



Full wwPDB EM Validation Report ⓘ

Sep 29, 2025 – 02:52 PM EDT

PDB ID : 9PFF / pdb_00009pff
EMDB ID : EMD-71600
Title : Min22bin20S complex (NSF-alphaSNAP-2:2 syntaxin-1a H3:SNAP-25 SN1),
non-hydrolyzing, class 27
Authors : White, K.I.; Brunger, A.T.
Deposited on : 2025-07-04
Resolution : 3.09 Å (reported)
Based on initial models : 1JTH, 6MDM

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:

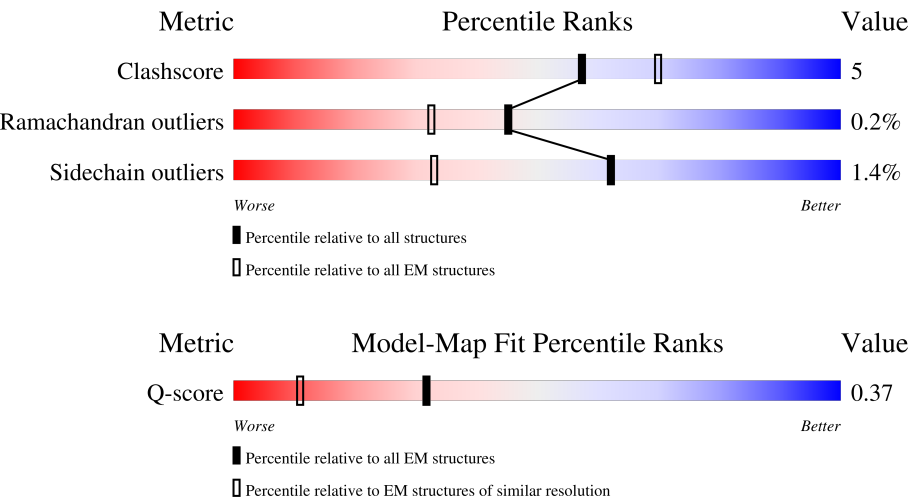
EMDB validation analysis : 0.0.1.dev129
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.46

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 3.09 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	14003 (2.59 - 3.59)

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	G	84	71% 70%20%• 7%
1	I	84	68% 55%14%31%
2	H	78	82% 64%23%13%
2	J	78	81% 65%22%13%

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Mol	Chain	Length	Quality of chain
3	L	296	94% 88% 8% •
3	M	296	92% 86% 8% 5%
3	N	296	93% 92% • 5%
3	O	296	94% 90% 5% 5%
4	A	747	65% • • 30%
4	B	747	25% 87% 10% • •
4	C	747	67% 5% 28%
4	D	747	65% 6% • 28%
4	E	747	26% 87% 10% •
4	F	747	13% 57% 11% • 30%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 81062 atoms, of which 40372 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 Synaptosomal-associated protein 25.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	G	78	Total	C	H	N	O	S	2	0
			1276	381	634	117	138	6		
1	I	58	Total	C	H	N	O	S	2	0
			946	283	474	84	101	4		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	0	SER	-	expression tag	UNP P60881
I	0	SER	-	expression tag	UNP P60881

- Molecule 2 is a protein called Syntaxin-1A.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	H	68	Total	C	H	N	O	S	0	0
			1100	345	544	94	112	5		
2	J	68	Total	C	H	N	O	S	0	0
			1100	345	544	94	112	5		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	190	MET	-	initiating methionine	UNP P32851
J	190	MET	-	initiating methionine	UNP P32851

- Molecule 3 is a protein called Alpha-soluble NSF attachment protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	L	284	Total	C	H	N	O	S	2	0
			4450	1410	2205	377	440	18		
3	M	280	Total	C	H	N	O	S	0	0
			4370	1387	2168	368	429	18		

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Mol	Chain	Residues	Atoms						AltConf	Trace
3	N	280	Total	C	H	N	O	S	0	0
			4370	1387	2168	368	429	18		
3	O	281	Total	C	H	N	O	S	0	0
			4377	1389	2171	369	430	18		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	0	GLY	-	expression tag	UNP P54921
M	0	GLY	-	expression tag	UNP P54921
N	0	GLY	-	expression tag	UNP P54921
O	0	GLY	-	expression tag	UNP P54921

- Molecule 4 is a protein called Vesicle-fusing ATPase.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	A	524	Total	C	H	N	O	S	37	0
			8725	2710	4442	762	789	22		
4	B	724	Total	C	H	N	O	S	24	0
			11695	3647	5925	1014	1079	30		
4	C	536	Total	C	H	N	O	S	26	0
			8773	2724	4465	765	796	23		
4	D	536	Total	C	H	N	O	S	16	0
			8684	2700	4413	756	792	23		
4	E	724	Total	C	H	N	O	S	16	0
			11569	3616	5851	997	1075	30		
4	F	523	Total	C	H	N	O	S	6	0
			8347	2604	4236	717	768	22		

There are 18 discrepancies between the modelled and reference sequences:

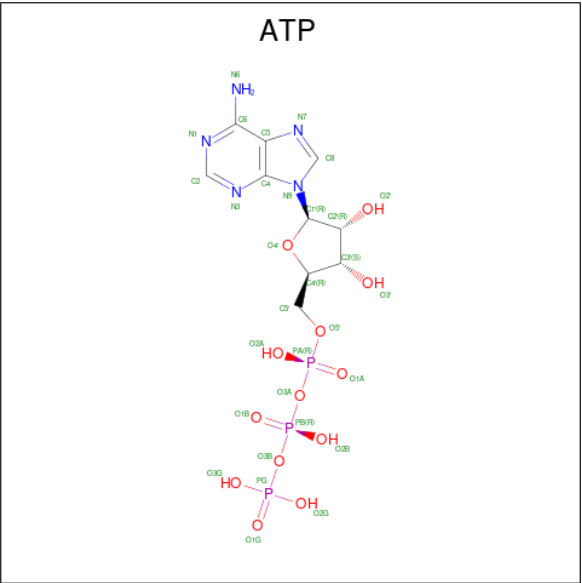
Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP P18708
A	-1	ALA	-	expression tag	UNP P18708
A	0	HIS	-	expression tag	UNP P18708
B	-2	GLY	-	expression tag	UNP P18708
B	-1	ALA	-	expression tag	UNP P18708
B	0	HIS	-	expression tag	UNP P18708
C	-2	GLY	-	expression tag	UNP P18708
C	-1	ALA	-	expression tag	UNP P18708
C	0	HIS	-	expression tag	UNP P18708
D	-2	GLY	-	expression tag	UNP P18708

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-1	ALA	-	expression tag	UNP P18708
D	0	HIS	-	expression tag	UNP P18708
E	-2	GLY	-	expression tag	UNP P18708
E	-1	ALA	-	expression tag	UNP P18708
E	0	HIS	-	expression tag	UNP P18708
F	-2	GLY	-	expression tag	UNP P18708
F	-1	ALA	-	expression tag	UNP P18708
F	0	HIS	-	expression tag	UNP P18708

- Molecule 5 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



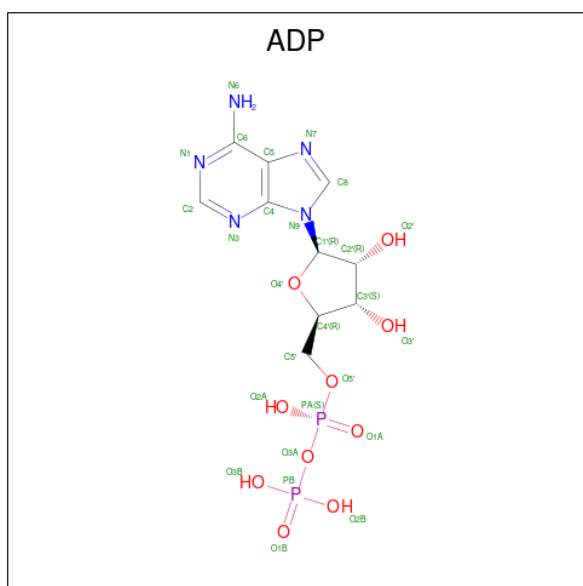
Mol	Chain	Residues	Atoms						AltConf
5	A	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
5	B	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
5	B	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
5	C	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
5	C	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
5	D	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
5	D	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	

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Mol	Chain	Residues	Atoms					AltConf	
5	E	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
5	E	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
5	F	1	Total 43	C 10	H 12	N 5	O 13	P 3	0

- Molecule 6 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						AltConf
6	A	1	Total	C	H	N	O	P	0
			39	10	12	5	10	2	

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		AltConf
7	G	2	Total	O	0
			2	2	
7	A	183	Total	O	0
			183	183	
7	B	218	Total	O	0
			218	218	
7	C	173	Total	O	1
			173	173	
7	D	125	Total	O	0
			125	125	

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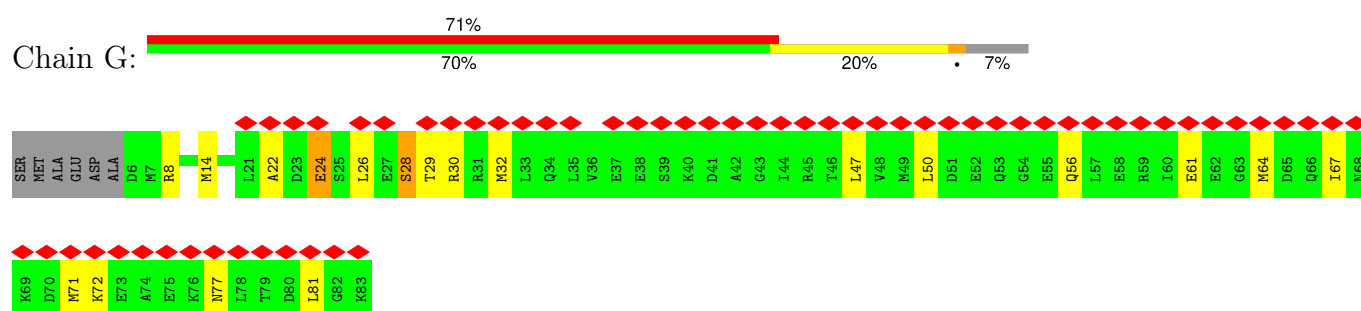
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Mol	Chain	Residues	Atoms		AltConf
7	E	64	Total 64	O 64	0
7	F	46	Total 46	O 46	0

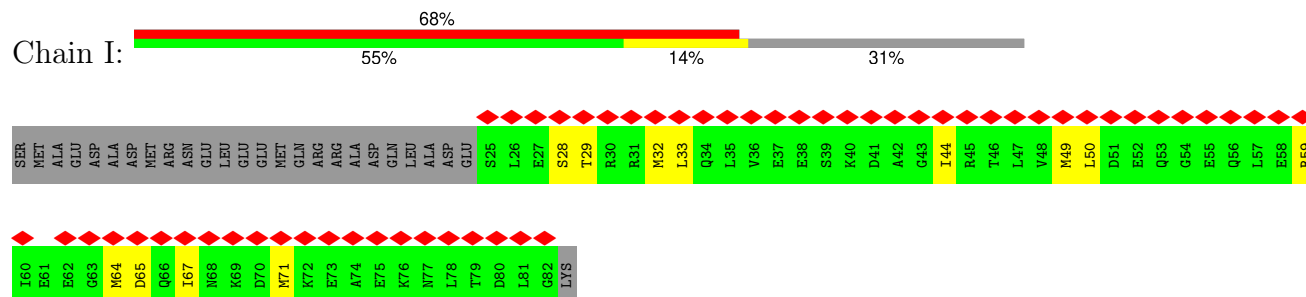
3 Residue-property plots

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.

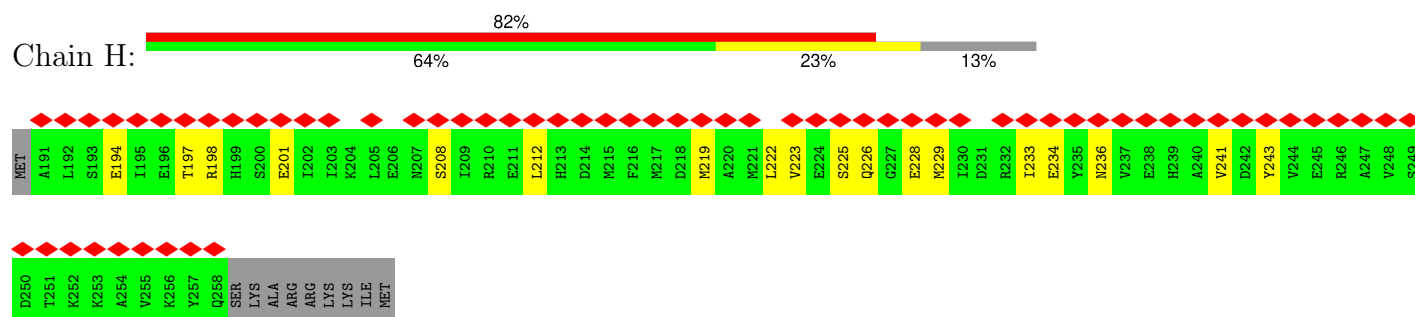
• Molecule 1: Synaptosomal-associated protein 25



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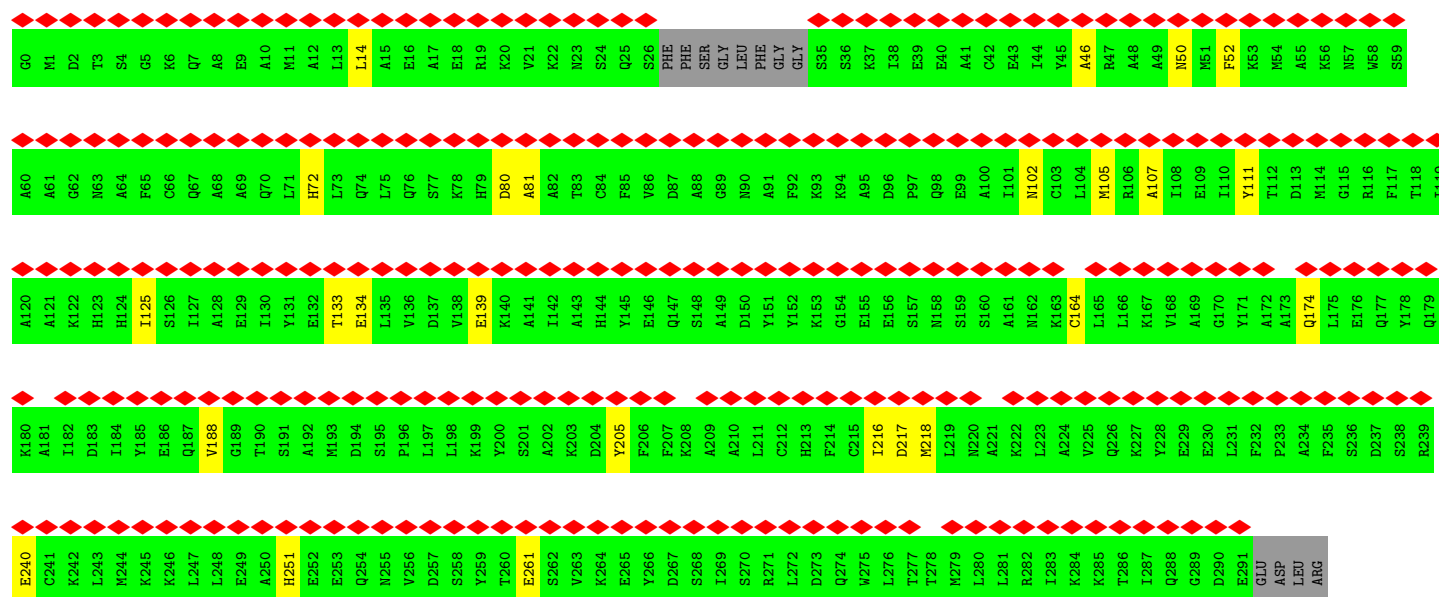
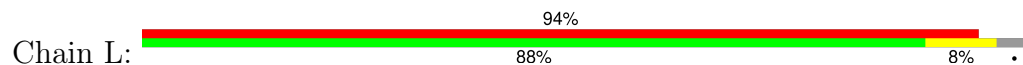


