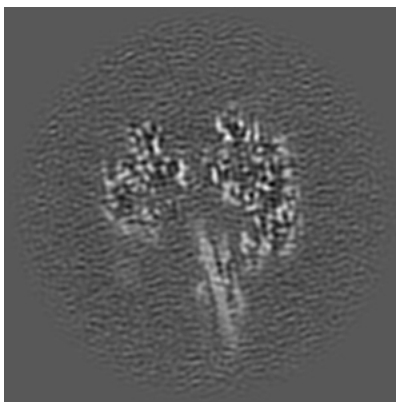
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

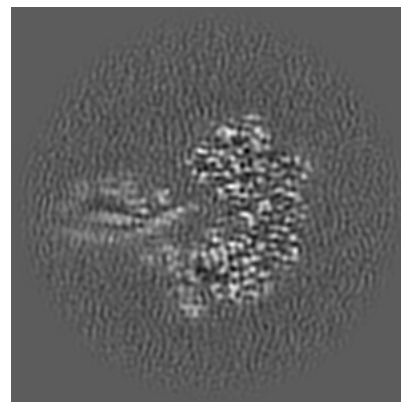
6.3.1 Primary map



X Index: 141

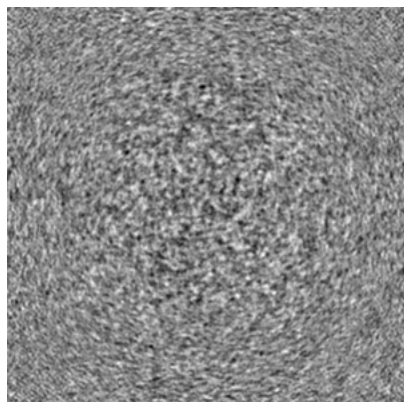


Y Index: 117

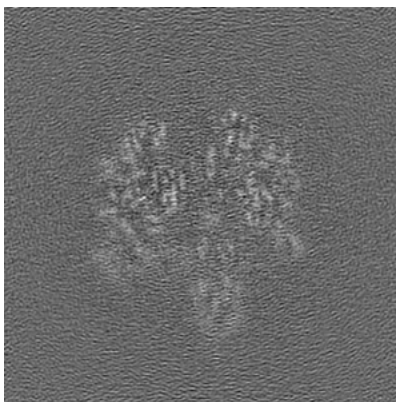


Z Index: 136

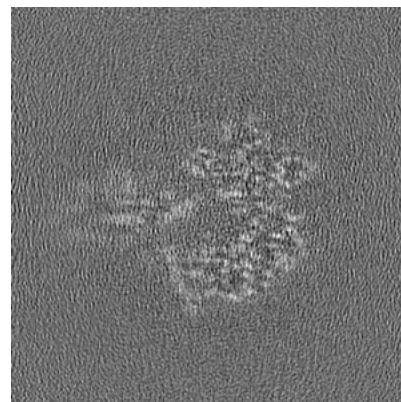
6.3.2 Raw map



X Index: 0



Y Index: 130

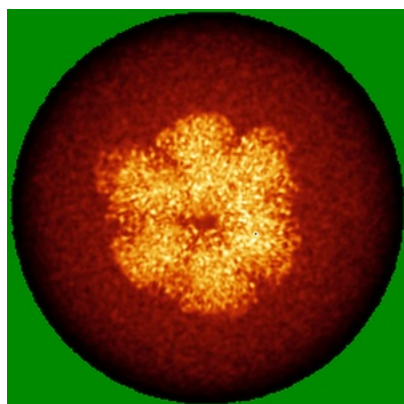


Z Index: 134

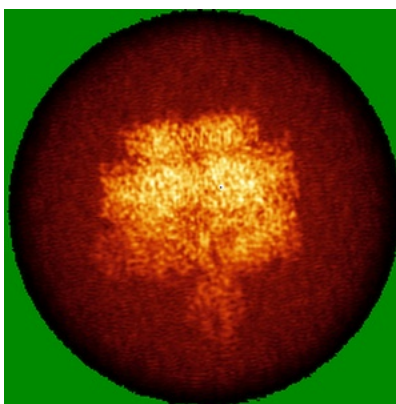
The images above show the largest variance slices of the map in three orthogonal directions.