• Molecule 2: Syntaxin-1A

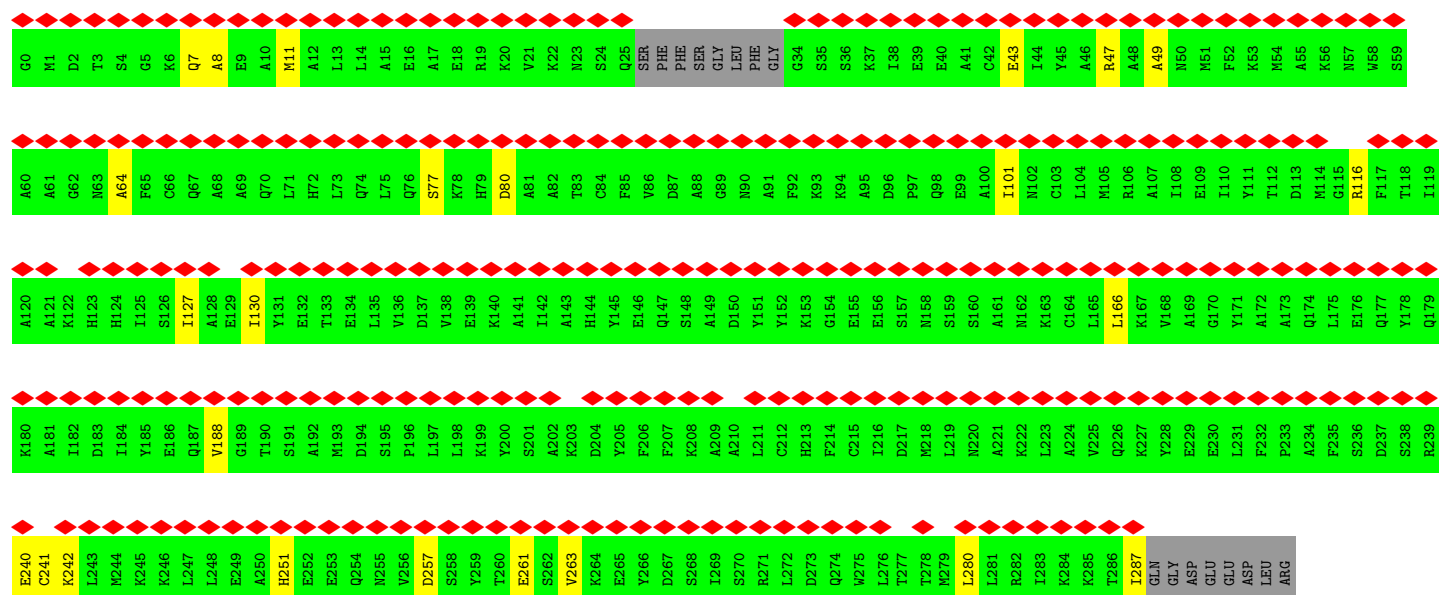
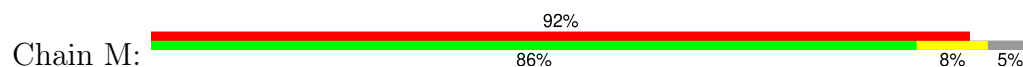




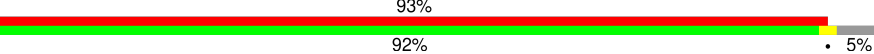
• Molecule 3: Alpha-soluble NSF attachment protein

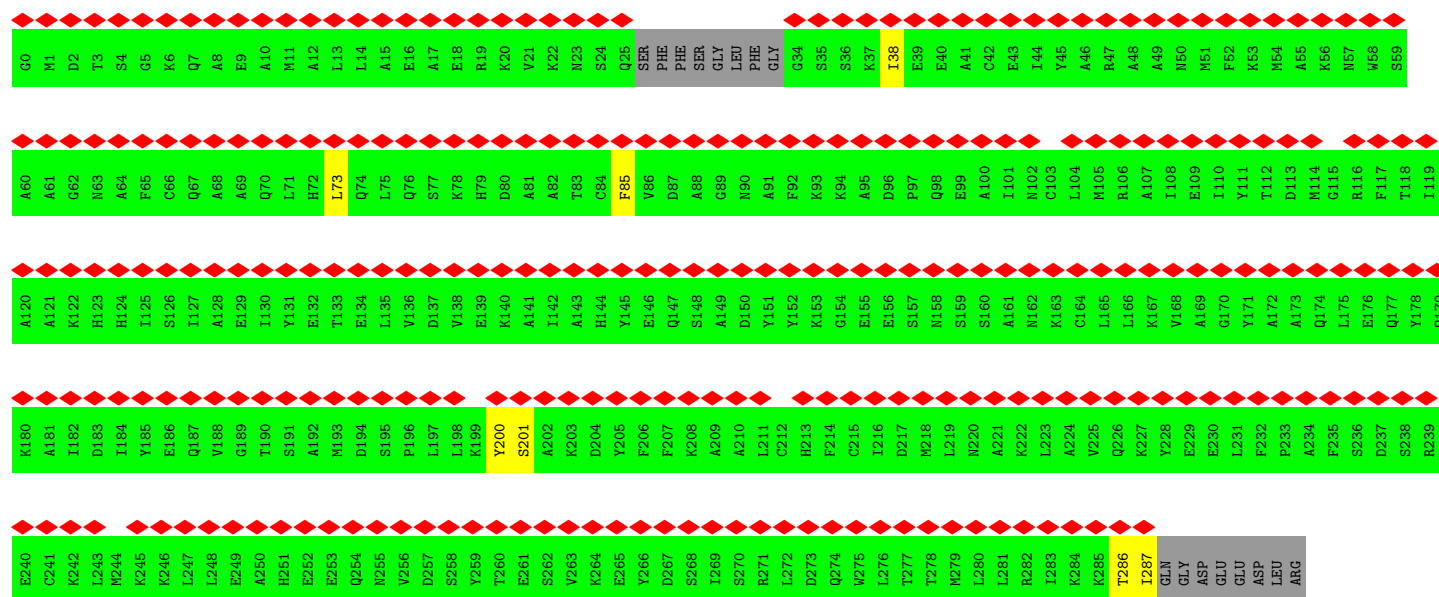


• Molecule 3: Alpha-soluble NSF attachment protein

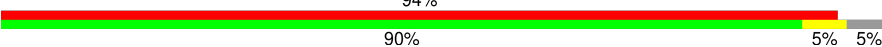


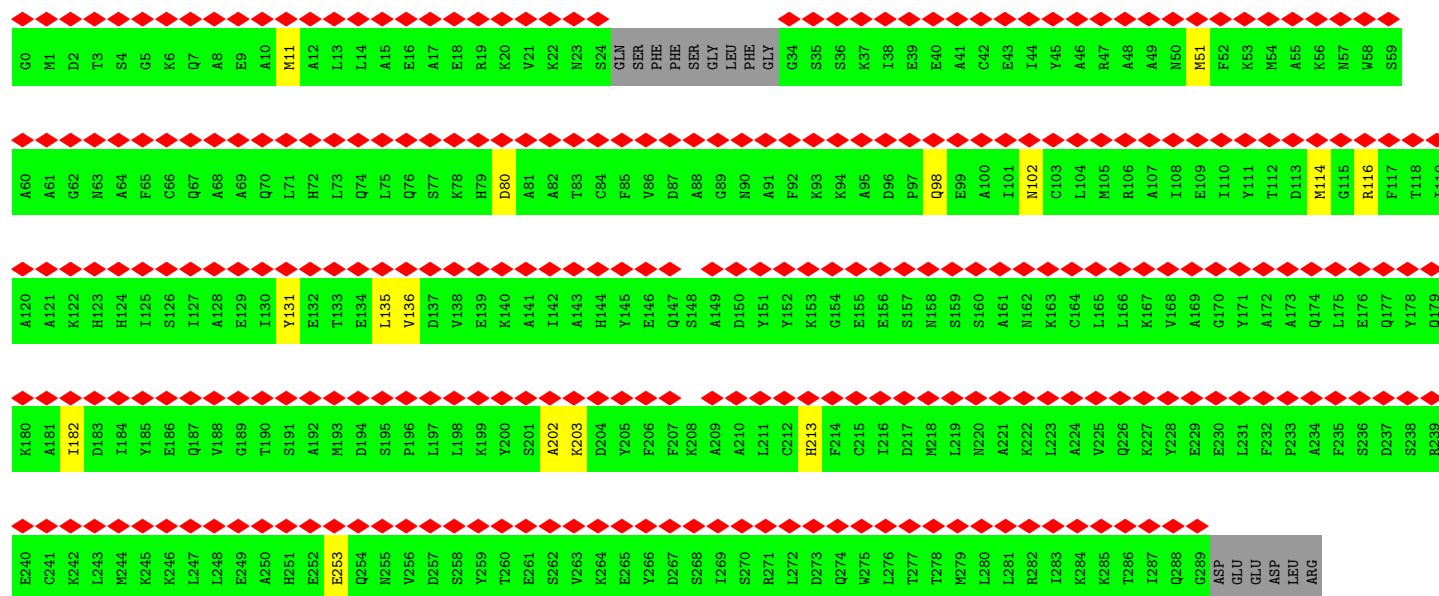
• Molecule 3: Alpha-soluble NSF attachment protein

Chain N: 



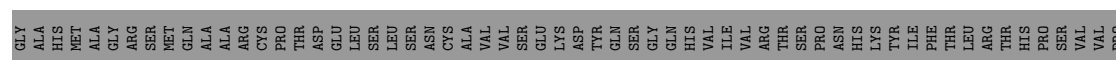
• Molecule 3: Alpha-soluble NSF attachment protein

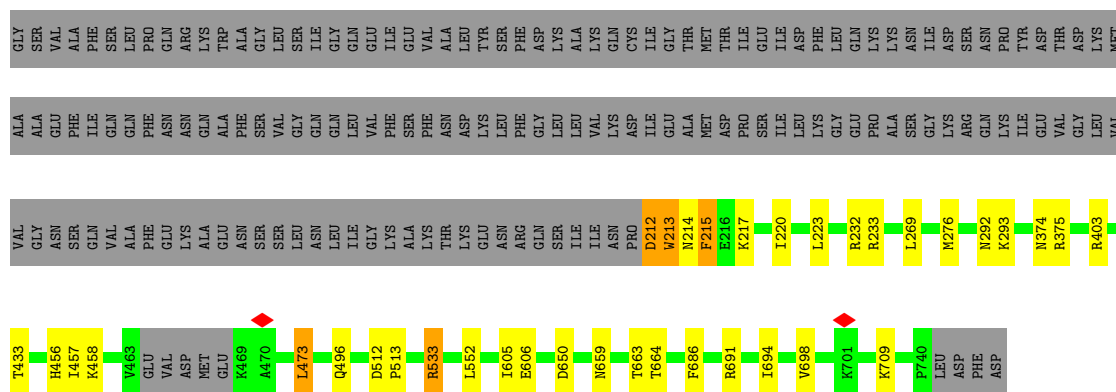
Chain O: 



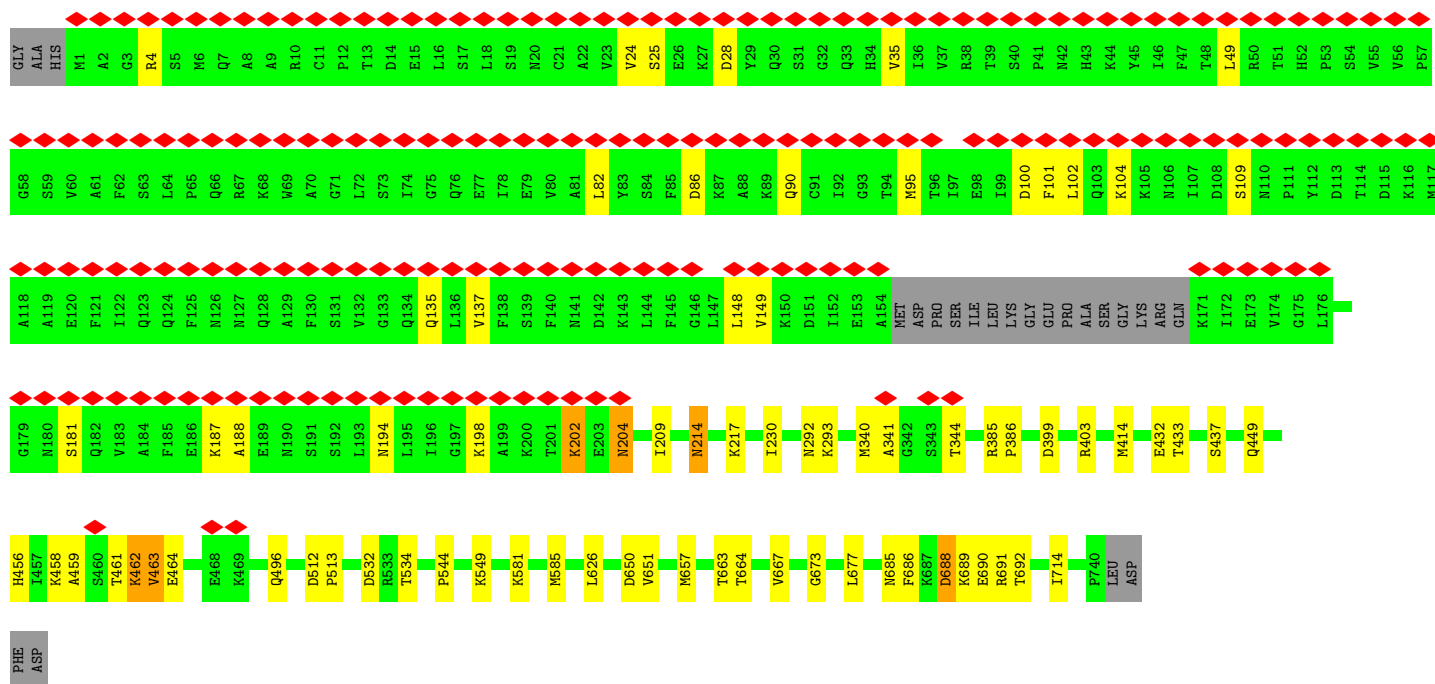
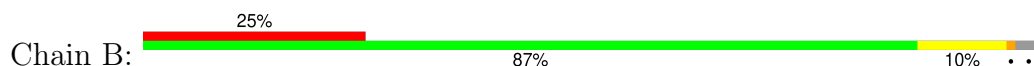
• Molecule 4: Vesicle-fusing ATPase