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

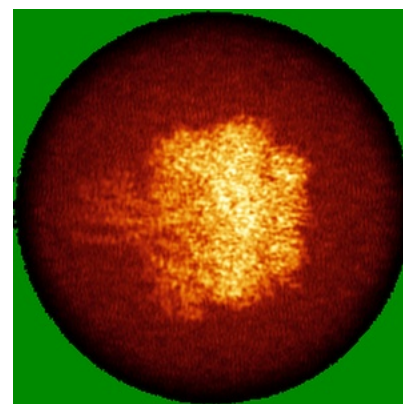
6.4.1 Primary map



X

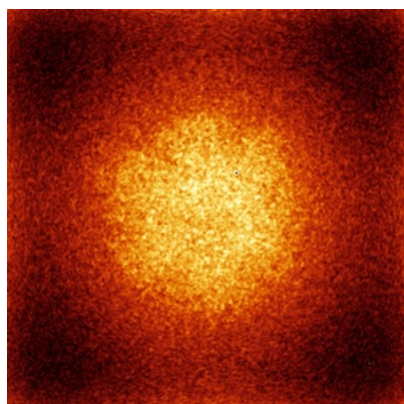


Y

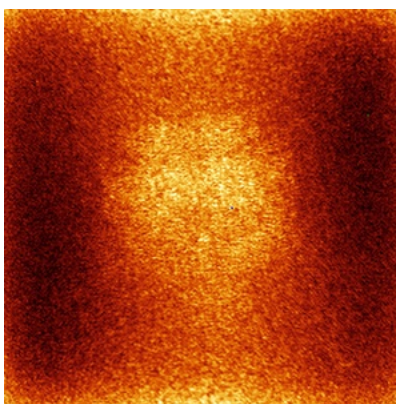


Z

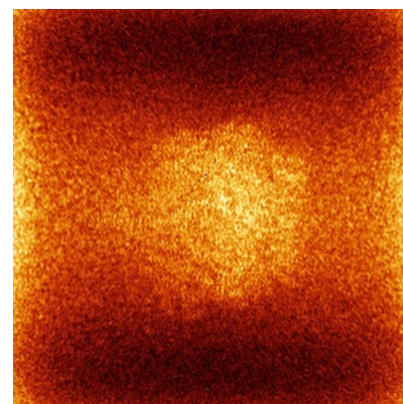
6.4.2 Raw map



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](#)

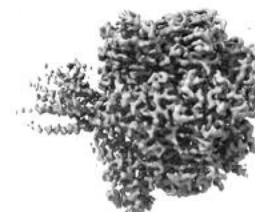
6.5.1 Primary map



X



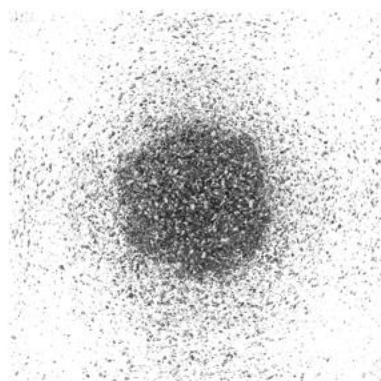
Y



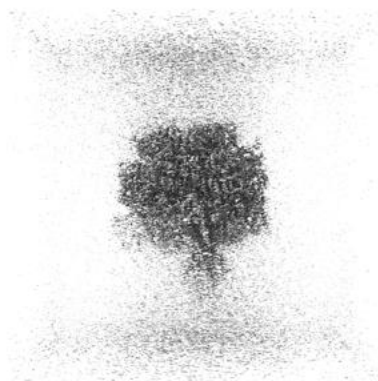
Z

The images above show the 3D surface view of the map at the recommended contour level 0.15. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

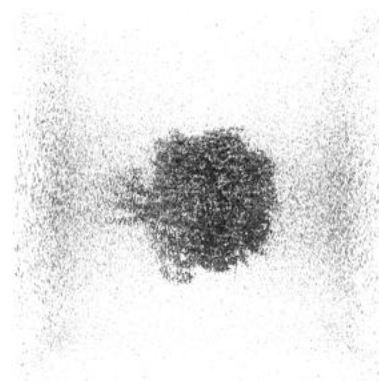
6.5.2 Raw map



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.