Chain A: 

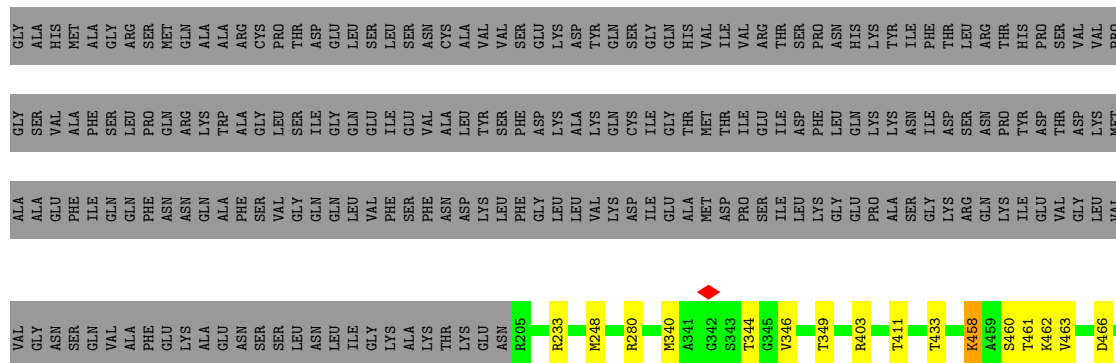


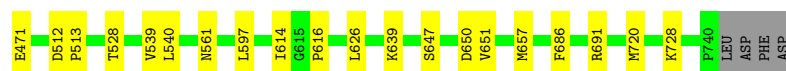


• Molecule 4: Vesicle-fusing ATPase

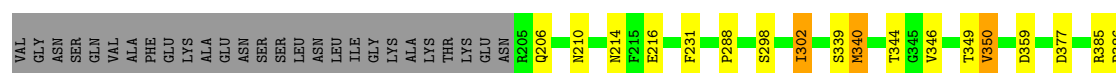
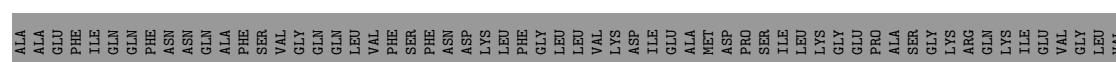
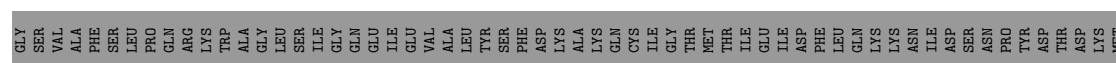
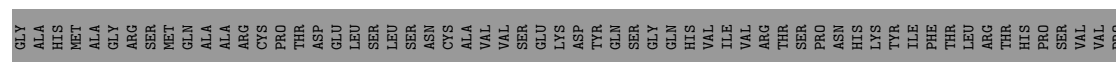


• Molecule 4: Vesicle-fusing ATPase

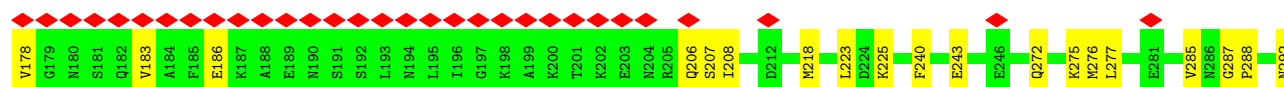
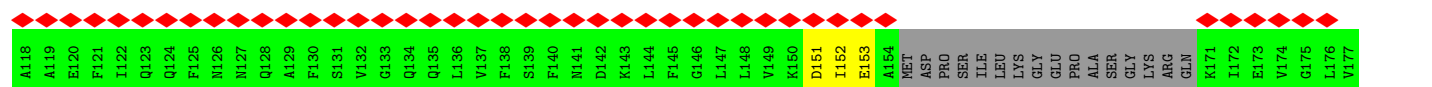
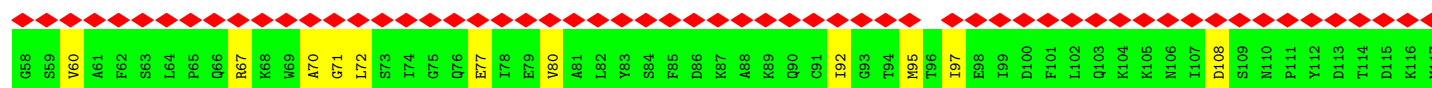
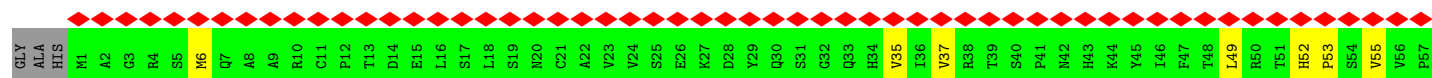
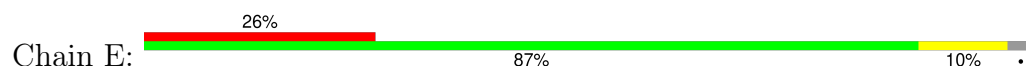




• Molecule 4: Vesicle-fusing ATPase

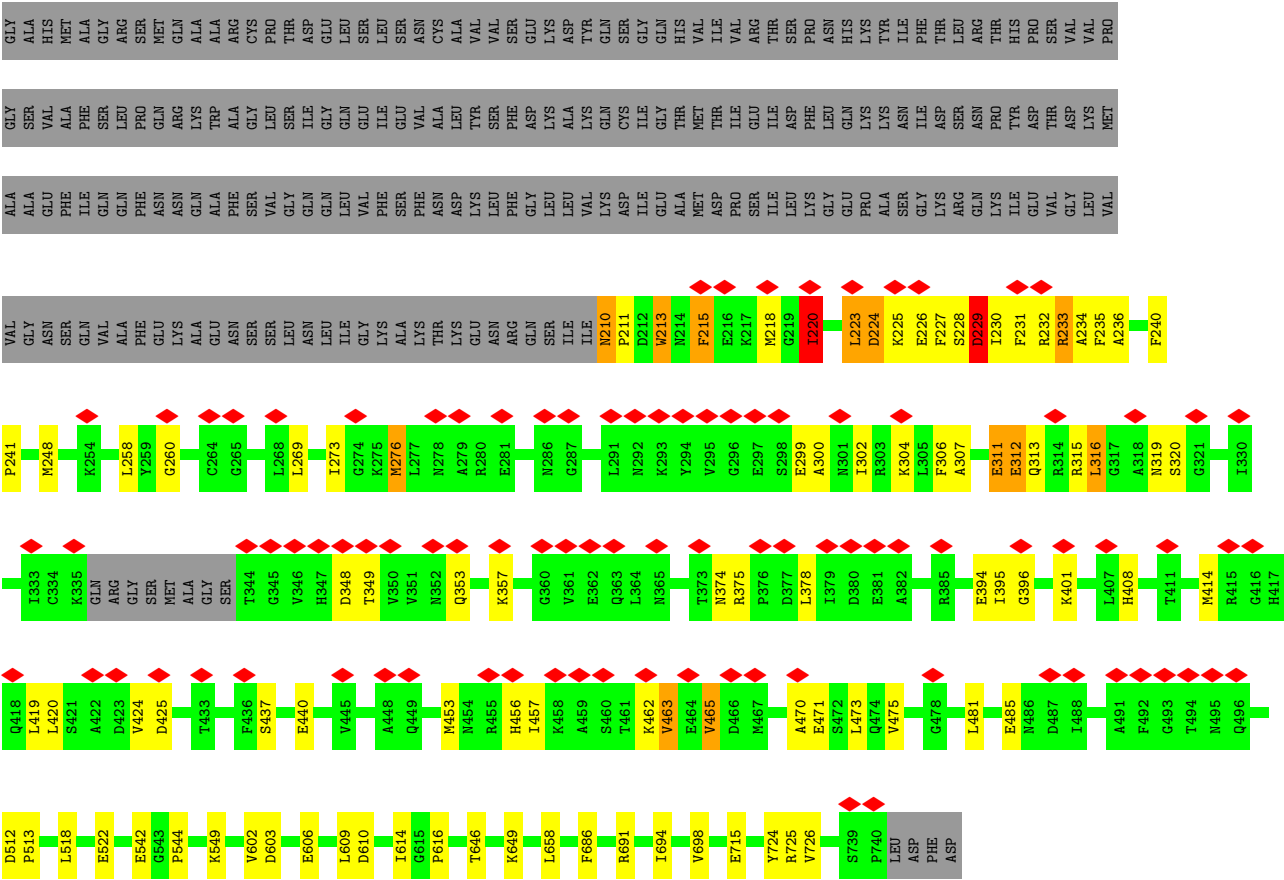


• Molecule 4: Vesicle-fusing ATPase



• Molecule 4: Vesicle-fusing ATPase





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	341427	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	33.992	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	22500	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	5.127	Depositor
Minimum map value	-2.723	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.112	Depositor
Recommended contour level	0.3	Depositor
Map size ($\text{\AA}$)	322.224, 322.224, 322.224	wwPDB
Map dimensions	294, 294, 294	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.096, 1.096, 1.096	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, 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	G	0.22	0/649	0.42	0/861
1	I	0.18	0/478	0.32	0/635
2	H	0.17	0/562	0.31	0/753
2	J	0.14	0/562	0.26	0/753
3	L	0.09	0/2289	0.24	0/3075
3	M	0.08	0/2238	0.21	0/3007
3	N	0.08	0/2238	0.20	0/3007
3	O	0.09	0/2242	0.22	0/3012
4	A	0.25	1/4470 (0.0%)	0.36	0/6010
4	B	0.29	0/5957	0.46	0/8018
4	C	0.24	1/4480 (0.0%)	0.40	0/6025
4	D	0.32	1/4400 (0.0%)	0.44	0/5927
4	E	0.19	0/5871	0.34	0/7908
4	F	0.35	1/4202 (0.0%)	0.54	0/5660
All	All	0.24	4/40638 (0.0%)	0.38	0/54651

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	533	ARG	C-N	7.53	1.44	1.33
4	D	569	SER	C-N	-7.13	1.25	1.33
4	F	220	ILE	C-N	-5.39	1.26	1.33
4	C	647	SER	C-N	5.20	1.40	1.33

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	642	634	622	24	0
1	I	472	474	466	18	0
2	H	556	544	544	23	0
2	J	556	544	544	20	0
3	L	2245	2205	2193	16	0
3	M	2202	2168	2168	16	0
3	N	2202	2168	2168	6	0
3	O	2206	2171	2171	12	0
4	A	4283	4442	4300	33	0
4	B	5770	5925	5824	52	0
4	C	4308	4465	4352	22	0
4	D	4271	4413	4348	34	0
4	E	5718	5851	5795	55	0
4	F	4111	4236	4217	89	0
5	A	31	12	12	0	0
5	B	62	24	24	0	0
5	C	62	24	24	0	0
5	D	62	24	24	0	0
5	E	62	24	24	0	0
5	F	31	12	12	0	0
6	A	27	12	12	0	0
7	A	183	0	0	1	0
7	B	218	0	0	0	0
7	C	173	0	0	1	0
7	D	125	0	0	0	0
7	E	64	0	0	0	0
7	F	46	0	0	0	0
7	G	2	0	0	0	0
All	All	40690	40372	39844	370	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 5.

All (370) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:215:PHE:CE1	4:A:220:ILE:HD13	2.06	0.91
4:E:584:ALA:O	4:E:588:ILE:HD12	1.81	0.81
4:D:694:ILE:O	4:D:698:VAL:HG23	1.80	0.80
1:I:50:LEU:HD21	2:J:222:LEU:HD13	1.66	0.78
1:G:71:MET:SD	1:G:72:LYS:N	2.57	0.78
4:A:496:GLN:OE1	4:A:496:GLN:N	2.17	0.77
4:F:463:VAL:HG22	4:F:465:VAL:HG23	1.69	0.75
4:E:354:LEU:O	4:E:358:ILE:HG22	1.85	0.74
4:F:260:GLY:O	4:F:374:ASN:ND2	2.21	0.74
4:F:348:ASP:OD1	4:F:349:THR:N	2.20	0.73
4:A:233:ARG:NH2	7:A:902:HOH:O	2.22	0.72
1:I:71:MET:HE1	2:J:244:VAL:HA	1.72	0.72
4:B:86:ASP:N	4:B:90:GLN:OE1	2.21	0.72
4:B:214:ASN:OD1	4:B:214:ASN:N	2.24	0.70
4:A:374:ASN:ND2	4:A:374:ASN:O	2.25	0.70
3:L:72:HIS:ND1	3:L:80:ASP:OD2	2.24	0.70
3:O:51:MET:HA	3:O:51:MET:HE2	1.74	0.69
4:B:35:VAL:HG13	4:B:49:LEU:HD11	1.74	0.69
4:F:315:ARG:CZ	4:F:316:LEU:HD22	2.22	0.69
4:D:390:GLU:OE2	4:E:446:ARG:NH1	2.26	0.69
4:A:223:LEU:HD12	4:A:223:LEU:O	1.93	0.68
3:L:139:GLU:OE1	3:L:139:GLU:N	2.27	0.68
4:C:458:LYS:HE3	4:C:466:ASP:OD1	1.93	0.68
4:A:686:PHE:O	4:A:691:ARG:NH2	2.27	0.68
4:F:218:MET:SD	4:F:223:LEU:CD2	2.82	0.68
4:E:218:MET:HE2	4:E:272:GLN:HB3	1.76	0.67
4:F:463:VAL:HG13	4:F:463:VAL:O	1.92	0.67
4:F:414:MET:HE2	4:F:475:VAL:HG23	1.77	0.66
4:B:100:ASP:OD1	4:B:101:PHE:N	2.29	0.66
1:I:50:LEU:CD2	2:J:222:LEU:HD13	2.27	0.65
4:F:230:ILE:HA	4:F:234:ALA:HB3	1.78	0.65
4:A:473:LEU:HD13	4:A:473:LEU:O	1.97	0.65
4:F:230:ILE:HG23	4:F:235:PHE:CD2	2.32	0.64
4:F:609:LEU:HD12	4:F:609:LEU:O	1.98	0.64
4:B:414:MET:SD	4:B:449:GLN:NE2	2.71	0.63
3:L:240:GLU:N	3:L:240:GLU:OE1	2.32	0.63
4:B:496:GLN:N	4:B:496:GLN:OE1	2.31	0.63
4:D:385:ARG:NH1	4:D:386:PRO:O	2.31	0.63
4:F:213:TRP:CD1	4:F:227:PHE:HB3	2.33	0.63
1:G:30:ARG:NH2	2:H:201:GLU:OE1	2.31	0.62
4:B:95:MET:SD	4:B:95:MET:N	2.71	0.62
4:B:102:LEU:O	4:B:104:LYS:NZ	2.32	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:462:LYS:O	4:F:463:VAL:HG12	1.99	0.62
4:F:215:PHE:HD1	4:F:223:LEU:HB2	1.64	0.62
1:G:50:LEU:HB3	2:H:222:LEU:HD11	1.80	0.61
4:B:135:GLN:OE1	4:B:135:GLN:N	2.33	0.61
1:I:64:MET:HE1	2:J:233:ILE:HG23	1.81	0.61
3:M:43:GLU:OE2	3:M:47:ARG:NE	2.33	0.61
4:C:686:PHE:O	4:C:691:ARG:NH2	2.34	0.61
3:M:240:GLU:OE1	3:M:240:GLU:N	2.34	0.60
4:E:302:ILE:HD11	4:E:350:VAL:HG13	1.84	0.59
4:C:248:MET:HE1	4:D:473:LEU:HD21	1.83	0.59
4:F:299:GLU:HA	4:F:302:ILE:HD12	1.83	0.58
2:J:219:MET:HE3	2:J:223:VAL:HG21	1.85	0.58
3:L:133:THR:HG23	3:L:134:GLU:HG3	1.84	0.58
4:F:230:ILE:HG22	4:F:231:PHE:N	2.16	0.58
4:E:77:GLU:N	4:E:77:GLU:OE1	2.37	0.58
1:G:22:ALA:HB3	2:H:194:GLU:HG3	1.84	0.58
1:I:33:LEU:HD12	2:J:205:LEU:HD21	1.85	0.58
4:F:215:PHE:HD1	4:F:223:LEU:CB	2.17	0.58
4:F:686:PHE:O	4:F:691:ARG:NH2	2.37	0.58
4:A:458:LYS:NZ	4:F:231:PHE:CZ	2.67	0.57
1:I:71:MET:HE1	2:J:244:VAL:CA	2.34	0.57
3:O:136:VAL:HG12	3:O:136:VAL:O	2.04	0.57
4:D:344:THR:HG23	4:D:346:VAL:HG23	1.86	0.57
3:M:77:SER:OG	3:M:80:ASP:OD1	2.22	0.57
4:E:35:VAL:HG22	4:E:49:LEU:HD11	1.86	0.56
4:D:339:SER:O	4:D:340:MET:C	2.47	0.56
4:E:206:GLN:O	4:E:208:ILE:N	2.37	0.56
2:H:229:MET:HE3	2:H:233:ILE:HG13	1.88	0.56
4:F:223:LEU:O	4:F:224:ASP:C	2.49	0.56
1:I:44:ILE:HG23	3:N:200:TYR:CE1	2.41	0.56
4:E:95:MET:O	4:E:183:VAL:HG13	2.05	0.55
4:F:375:ARG:HG3	4:F:375:ARG:O	2.06	0.55
4:F:440:GLU:N	4:F:440:GLU:OE1	2.38	0.55
4:E:389:LEU:O	4:E:390:GLU:HG2	2.06	0.55
4:F:258:LEU:HD22	4:F:395:ILE:HD11	1.88	0.55
2:J:222:LEU:HD12	2:J:223:VAL:N	2.20	0.55
4:E:457:ILE:HG13	4:E:465:VAL:HG22	1.88	0.55
4:F:316:LEU:HD23	4:F:319:ASN:O	2.06	0.55
4:F:228:SER:O	4:F:229:ASP:C	2.49	0.55
4:F:694:ILE:O	4:F:698:VAL:HG22	2.06	0.55
3:O:182:ILE:HD13	3:O:213:HIS:CD2	2.42	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:315:ARG:HD2	4:F:316:LEU:HD13	1.89	0.55
4:F:269:LEU:O	4:F:273:ILE:HD12	2.06	0.55
4:C:650:ASP:OD1	4:C:651:VAL:N	2.39	0.55
4:C:471:GLU:N	4:C:471:GLU:OE1	2.40	0.54
1:I:44:ILE:HG23	3:N:200:TYR:HE1	1.72	0.54
3:O:11:MET:HE3	3:O:11:MET:HA	1.89	0.54
4:A:605:ILE:HG22	4:A:605:ILE:O	2.07	0.54
4:D:401:LYS:HD3	4:D:401:LYS:N	2.23	0.53
4:B:459:ALA:CB	4:B:463:VAL:HA	2.39	0.53
4:E:299:GLU:N	4:E:299:GLU:OE1	2.42	0.53
4:A:292:ASN:OD1	4:A:293:LYS:N	2.41	0.53
4:F:401:LYS:HD3	4:F:401:LYS:N	2.23	0.53
1:I:29:THR:O	1:I:33:LEU:HD13	2.07	0.53
4:D:699:LYS:O	4:D:699:LYS:NZ	2.27	0.53
4:F:610:ASP:OD1	4:F:610:ASP:N	2.41	0.52
1:G:56:GLN:NE2	2:J:234:GLU:OE1	2.42	0.52
1:G:61:GLU:HG3	2:H:229:MET:HE1	1.91	0.52
4:E:108:ASP:OD1	4:E:108:ASP:N	2.41	0.52
4:F:258:LEU:CD2	4:F:395:ILE:HD11	2.39	0.52
4:C:403:ARG:NE	4:C:433:THR:O	2.43	0.52
4:E:285:VAL:HG12	4:E:287:GLY:H	1.75	0.52
4:F:437:SER:OG	4:F:440:GLU:OE1	2.27	0.52
4:B:4:ARG:NH2	4:B:28:ASP:OD2	2.42	0.52
4:C:411:THR:HG22	4:C:411:THR:O	2.09	0.52
4:F:215:PHE:CD1	4:F:223:LEU:CB	2.93	0.52
3:M:101:ILE:HD11	3:M:130:ILE:HG21	1.91	0.51
1:G:22:ALA:HB3	2:H:194:GLU:CD	2.36	0.51
4:D:216:GLU:N	4:D:216:GLU:OE1	2.44	0.51
4:B:187:LYS:NZ	4:B:188:ALA:O	2.44	0.51
4:F:394:GLU:OE1	4:F:394:GLU:N	2.37	0.51
4:F:462:LYS:O	4:F:463:VAL:CB	2.58	0.51
4:B:432:GLU:OE1	4:B:432:GLU:C	2.54	0.51
4:C:280:ARG:HD3	4:C:280:ARG:N	2.25	0.51
4:F:300:ALA:HB1	4:F:304:LYS:NZ	2.26	0.51
4:E:151:ASP:OD1	4:E:152:ILE:N	2.43	0.51
1:G:47:LEU:CD2	2:H:219:MET:HE3	2.41	0.51
3:O:253:GLU:OE1	3:O:253:GLU:N	2.43	0.51
1:G:8:ARG:HB2	4:B:344:THR:OG1	2.11	0.51
4:D:231:PHE:CZ	4:E:463:VAL:HG21	2.46	0.50
4:E:462:LYS:O	4:E:463:VAL:C	2.54	0.50
4:E:590[B]:ASP:OD1	4:E:590[B]:ASP:C	2.53	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:213:TRP:HB2	4:F:227:PHE:CD1	2.46	0.50
3:L:218:MET:SD	3:L:251:HIS:ND1	2.84	0.50
4:C:346:VAL:O	4:C:346:VAL:HG12	2.11	0.50
4:C:626:LEU:HD23	4:C:657:MET:HE1	1.93	0.50
4:F:215:PHE:CD1	4:F:223:LEU:HB2	2.46	0.50
4:F:456:HIS:CD2	4:F:473:LEU:HD21	2.47	0.50
3:N:286:THR:O	3:N:287:ILE:C	2.55	0.50
4:F:220:ILE:HD11	4:F:223:LEU:HD22	1.92	0.50
4:F:462:LYS:O	4:F:463:VAL:HB	2.12	0.50
4:C:248:MET:HE1	4:D:473:LEU:CD2	2.42	0.50
4:D:407:LEU:HD11	4:D:441:LEU:HD22	1.93	0.50
4:F:375:ARG:HD3	4:F:378:LEU:HD22	1.94	0.50
4:F:614:ILE:O	4:F:616:PRO:HA	2.11	0.49
3:M:263:VAL:HG22	3:M:280:LEU:HD21	1.93	0.49
4:B:688:ASP:O	4:B:692:THR:HG23	2.13	0.49
4:C:614:ILE:O	4:C:616:PRO:HA	2.12	0.49
4:C:349:THR:HG23	4:D:288:PRO:HG3	1.93	0.49
4:E:70:ALA:HB3	4:E:72:LEU:HD12	1.94	0.49
4:B:209:ILE:CD1	4:C:463:VAL:HG21	2.42	0.49
2:H:234:GLU:OE2	1:I:59:ARG:NE	2.45	0.49
4:F:606:GLU:OE1	4:F:646:THR:OG1	2.30	0.49
4:E:92:ILE:O	4:E:178:VAL:HG22	2.12	0.49
2:H:225:SER:O	2:H:228:GLU:HG3	2.12	0.49
1:I:71:MET:HE1	2:J:244:VAL:CG2	2.42	0.49
4:D:497:GLU:OE1	4:D:497:GLU:HA	2.13	0.49
4:F:227:PHE:O	4:F:228:SER:C	2.55	0.49
2:J:230:ILE:HA	2:J:233:ILE:HD12	1.95	0.49
3:M:251:HIS:O	3:M:251:HIS:ND1	2.46	0.49
4:E:208:ILE:O	4:E:277:LEU:HD12	2.13	0.49
4:F:210:ASN:CB	4:F:211:PRO:CD	2.91	0.49
4:E:240:PHE:HZ	4:F:457:ILE:HD11	1.77	0.48
4:E:276:MET:SD	4:E:276:MET:C	2.96	0.48
4:D:206:GLN:OE1	4:D:206:GLN:N	2.47	0.48
3:O:114:MET:SD	3:O:116:ARG:NH1	2.87	0.48
4:B:512:ASP:N	4:B:513:PRO:CD	2.76	0.48
4:C:597:LEU:HD23	4:C:639:LYS:HB2	1.96	0.48
3:O:51:MET:HE2	3:O:51:MET:CA	2.44	0.48
4:B:626:LEU:HD23	4:B:657:MET:HE1	1.94	0.48
4:D:399:ASP:OD1	4:D:399:ASP:N	2.43	0.48
4:E:49:LEU:HD12	4:E:49:LEU:N	2.29	0.48
4:E:594[B]:LYS:O	4:E:638:ARG:NH1	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:273:ILE:HA	4:F:276:MET:HB3	1.95	0.48
4:F:462:LYS:O	4:F:463:VAL:CG1	2.61	0.48
3:M:8:ALA:HA	3:M:11:MET:HE3	1.96	0.48
4:C:650:ASP:OD1	4:C:651:VAL:HG23	2.14	0.48
4:B:544:PRO:O	4:B:549:LYS:NZ	2.46	0.47
2:J:206:GLU:OE1	2:J:210:ARG:NH2	2.47	0.47
1:I:64:MET:HE1	2:J:233:ILE:HG12	1.97	0.47
2:J:219:MET:SD	2:J:222:LEU:HD11	2.55	0.47
4:D:581:LYS:O	4:D:585:MET:HG3	2.14	0.47
1:I:28:SER:O	1:I:32:MET:SD	2.72	0.47
3:L:107:ALA:HB1	3:L:111:TYR:OH	2.14	0.47
3:N:73:LEU:HD11	3:N:85:PHE:CE2	2.49	0.47
4:B:714:ILE:HG22	4:B:714:ILE:O	2.15	0.47
4:E:153:GLU:N	4:E:153:GLU:OE1	2.48	0.47
4:E:461:THR:O	4:E:462:LYS:C	2.57	0.47
1:G:22:ALA:HB3	2:H:194:GLU:CG	2.44	0.47
4:B:462:LYS:C	4:B:463:VAL:HG23	2.40	0.47
4:C:512:ASP:N	4:C:513:PRO:CD	2.78	0.47
4:E:403:ARG:NH1	4:E:433:THR:O	2.43	0.47
3:L:125:ILE:HD11	3:L:164:CYS:SG	2.55	0.47
4:A:403:ARG:NE	4:A:433:THR:O	2.47	0.47
4:F:481:LEU:O	4:F:485:GLU:HG3	2.15	0.47
3:L:46:ALA:O	3:L:50:ASN:ND2	2.46	0.47
4:A:694:ILE:O	4:A:698:VAL:HG22	2.14	0.47
4:B:202:LYS:CG	4:B:204:ASN:HD21	2.29	0.46
4:C:233[A]:ARG:NH1	7:C:906:HOH:O	2.47	0.46
4:F:228:SER:OG	4:F:229:ASP:N	2.48	0.46
3:L:80:ASP:OD1	3:L:81:ALA:N	2.48	0.46
4:A:213:TRP:HB3	4:B:461:THR:HA	1.96	0.46
4:A:512:ASP:N	4:A:513:PRO:CD	2.79	0.46
4:E:67:ARG:O	4:E:71:GLY:N	2.48	0.46
4:B:95:MET:HE1	4:B:181:SER:HB3	1.96	0.46
4:B:109:SER:O	4:B:194:ASN:ND2	2.48	0.46
4:C:458:LYS:CE	4:C:466:ASP:OD1	2.61	0.46
4:F:457:ILE:HG23	4:F:465:VAL:HA	1.97	0.46
1:G:29:THR:HG21	2:H:201:GLU:HG3	1.98	0.46
3:L:107:ALA:HB1	3:L:111:TYR:CZ	2.50	0.46
4:F:425:ASP:OD1	4:F:425:ASP:N	2.45	0.46
1:I:49:MET:SD	1:I:49:MET:C	2.99	0.46
2:J:218:ASP:O	2:J:222:LEU:HG	2.15	0.46
4:A:215:PHE:CZ	4:A:269:LEU:HD13	2.50	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:411:THR:HG22	4:E:411:THR:O	2.15	0.46
4:E:585:MET:HE1	4:E:626:LEU:HD13	1.98	0.46
4:F:463:VAL:O	4:F:463:VAL:CG1	2.61	0.46
4:F:512:ASP:N	4:F:513:PRO:CD	2.79	0.46
4:E:544:PRO:O	4:E:549:LYS:NZ	2.49	0.46
2:J:217:MET:O	2:J:221:MET:HG2	2.16	0.46
3:M:101:ILE:HD11	3:M:130:ILE:CG2	2.46	0.46
3:M:241:CYS:SG	3:M:242:LYS:N	2.89	0.46
4:B:35:VAL:CG1	4:B:49:LEU:HD11	2.45	0.46
4:C:462:LYS:O	4:C:463:VAL:C	2.59	0.46
4:D:214:ASN:HB2	4:E:461:THR:HG22	1.97	0.46
4:B:667:VAL:HG23	4:B:667:VAL:O	2.15	0.46
4:D:210:ASN:OD1	4:D:210:ASN:C	2.59	0.46
2:J:219:MET:HE3	2:J:223:VAL:CG2	2.45	0.45
4:A:220:ILE:CG2	4:A:223:LEU:HD11	2.46	0.45
4:B:673:GLY:O	4:B:677:LEU:HD23	2.16	0.45
4:F:299:GLU:HG2	4:F:353:GLN:HB2	1.98	0.45
4:D:214:ASN:CB	4:E:461:THR:HG22	2.46	0.45
4:D:512:ASP:N	4:D:513:PRO:CD	2.79	0.45
4:D:608:LEU:HD12	4:D:608:LEU:HA	1.83	0.45
4:A:659[A]:ASN:OD1	4:A:659[A]:ASN:C	2.59	0.45
4:A:659[B]:ASN:OD1	4:A:659[B]:ASN:C	2.59	0.45
4:D:595:SER:OG	4:D:596:GLN:N	2.50	0.45
4:F:213:TRP:CD1	4:F:227:PHE:CG	3.04	0.45
4:F:315:ARG:NH1	4:F:316:LEU:HD22	2.32	0.45
4:F:220:ILE:HD13	4:F:223:LEU:HB2	1.97	0.45
4:F:311:GLU:HG2	4:F:312:GLU:N	2.31	0.45
4:A:698:VAL:O	4:A:698:VAL:HG23	2.16	0.45
4:B:35:VAL:HG12	4:B:82:LEU:HA	1.98	0.45
4:D:302:ILE:HD12	4:D:350:VAL:HG22	1.99	0.45
2:H:197:THR:O	2:H:201:GLU:HG2	2.16	0.45
4:A:473:LEU:HD11	4:F:248:MET:CE	2.47	0.45
4:A:605:ILE:O	4:A:605:ILE:CG2	2.64	0.45
4:E:186:GLU:OE1	4:E:186:GLU:N	2.49	0.45
4:E:531:SER:OG	4:F:715:GLU:OE2	2.30	0.45
4:B:385:ARG:NH1	4:B:386:PRO:O	2.50	0.44
4:F:470:ALA:O	4:F:473:LEU:HD23	2.17	0.44
3:L:14:LEU:HD22	3:L:52:PHE:HE2	1.83	0.44
4:B:581:LYS:O	4:B:585:MET:HG3	2.16	0.44
4:E:594[A]:LYS:O	4:E:638:ARG:NH1	2.51	0.44
4:A:456:HIS:ND1	4:A:456:HIS:C	2.75	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:650:ASP:OD1	4:B:651:VAL:N	2.51	0.44
4:B:663:THR:OG1	4:B:664:THR:N	2.50	0.44
1:G:47:LEU:HD23	2:H:219:MET:HE3	1.99	0.44
4:A:663:THR:HG22	4:A:664:THR:N	2.33	0.44
4:F:649:LYS:HE3	4:F:658:LEU:HD21	2.00	0.44
1:G:14:MET:HE2	4:D:346:VAL:HG21	1.99	0.44
4:E:243:GLU:OE1	4:E:243:GLU:N	2.51	0.44
4:E:626:LEU:HD23	4:E:657:MET:HE1	1.98	0.44
4:F:471:GLU:H	4:F:471:GLU:CD	2.25	0.44
1:G:24:GLU:OE1	2:H:198:ARG:NH2	2.50	0.44
4:B:686:PHE:HB3	4:B:690:GLU:HB3	2.00	0.44
4:E:223:LEU:O	4:E:225:LYS:N	2.51	0.44
4:F:542:GLU:OE1	4:F:649:LYS:HD2	2.17	0.44
2:H:208:SER:O	2:H:212:LEU:HG	2.18	0.44
4:A:650:ASP:OD1	4:A:650:ASP:N	2.50	0.44
4:F:218:MET:SD	4:F:223:LEU:HD21	2.58	0.44
4:F:306:PHE:CE1	4:F:357:LYS:HG2	2.53	0.44
1:G:71:MET:HE3	2:H:243:TYR:HB3	1.99	0.43
4:E:272:GLN:OE1	4:E:275:LYS:NZ	2.50	0.43
4:B:403:ARG:NE	4:B:433:THR:O	2.50	0.43
4:D:407:LEU:CD1	4:D:441:LEU:HD22	2.48	0.43
4:A:457:ILE:HD13	4:F:240:PHE:CD1	2.54	0.43
4:F:518:LEU:O	4:F:522:GLU:HG2	2.18	0.43
4:F:724:TYR:O	4:F:725:ARG:C	2.62	0.43
4:A:215:PHE:CE2	4:A:220:ILE:HG21	2.53	0.43
4:F:414:MET:SD	4:F:419:LEU:HB2	2.59	0.43
3:N:38:ILE:H	3:N:38:ILE:HD12	1.84	0.43
4:B:230:ILE:HG22	4:B:230:ILE:O	2.18	0.43
4:F:306:PHE:CE2	4:F:357:LYS:HG3	2.53	0.43
3:L:261:GLU:OE1	3:L:261:GLU:HA	2.19	0.43
4:B:399:ASP:OD1	4:B:399:ASP:N	2.45	0.43
4:D:427:LYS:HD3	4:D:427:LYS:N	2.33	0.43
4:E:52:HIS:ND1	4:E:53:PRO:O	2.48	0.43
4:F:348:ASP:OD1	4:F:348:ASP:C	2.62	0.43
4:A:214:ASN:CG	4:B:461:THR:HB	2.44	0.43
4:A:473:LEU:C	4:A:473:LEU:HD22	2.44	0.42
4:B:459:ALA:HB2	4:B:464:GLU:H	1.84	0.42
4:E:37:VAL:HG23	4:E:80:VAL:HG22	2.00	0.42
4:F:213:TRP:NE1	4:F:227:PHE:HB3	2.33	0.42
4:F:231:PHE:HD2	4:F:232:ARG:HG3	1.84	0.42
1:G:28:SER:HB3	1:G:32:MET:HE3	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:192:LEU:HA	2:J:195:ILE:HD12	2.02	0.42
4:B:24:VAL:HG22	4:B:25:SER:N	2.35	0.42
4:D:730:LEU:O	4:D:734:ARG:HG3	2.18	0.42
4:C:720:MET:HE2	4:C:728[A]:LYS:HD2	2.00	0.42
4:E:522:GLU:HA	4:E:522:GLU:OE1	2.18	0.42
4:F:240:PHE:CD2	4:F:241:PRO:HD2	2.54	0.42
4:B:534:THR:O	4:B:534:THR:HG22	2.20	0.42
4:D:414:MET:CE	4:D:475:VAL:HG21	2.49	0.42
4:E:292:ASN:OD1	4:E:293:LYS:N	2.53	0.42
1:G:71:MET:SD	1:G:71:MET:C	3.02	0.42
1:I:71:MET:HE1	2:J:244:VAL:HG22	2.01	0.42
4:A:457:ILE:HG23	4:A:458:LYS:HD3	2.01	0.42
4:B:340:MET:CG	4:B:341:ALA:N	2.81	0.42
1:G:77:ASN:O	1:G:81:LEU:HG	2.20	0.42
4:D:377:ASP:OD1	4:D:377:ASP:C	2.61	0.42
3:L:174:GLN:O	3:L:174:GLN:NE2	2.45	0.42
3:O:131:TYR:CD2	3:O:135:LEU:HD23	2.55	0.42
4:A:663:THR:HG22	4:A:664:THR:H	1.85	0.42
4:E:240:PHE:CE2	4:F:453:MET:HE3	2.54	0.42
4:B:148:LEU:HD23	4:B:149:VAL:N	2.35	0.42
4:B:292:ASN:OD1	4:B:293:LYS:N	2.53	0.42
4:F:218:MET:HE2	4:F:269:LEU:HD23	2.02	0.42
1:G:50:LEU:O	2:H:226:GLN:NE2	2.51	0.41
1:G:26:LEU:HD21	2:H:197:THR:HB	2.01	0.41
4:A:212:ASP:OD2	4:B:461:THR:O	2.38	0.41
4:B:214:ASN:OD1	4:B:217:LYS:HE3	2.20	0.41
2:H:219:MET:O	2:H:223:VAL:HG23	2.20	0.41
3:M:7:GLN:O	3:M:11:MET:HG2	2.20	0.41
3:M:251:HIS:NE2	3:M:287:ILE:HG22	2.36	0.41
3:O:98:GLN:OE1	3:O:102:ASN:ND2	2.54	0.41
4:D:359:ASP:OD1	4:D:359:ASP:C	2.63	0.41
4:F:395:ILE:HG22	4:F:396:GLY:H	1.84	0.41
3:O:80:ASP:N	3:O:80:ASP:OD1	2.53	0.41
4:D:401:LYS:N	4:D:401:LYS:CD	2.83	0.41
4:F:463:VAL:HG22	4:F:465:VAL:CG2	2.44	0.41
2:H:241:VAL:HA	1:I:67:ILE:HD11	2.01	0.41
3:L:102:ASN:O	3:L:105:MET:HG3	2.20	0.41
3:M:166:LEU:HD11	3:M:188:VAL:HG11	2.03	0.41
4:D:514:VAL:O	4:D:518:LEU:HG	2.21	0.41
4:E:695:ALA:HA	4:E:698:VAL:HG22	2.03	0.41
4:F:276:MET:O	4:F:276:MET:SD	2.78	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:M:101:ILE:HD12	3:M:127:ILE:HG23	2.03	0.41
1:G:8:ARG:O	4:B:344:THR:HG21	2.21	0.41
2:H:241:VAL:CA	1:I:67:ILE:HD11	2.51	0.41
2:J:253:LYS:HG3	2:J:254:ALA:N	2.35	0.41
3:O:202:ALA:O	3:O:203:LYS:C	2.64	0.41
4:B:214:ASN:O	4:B:217:LYS:HG2	2.21	0.41
4:E:6:MET:SD	4:E:60:VAL:HG23	2.60	0.41
4:F:229:ASP:O	4:F:233:ARG:NE	2.53	0.41
4:F:544:PRO:O	4:F:549:LYS:NZ	2.54	0.41
4:F:603:ASP:OD1	4:F:603:ASP:N	2.53	0.41
4:F:420:LEU:HD21	4:F:424:VAL:HG21	2.03	0.41
1:G:28:SER:CB	1:G:32:MET:HE3	2.51	0.40
2:H:229:MET:HE3	2:H:233:ILE:CG1	2.50	0.40
3:N:200:TYR:CD1	3:N:201:SER:N	2.89	0.40
4:B:714:ILE:O	4:B:714:ILE:CG2	2.69	0.40
4:E:95:MET:HB3	4:E:152:ILE:HD12	2.02	0.40
4:E:723:GLU:O	4:E:727:ARG:NH2	2.54	0.40
1:G:64:MET:O	1:G:67:ILE:HG22	2.22	0.40
1:I:65:ASP:OD2	3:M:116:ARG:NH1	2.54	0.40
3:L:216:ILE:HG23	3:L:217:ASP:H	1.86	0.40
3:M:257:ASP:O	3:M:261:GLU:HG2	2.21	0.40
4:B:102:LEU:HD13	4:B:137:VAL:HG13	2.03	0.40
4:F:602:VAL:O	4:F:602:VAL:HG23	2.21	0.40
4:F:609:LEU:O	4:F:610:ASP:C	2.64	0.40
3:M:49:ALA:HB2	3:M:64:ALA:HB3	2.04	0.40
3:L:188:VAL:HG11	3:L:205:TYR:CZ	2.57	0.40
4:C:539:VAL:HG22	4:C:540:LEU:N	2.37	0.40
4:E:97:ILE:HD12	4:E:183:VAL:HG11	2.03	0.40
4:E:207:SER:O	4:E:208:ILE:HB	2.22	0.40
1:G:64:MET:HE3	2:H:236:ASN:HB2	2.02	0.40
3:O:51:MET:HA	3:O:51:MET:CE	2.49	0.40
4:B:686:PHE:O	4:B:691:ARG:CD	2.69	0.40
4:D:610:ASP:O	4:D:618:PHE:HA	2.21	0.40
4:E:428:GLU:OE1	4:E:477:ARG:NH2	2.54	0.40
4:E:457:ILE:N	4:E:457:ILE:HD12	2.37	0.40
4:F:725:ARG:O	4:F:726:VAL:C	2.64	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	78/84 (93%)	75 (96%)	3 (4%)	0	100	100
1	I	58/84 (69%)	57 (98%)	1 (2%)	0	100	100
2	H	66/78 (85%)	64 (97%)	2 (3%)	0	100	100
2	J	66/78 (85%)	66 (100%)	0	0	100	100
3	L	282/296 (95%)	279 (99%)	3 (1%)	0	100	100
3	M	276/296 (93%)	272 (99%)	4 (1%)	0	100	100
3	N	276/296 (93%)	272 (99%)	4 (1%)	0	100	100
3	O	277/296 (94%)	272 (98%)	5 (2%)	0	100	100
4	A	557/747 (75%)	531 (95%)	26 (5%)	0	100	100
4	B	746/747 (100%)	717 (96%)	27 (4%)	2 (0%)	37	68
4	C	560/747 (75%)	540 (96%)	20 (4%)	0	100	100
4	D	550/747 (74%)	535 (97%)	14 (2%)	1 (0%)	44	74
4	E	736/747 (98%)	705 (96%)	29 (4%)	2 (0%)	37	68
4	F	525/747 (70%)	493 (94%)	27 (5%)	5 (1%)	13	42
All	All	5053/5990 (84%)	4878 (96%)	165 (3%)	10 (0%)	45	74