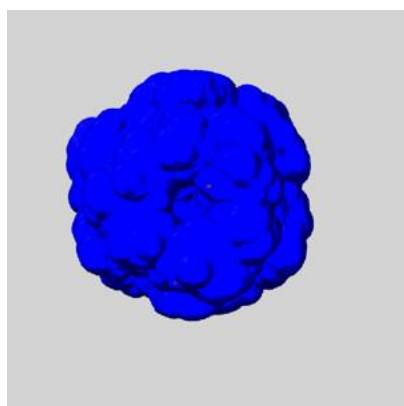
6.6 Mask visualisation [i](#)

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

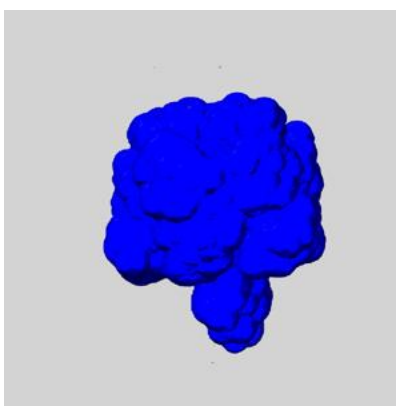
A mask typically either:

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

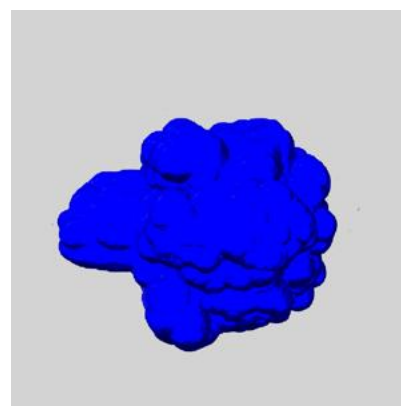
6.6.1 emd_41811_msk_1.map [i](#)



X



Y

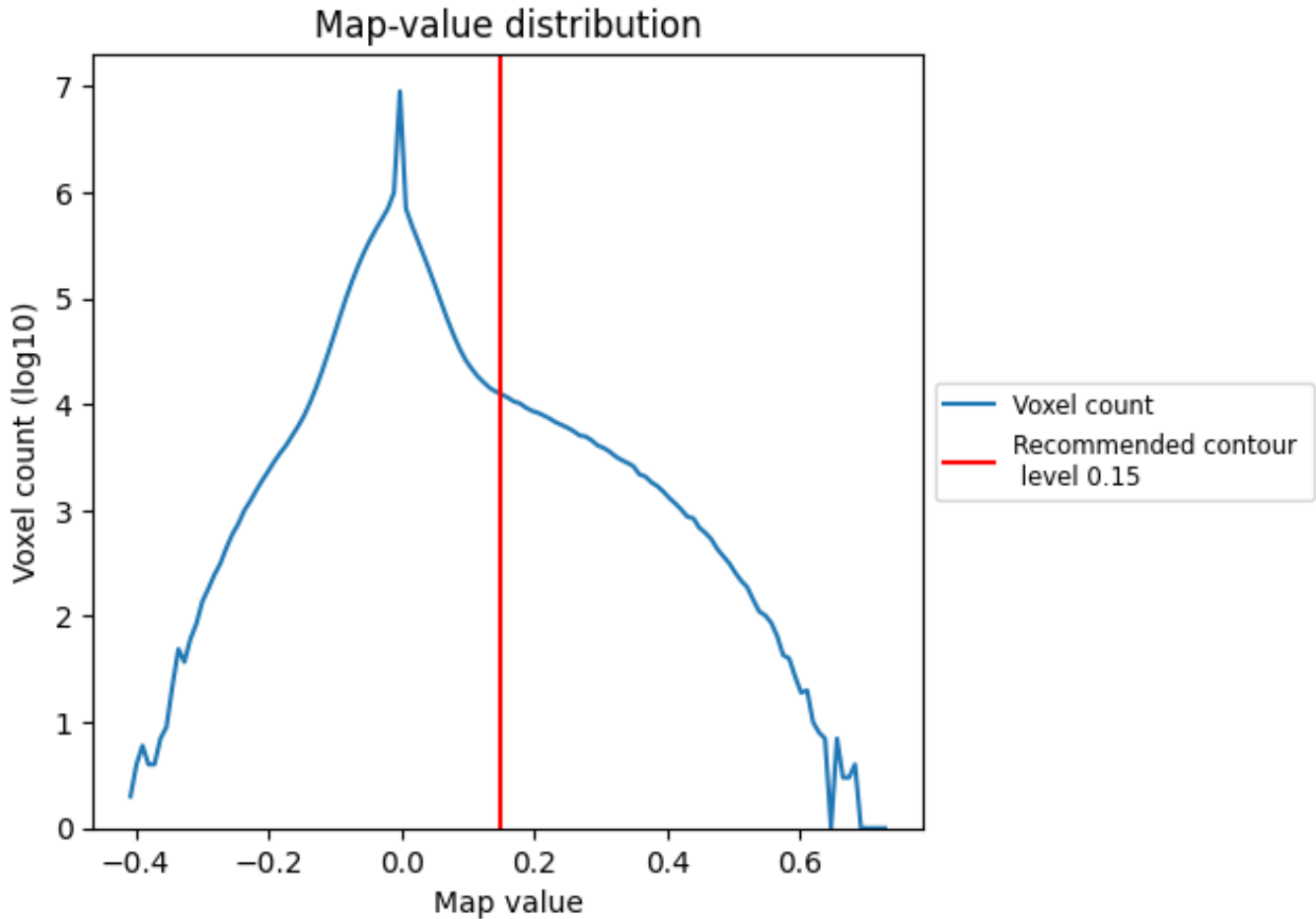


Z

7 Map analysis [i](#)

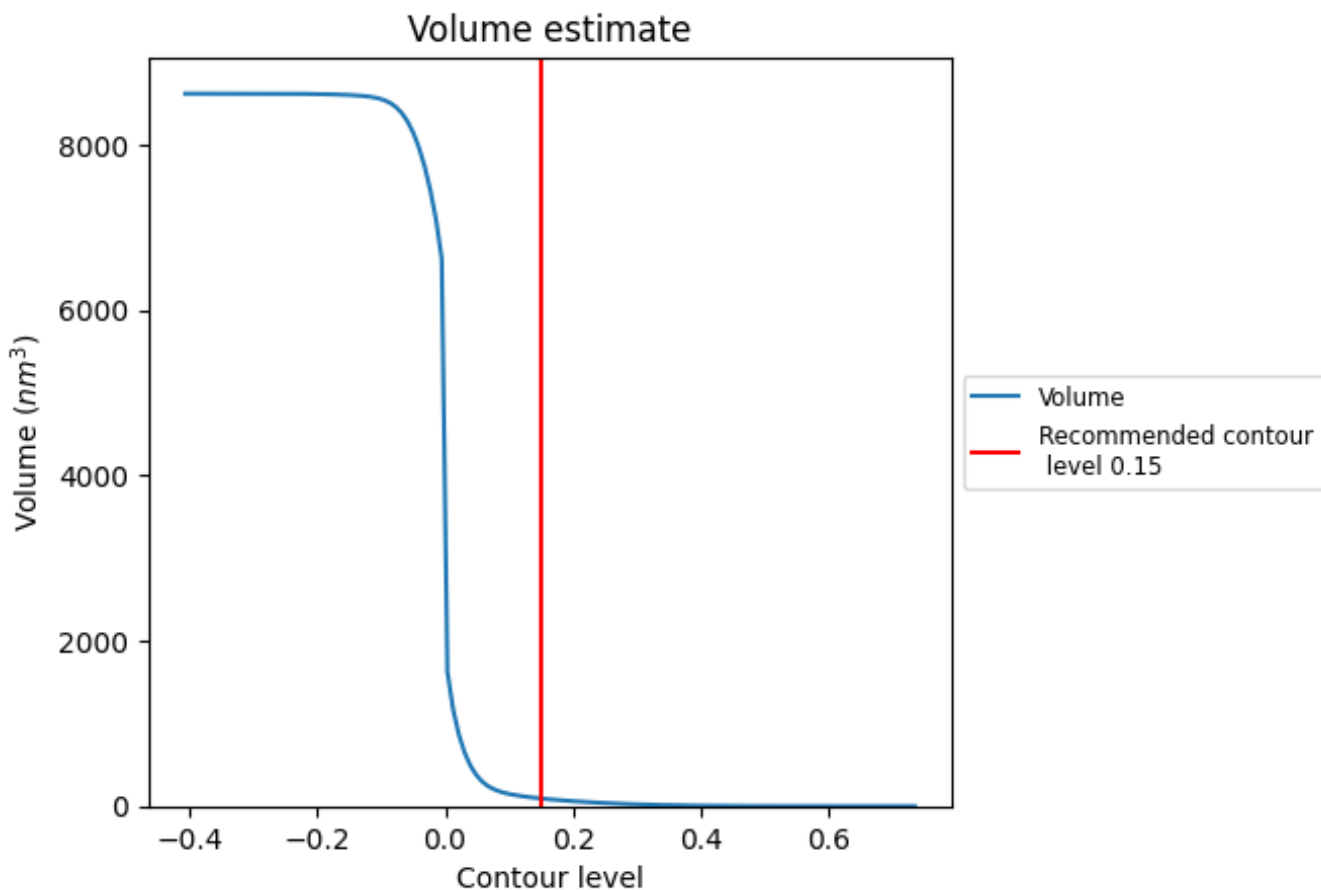
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