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	F	463	VAL
4	F	465	VAL
4	B	463	VAL
4	F	236	ALA
4	F	307	ALA
4	B	688	ASP
4	F	229	ASP
4	E	55	VAL
4	D	340	MET

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Mol	Chain	Res	Type
4	E	288	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	G	72/74 (97%)	70 (97%)	2 (3%)	38	66
1	I	54/74 (73%)	54 (100%)	0	100	100
2	H	62/71 (87%)	62 (100%)	0	100	100
2	J	62/71 (87%)	62 (100%)	0	100	100
3	L	236/243 (97%)	236 (100%)	0	100	100
3	M	230/243 (95%)	230 (100%)	0	100	100
3	N	230/243 (95%)	230 (100%)	0	100	100
3	O	230/243 (95%)	230 (100%)	0	100	100
4	A	480/638 (75%)	469 (98%)	11 (2%)	45	70
4	B	642/638 (101%)	631 (98%)	11 (2%)	56	78
4	C	482/638 (76%)	474 (98%)	8 (2%)	56	78
4	D	474/638 (74%)	466 (98%)	8 (2%)	56	78
4	E	635/638 (100%)	629 (99%)	6 (1%)	75	88
4	F	454/638 (71%)	437 (96%)	17 (4%)	29	59
All	All	4343/5090 (85%)	4280 (98%)	63 (2%)	62	80

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

Mol	Chain	Res	Type
1	G	24	GLU
1	G	28	SER
4	A	212	ASP
4	A	213	TRP
4	A	215	PHE
4	A	217	LYS

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Mol	Chain	Res	Type
4	A	232[A]	ARG
4	A	232[B]	ARG
4	A	276	MET
4	A	375	ARG
4	A	473	LEU
4	A	533	ARG
4	A	606	GLU
4	B	198	LYS
4	B	202	LYS
4	B	204	ASN
4	B	214	ASN
4	B	437	SER
4	B	456	HIS
4	B	458	LYS
4	B	462	LYS
4	B	532	ASP
4	B	685	ASN
4	B	689	LYS
4	C	340	MET
4	C	344	THR
4	C	458	LYS
4	C	460	SER
4	C	461[A]	THR
4	C	461[B]	THR
4	C	528	THR
4	C	561	ASN
4	D	298	SER
4	D	302	ILE
4	D	349	THR
4	D	350	VAL
4	D	408	HIS
4	D	462[A]	LYS
4	D	462[B]	LYS
4	D	569	SER
4	E	458	LYS
4	E	461	THR
4	E	462	LYS
4	E	463	VAL
4	E	586[A]	LYS
4	E	586[B]	LYS
4	F	210	ASN
4	F	213	TRP

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Mol	Chain	Res	Type
4	F	215	PHE
4	F	220	ILE
4	F	223	LEU
4	F	224	ASP
4	F	225	LYS
4	F	226	GLU
4	F	229	ASP
4	F	233	ARG
4	F	276	MET
4	F	311	GLU
4	F	312	GLU
4	F	313	GLN
4	F	316	LEU
4	F	320	SER
4	F	408	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
3	M	7	GLN
3	M	50	ASN
3	O	147	GLN
4	A	474	GLN
4	B	204	ASN
4	B	666	HIS
4	C	596	GLN
4	D	352	ASN
4	D	374	ASN
4	D	405	GLN
4	D	675	GLN
4	E	7	GLN
4	E	34	HIS
4	E	42	ASN
4	E	110	ASN
4	E	190	ASN
4	E	653	GLN
4	E	666	HIS
4	E	719	GLN
4	F	456	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

11 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	ATP	E	801	-	28,33,33	0.81	0	34,52,52	0.82	1 (2%)
5	ATP	C	801	-	28,33,33	0.87	0	34,52,52	0.76	1 (2%)
5	ATP	C	802	-	28,33,33	0.95	1 (3%)	34,52,52	0.81	1 (2%)
5	ATP	A	801	-	28,33,33	0.85	0	34,52,52	0.82	1 (2%)
5	ATP	F	801	-	28,33,33	0.82	0	34,52,52	0.74	1 (2%)
5	ATP	D	801	-	28,33,33	0.83	0	34,52,52	0.74	1 (2%)
6	ADP	A	802	-	24,29,29	0.84	1 (4%)	29,45,45	0.77	1 (3%)
5	ATP	B	801	-	28,33,33	0.98	1 (3%)	34,52,52	0.80	1 (2%)
5	ATP	D	802	-	28,33,33	0.88	1 (3%)	34,52,52	0.78	1 (2%)
5	ATP	E	802	-	28,33,33	0.83	1 (3%)	34,52,52	0.82	1 (2%)
5	ATP	B	802	-	28,33,33	0.85	0	34,52,52	0.75	1 (2%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	ATP	E	801	-	-	2/18/38/38	0/3/3/3
5	ATP	C	801	-	-	1/18/38/38	0/3/3/3
5	ATP	C	802	-	-	6/18/38/38	0/3/3/3
5	ATP	A	801	-	-	2/18/38/38	0/3/3/3
5	ATP	F	801	-	-	2/18/38/38	0/3/3/3
5	ATP	D	801	-	-	5/18/38/38	0/3/3/3
6	ADP	A	802	-	-	2/12/32/32	0/3/3/3
5	ATP	B	801	-	-	6/18/38/38	0/3/3/3
5	ATP	D	802	-	-	2/18/38/38	0/3/3/3
5	ATP	E	802	-	-	3/18/38/38	0/3/3/3
5	ATP	B	802	-	-	7/18/38/38	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	801	ATP	C1'-N9	-2.48	1.43	1.49
5	C	802	ATP	C1'-N9	-2.18	1.44	1.49
5	E	802	ATP	C1'-N9	-2.17	1.44	1.49
5	D	802	ATP	C1'-N9	-2.07	1.44	1.49
6	A	802	ADP	C8-N7	-2.02	1.31	1.34

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	801	ATP	C5-C6-N6	2.43	124.01	120.31
5	B	801	ATP	C5-C6-N6	2.34	123.87	120.31
5	B	802	ATP	C5-C6-N6	2.33	123.86	120.31
5	C	801	ATP	C5-C6-N6	2.29	123.80	120.31
5	D	801	ATP	C5-C6-N6	2.28	123.78	120.31
5	A	801	ATP	C5-C6-N6	2.27	123.76	120.31
6	A	802	ADP	C5-C6-N6	2.27	123.76	120.31
5	D	802	ATP	C5-C6-N6	2.24	123.73	120.31
5	F	801	ATP	C5-C6-N6	2.20	123.67	120.31
5	E	802	ATP	C5-C6-N6	2.19	123.65	120.31
5	C	802	ATP	C5-C6-N6	2.16	123.60	120.31

There are no chirality outliers.

All (38) torsion outliers are listed below:

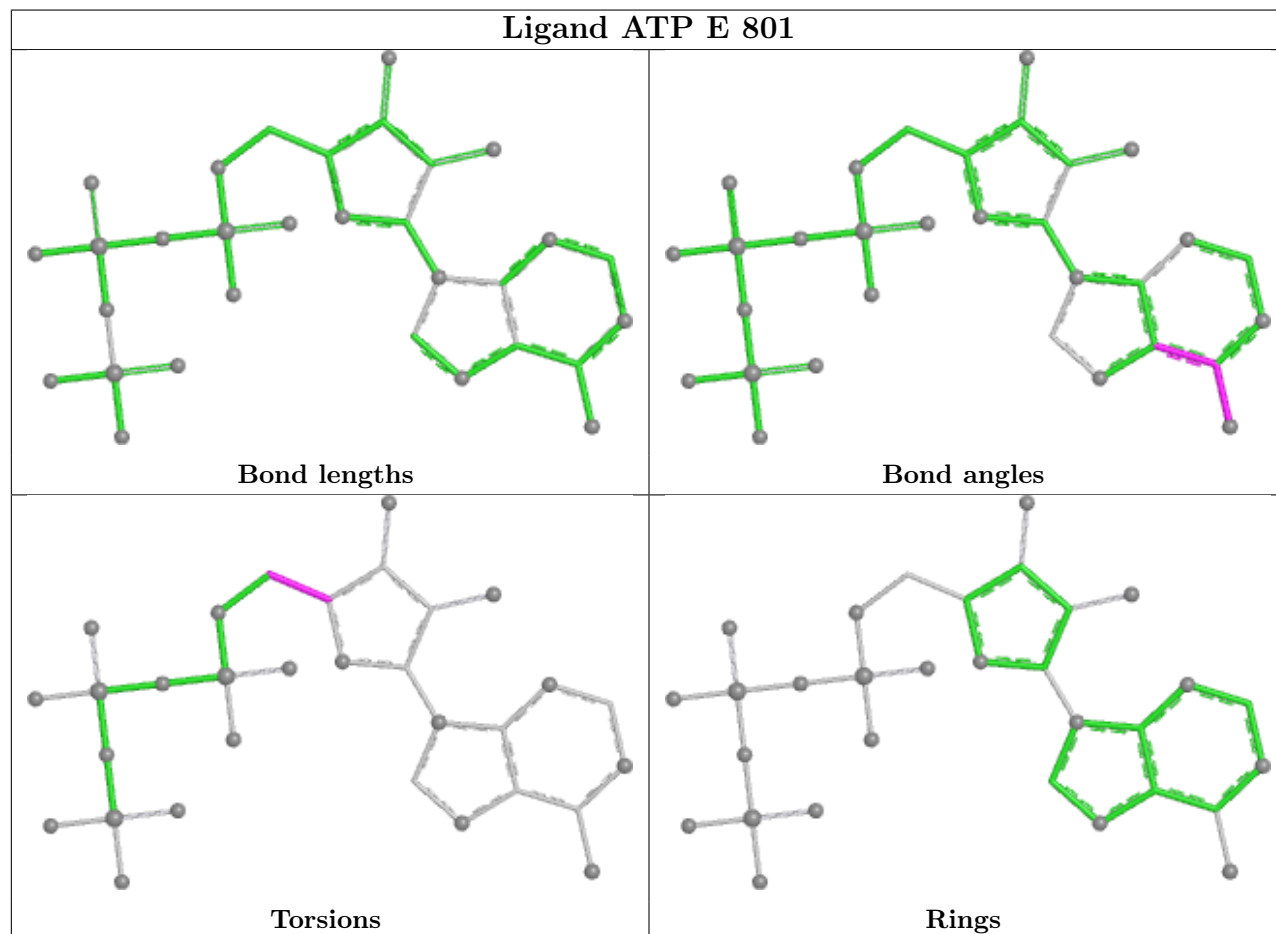
Mol	Chain	Res	Type	Atoms
5	B	801	ATP	C5'-O5'-PA-O2A
5	B	801	ATP	C5'-O5'-PA-O3A
5	B	802	ATP	C5'-O5'-PA-O2A
5	C	802	ATP	C5'-O5'-PA-O1A
5	C	802	ATP	C5'-O5'-PA-O2A
5	C	802	ATP	C5'-O5'-PA-O3A
5	D	801	ATP	C5'-O5'-PA-O1A
5	D	801	ATP	C5'-O5'-PA-O3A
5	D	802	ATP	C5'-O5'-PA-O1A
5	F	801	ATP	C5'-O5'-PA-O2A
6	A	802	ADP	C5'-O5'-PA-O3A
5	E	801	ATP	O4'-C4'-C5'-O5'
5	B	801	ATP	O4'-C4'-C5'-O5'
5	E	801	ATP	C3'-C4'-C5'-O5'
5	D	801	ATP	O4'-C4'-C5'-O5'
5	D	801	ATP	C3'-C4'-C5'-O5'
5	C	802	ATP	O4'-C4'-C5'-O5'
5	B	802	ATP	O4'-C4'-C5'-O5'
5	B	802	ATP	C3'-C4'-C5'-O5'
5	B	802	ATP	PB-O3B-PG-O2G
5	B	802	ATP	PB-O3B-PG-O3G
5	B	801	ATP	PA-O3A-PB-O1B
5	A	801	ATP	O4'-C4'-C5'-O5'
5	E	802	ATP	O4'-C4'-C5'-O5'
5	B	802	ATP	C5'-O5'-PA-O1A
5	B	802	ATP	C5'-O5'-PA-O3A
5	D	801	ATP	C5'-O5'-PA-O2A
5	D	802	ATP	C5'-O5'-PA-O3A
6	A	802	ADP	C5'-O5'-PA-O1A
5	B	801	ATP	PA-O3A-PB-O2B
5	C	802	ATP	PA-O3A-PB-O1B
5	A	801	ATP	C3'-C4'-C5'-O5'
5	E	802	ATP	PB-O3B-PG-O3G
5	C	801	ATP	O4'-C4'-C5'-O5'
5	B	801	ATP	C3'-C4'-C5'-O5'
5	F	801	ATP	O4'-C4'-C5'-O5'
5	C	802	ATP	C3'-C4'-C5'-O5'
5	E	802	ATP	C3'-C4'-C5'-O5'

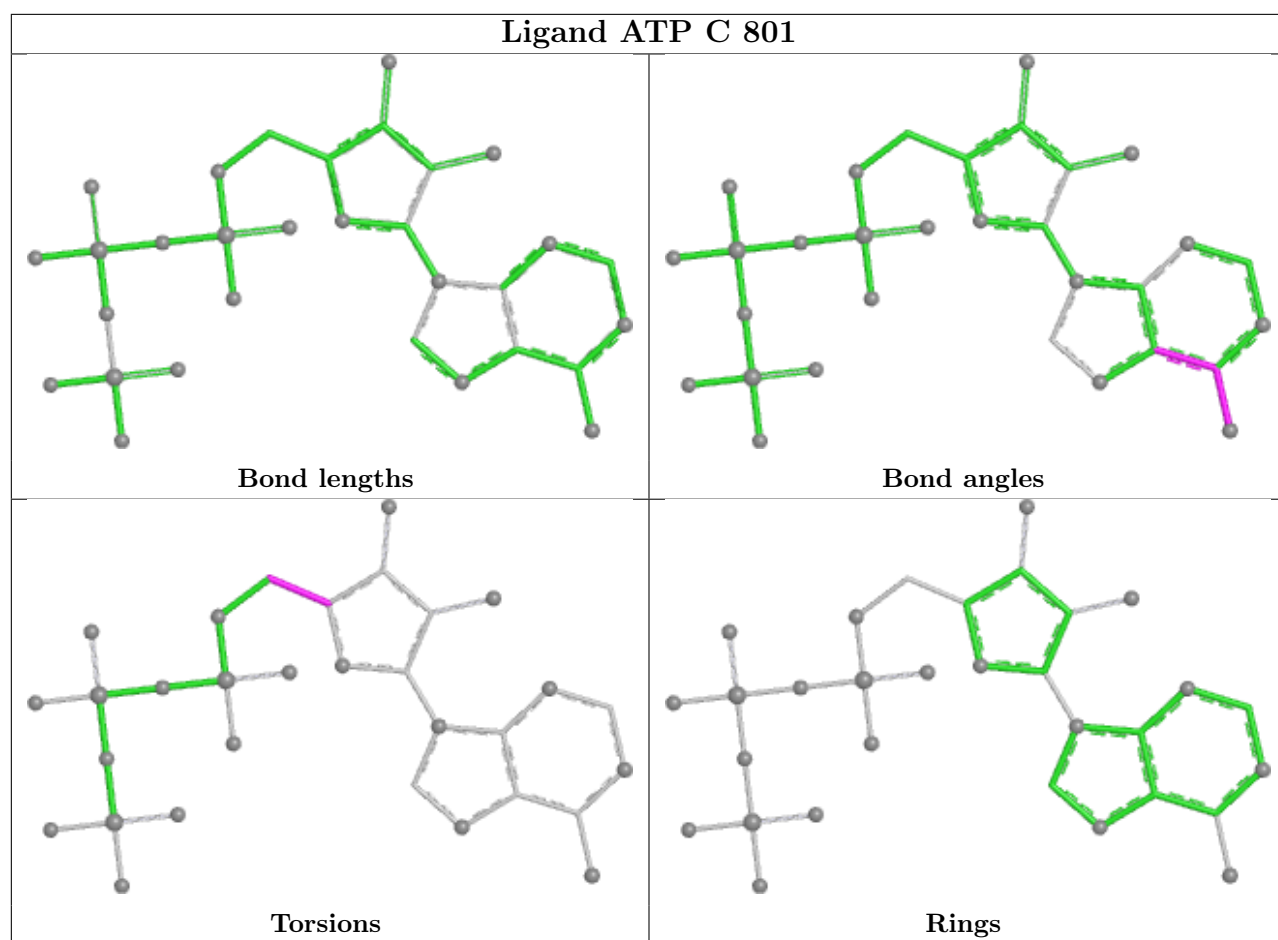
There are no ring outliers.