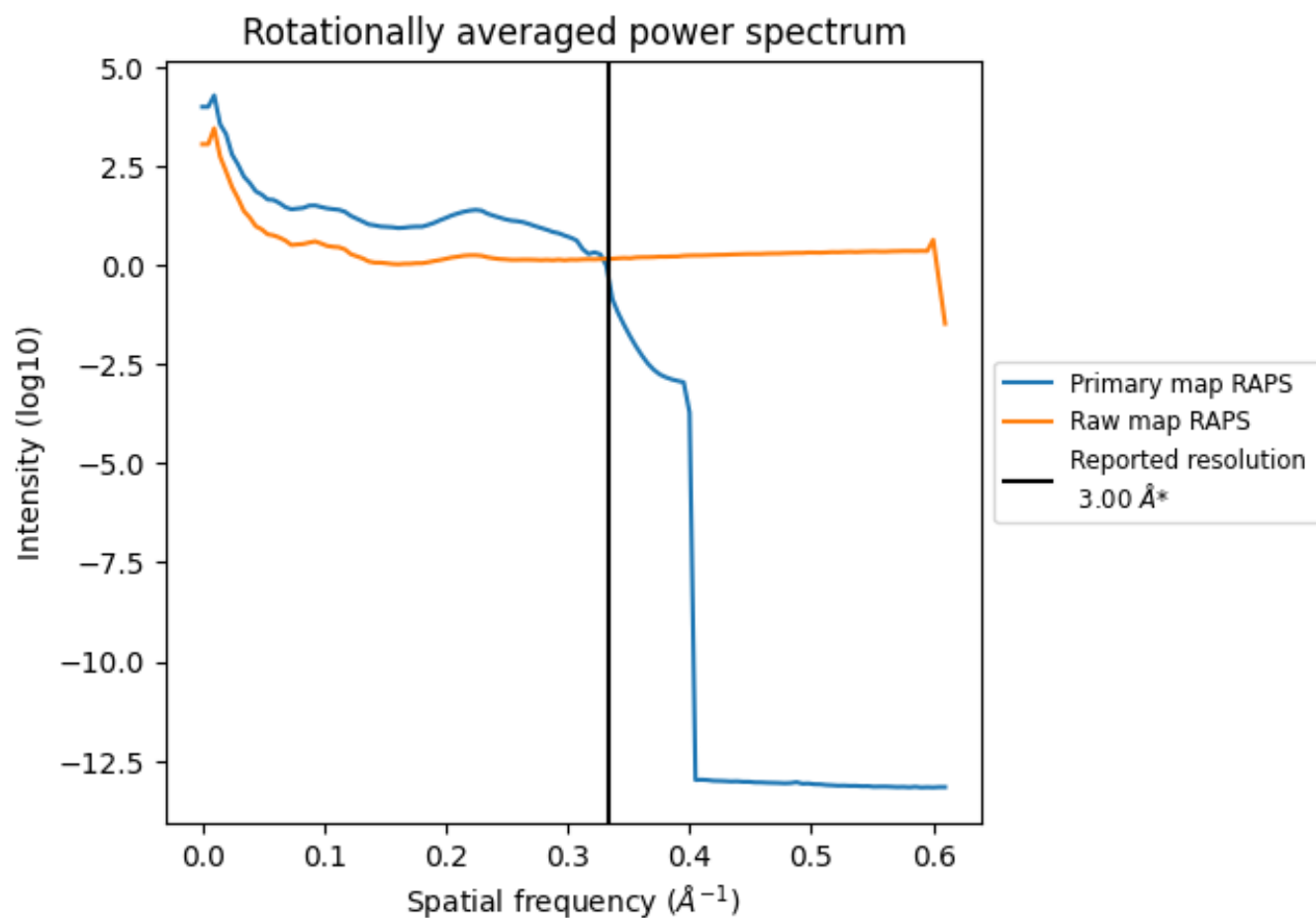
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 93 nm^3 ; this corresponds to an approximate mass of 84 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](#)

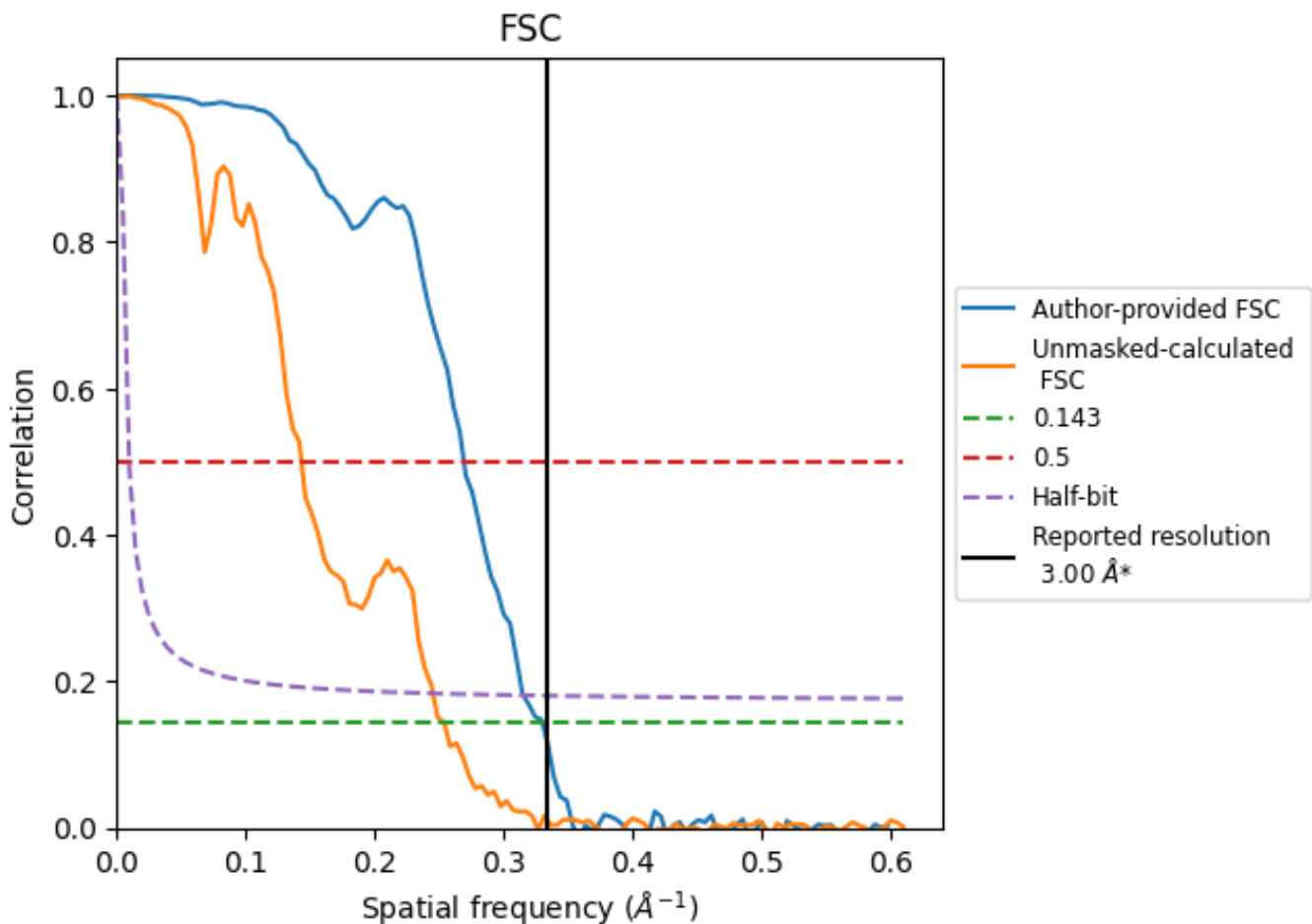


*Reported resolution corresponds to spatial frequency of 0.333 Å⁻¹

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 0.333 Å⁻¹

8.2 Resolution estimates [i](#)

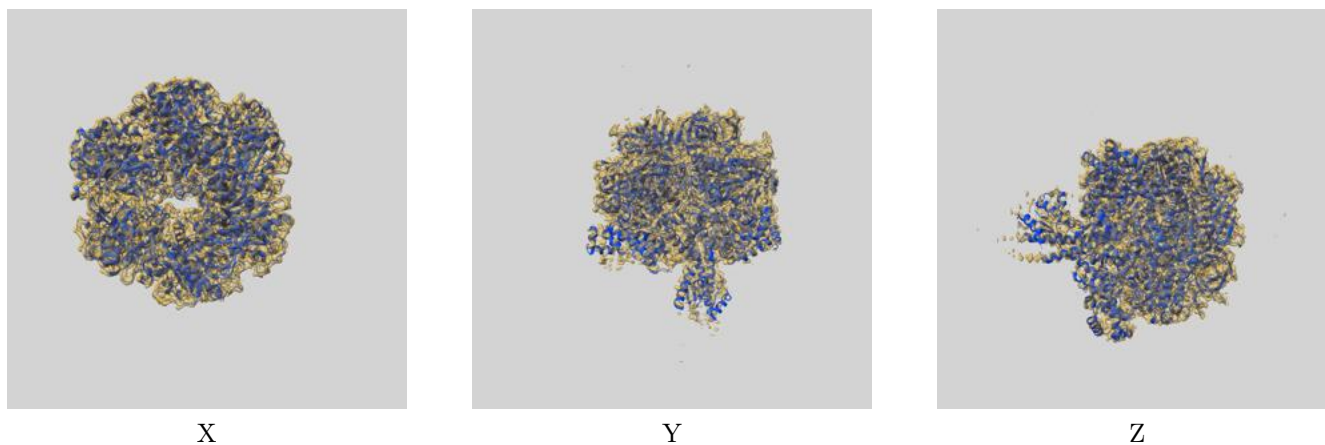
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	3.03	3.71	3.17
Unmasked-calculated*	3.94	6.98	4.08