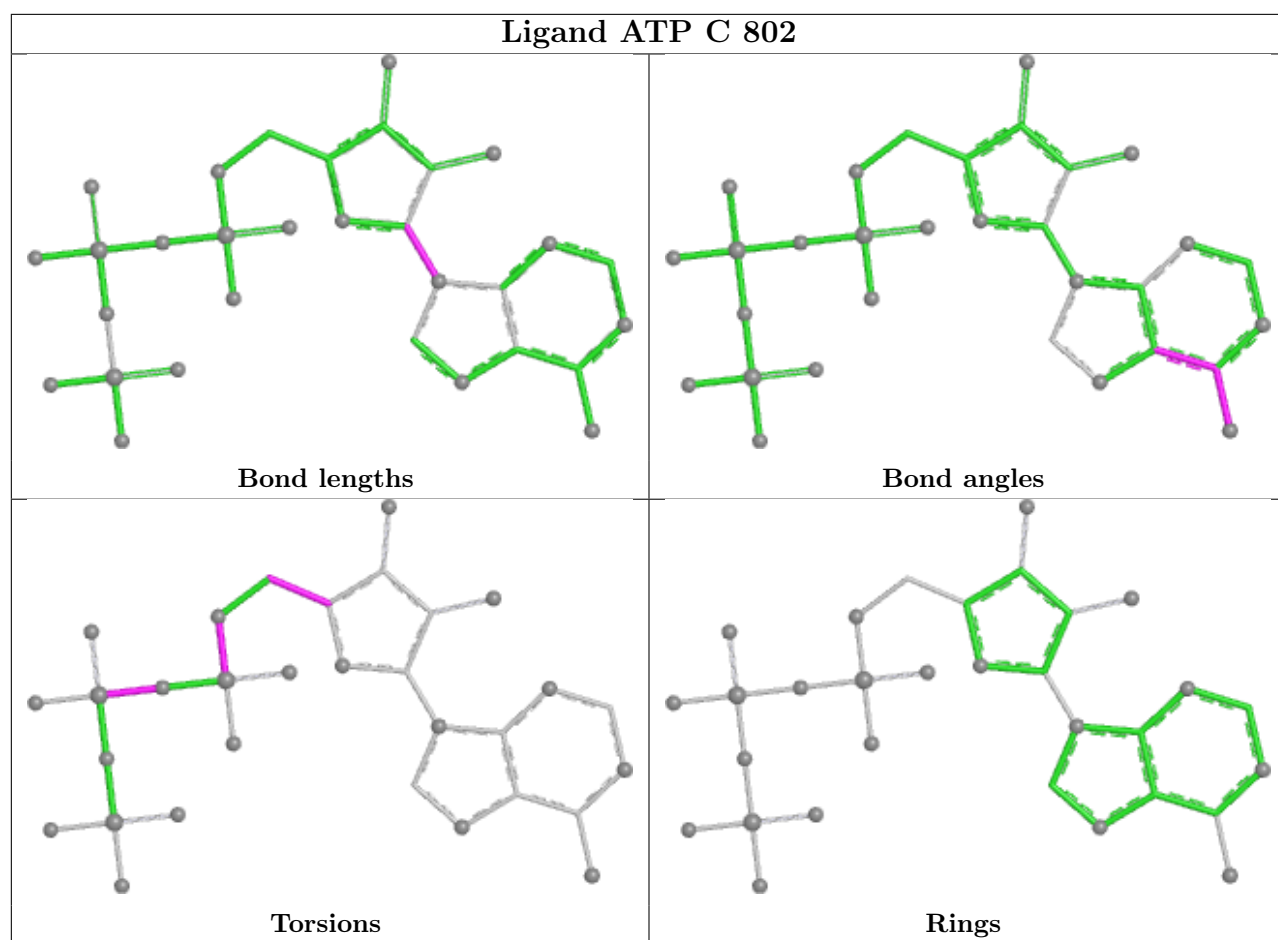
No monomer is involved in short contacts.

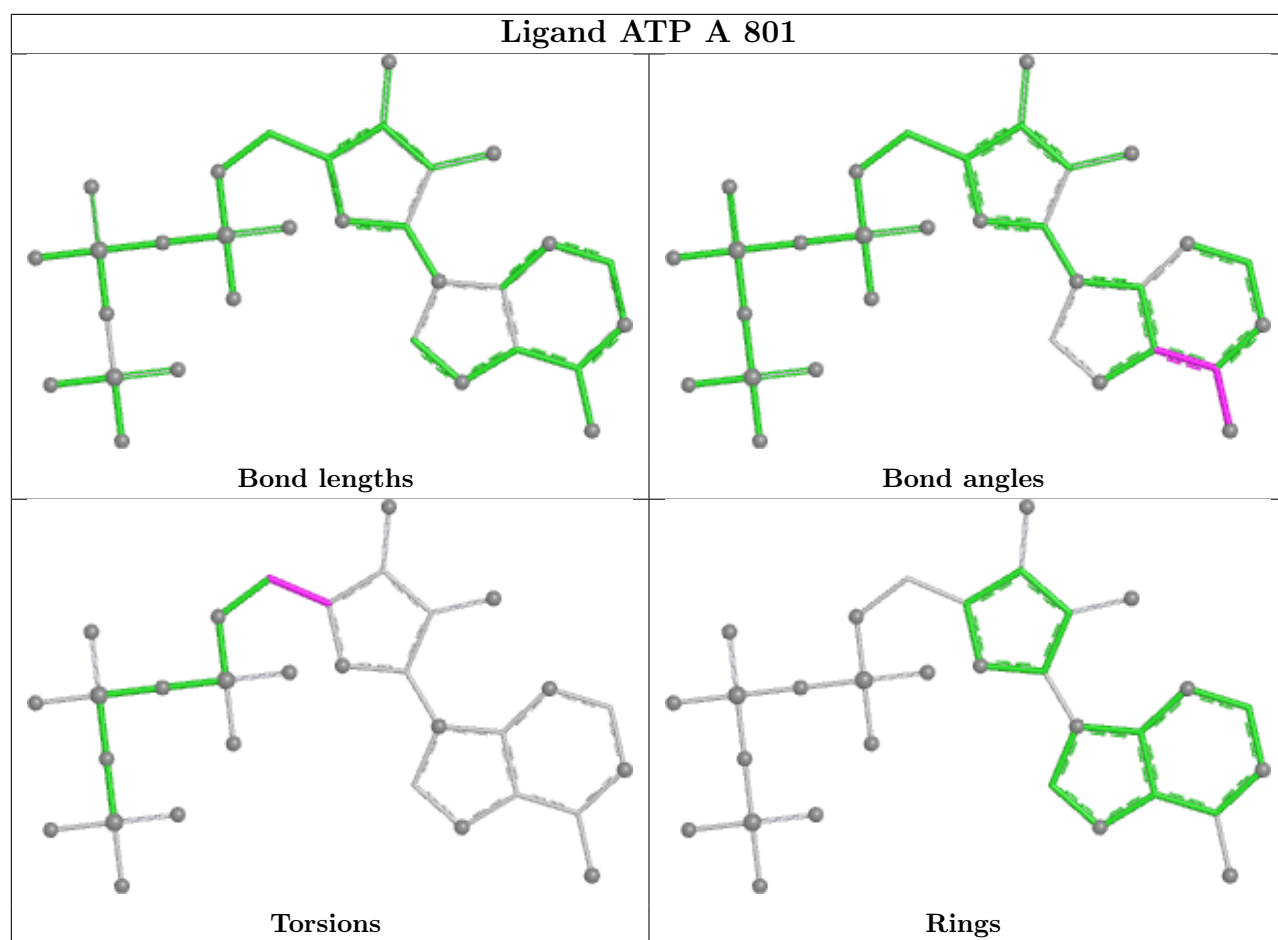
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

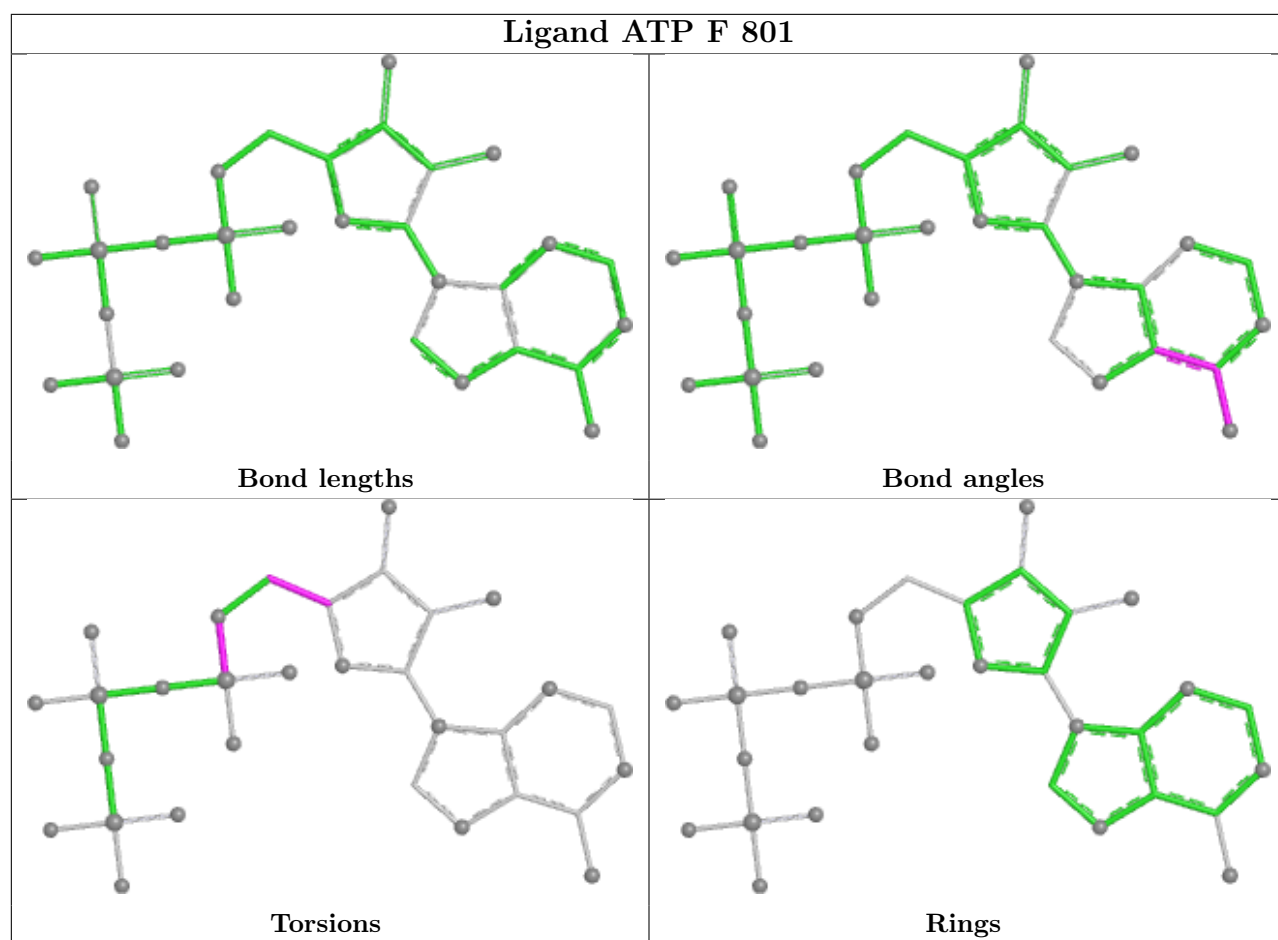
addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