*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 3.94 differs from the reported value 3.0 by more than 10 %

9 Map-model fit [i](#)

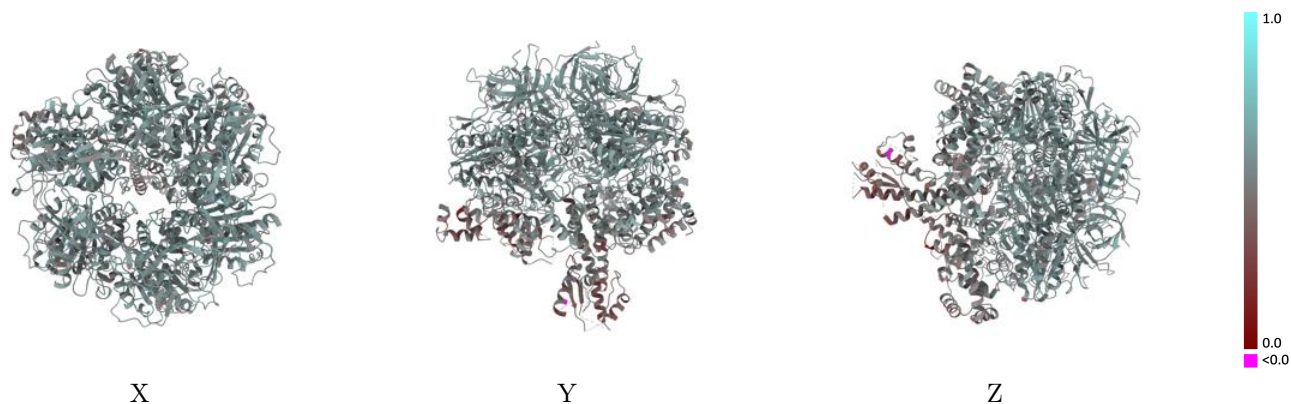
This section contains information regarding the fit between EMDB map EMD-41811 and PDB model 8U1H. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



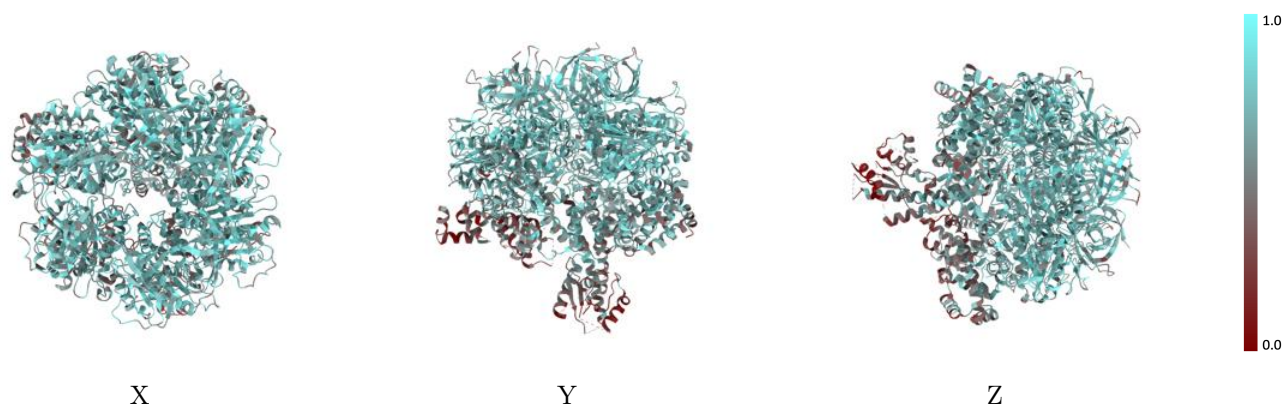
The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



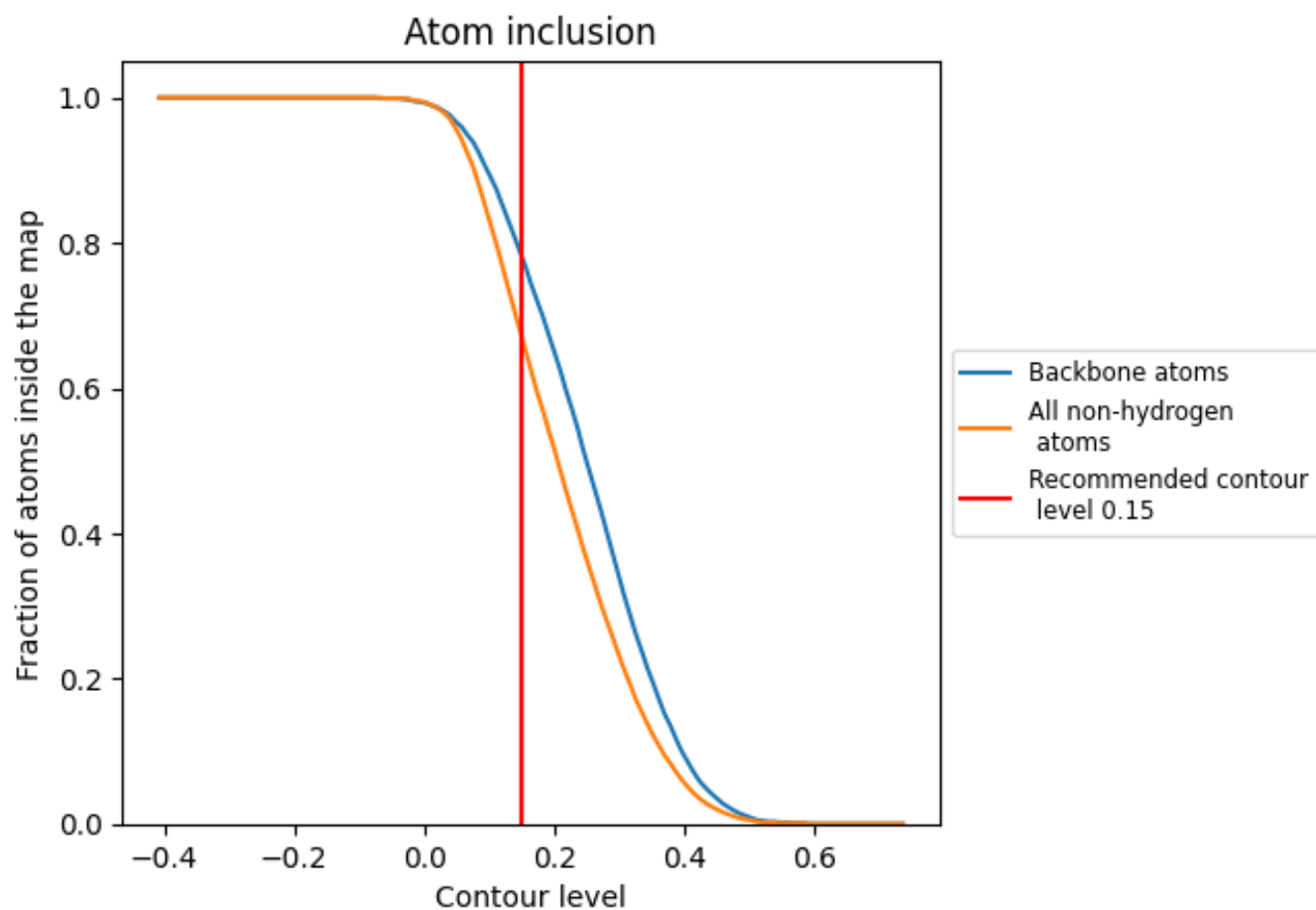
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.15).

















9.4 Atom inclusion [i](#)



At the recommended contour level, 78% of all backbone atoms, 67% 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 (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6710	 0.5260
A	 0.6650	 0.5260
B	 0.6370	 0.5160
C	 0.7330	 0.5470
D	 0.7130	 0.5390
E	 0.6410	 0.5170
F	 0.7130	 0.5480
G	 0.4450	 0.4180