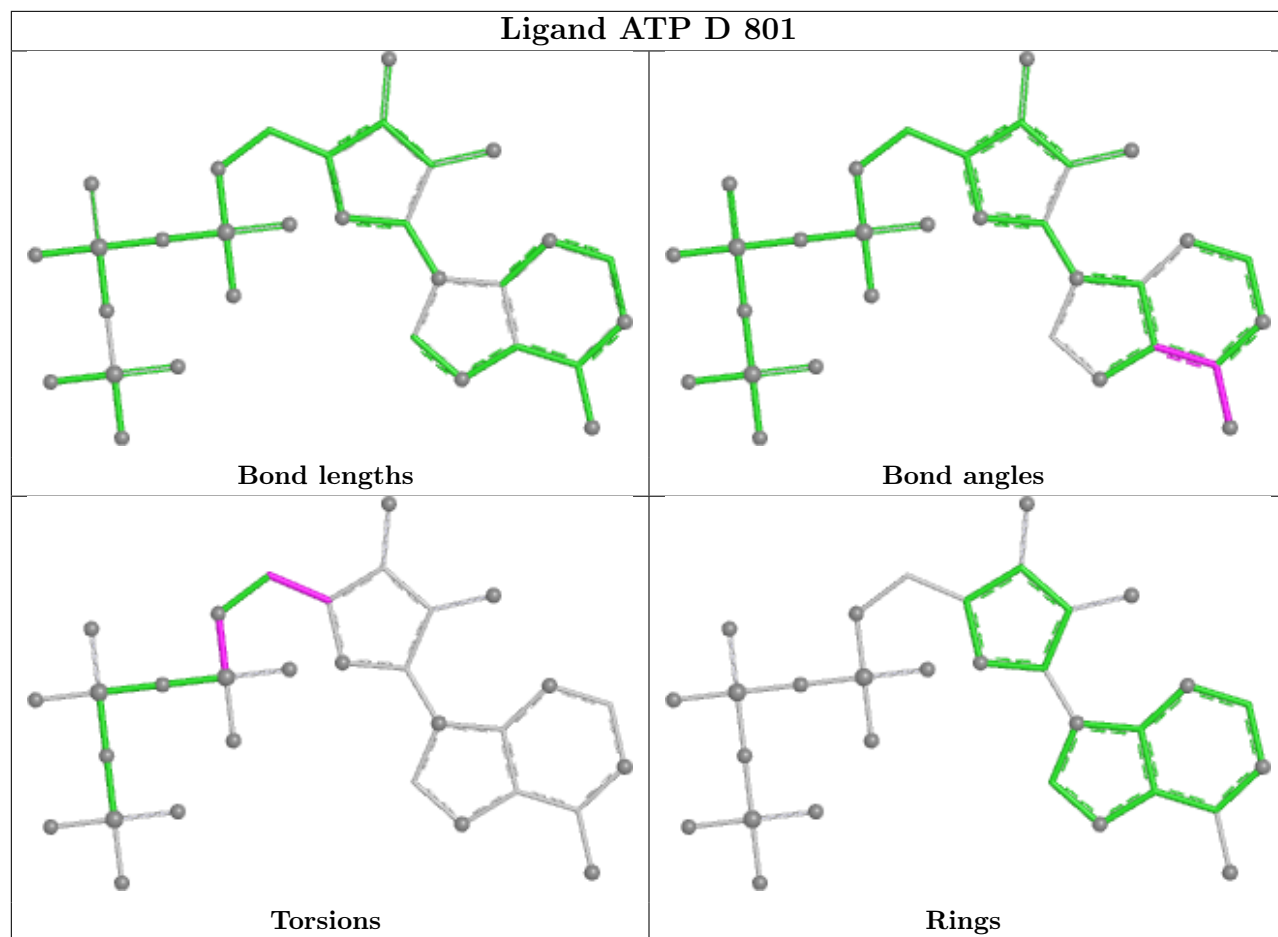




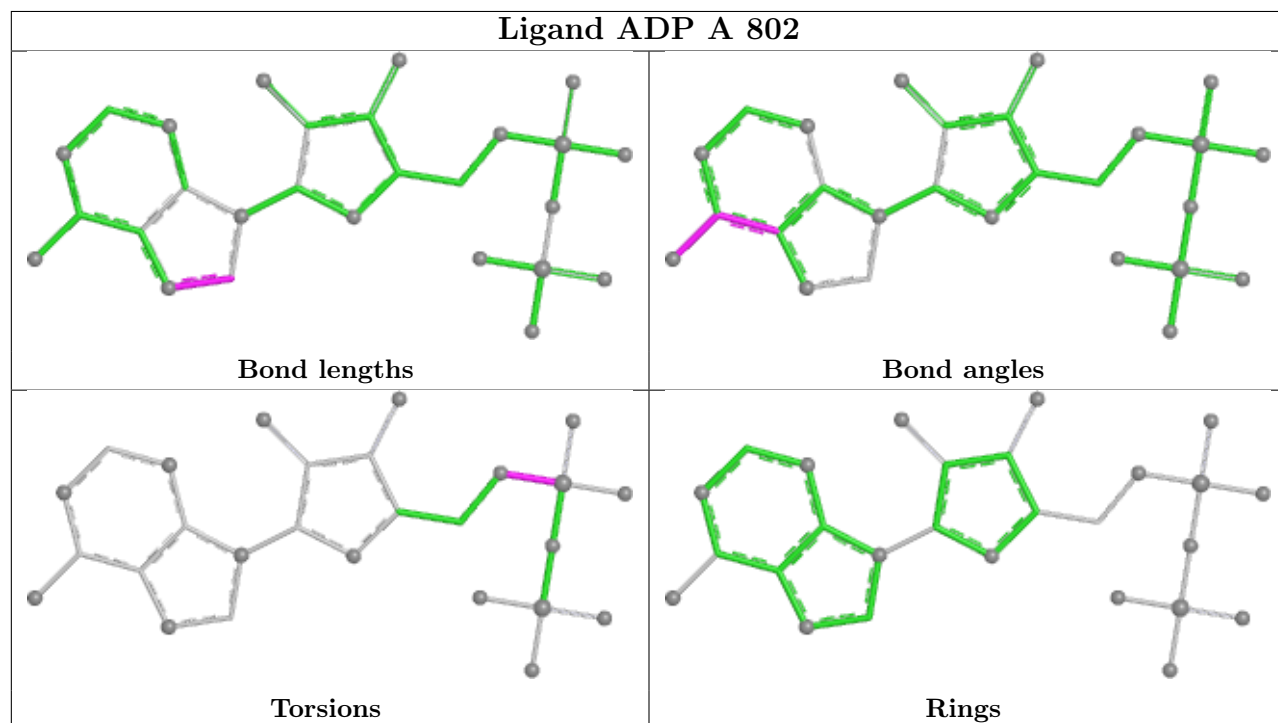


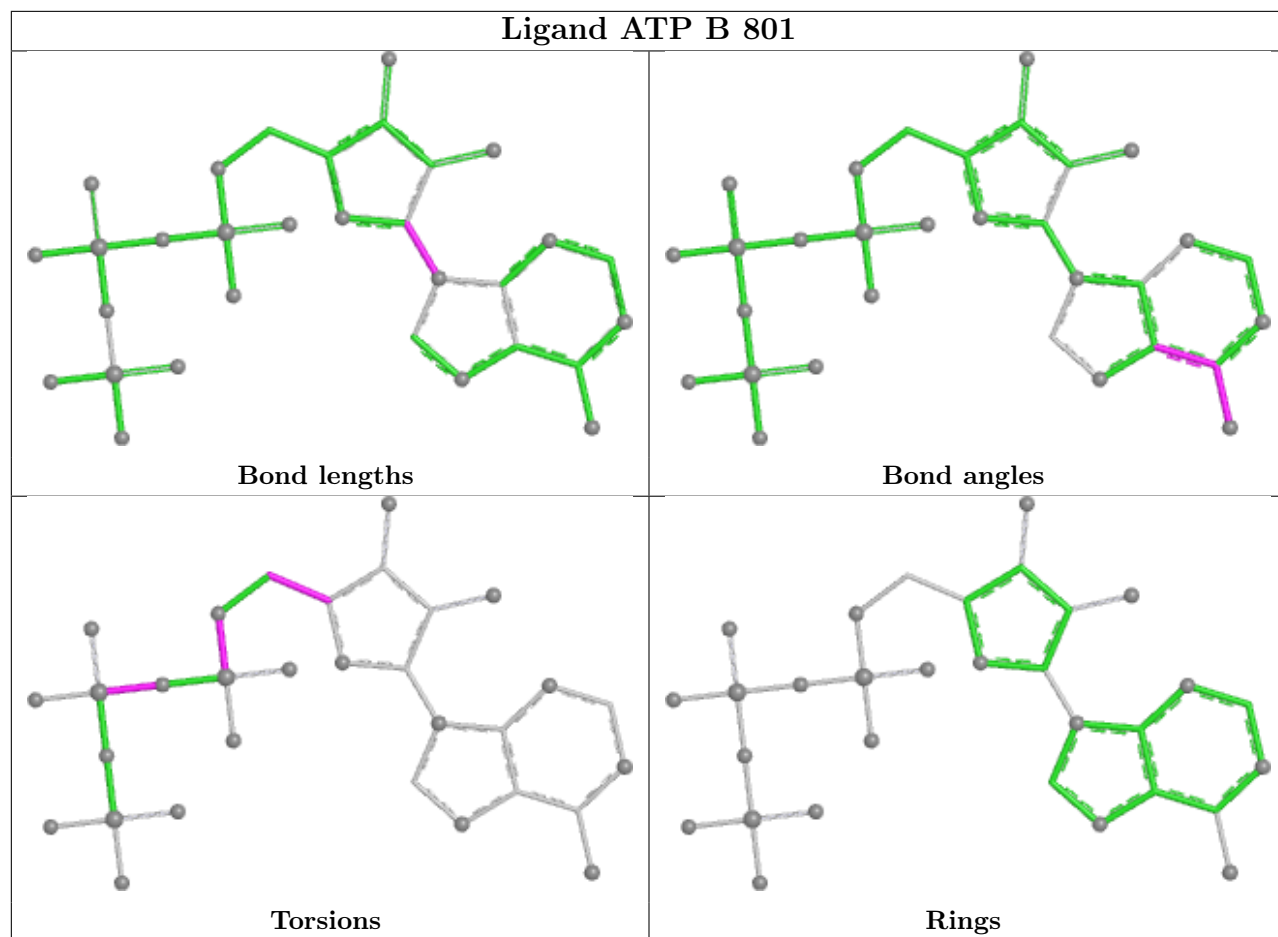


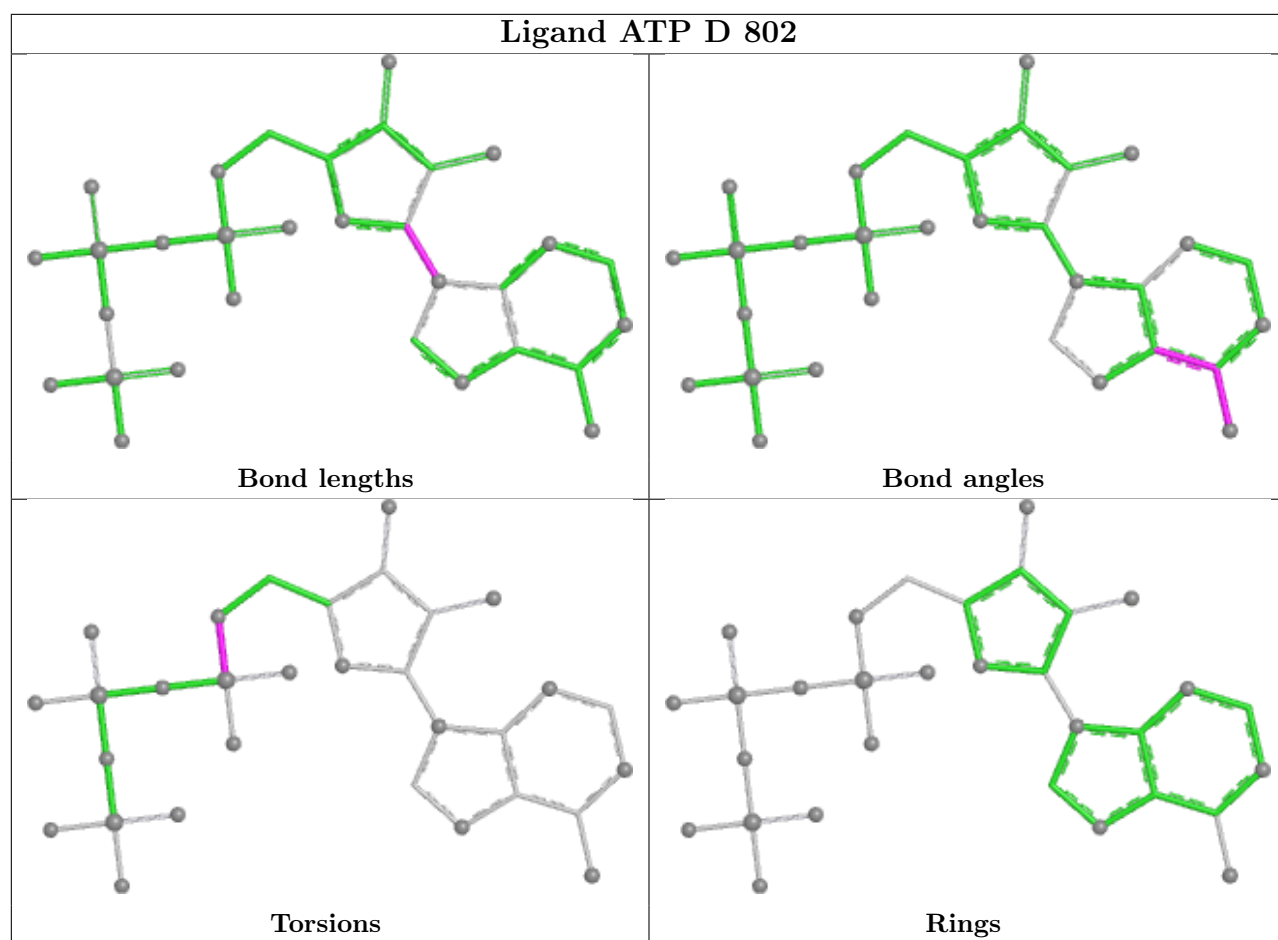
Ligand ATP D 801

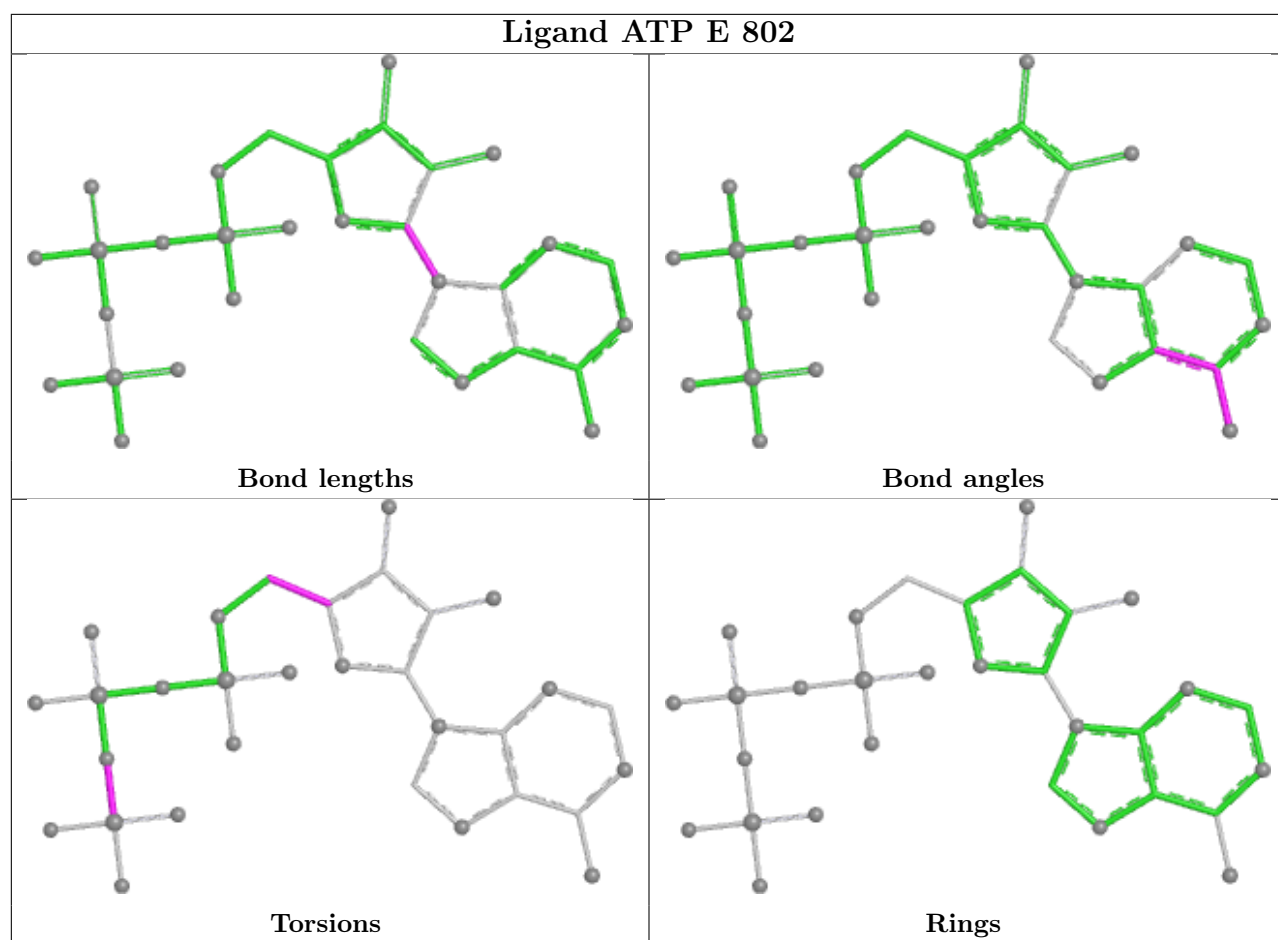


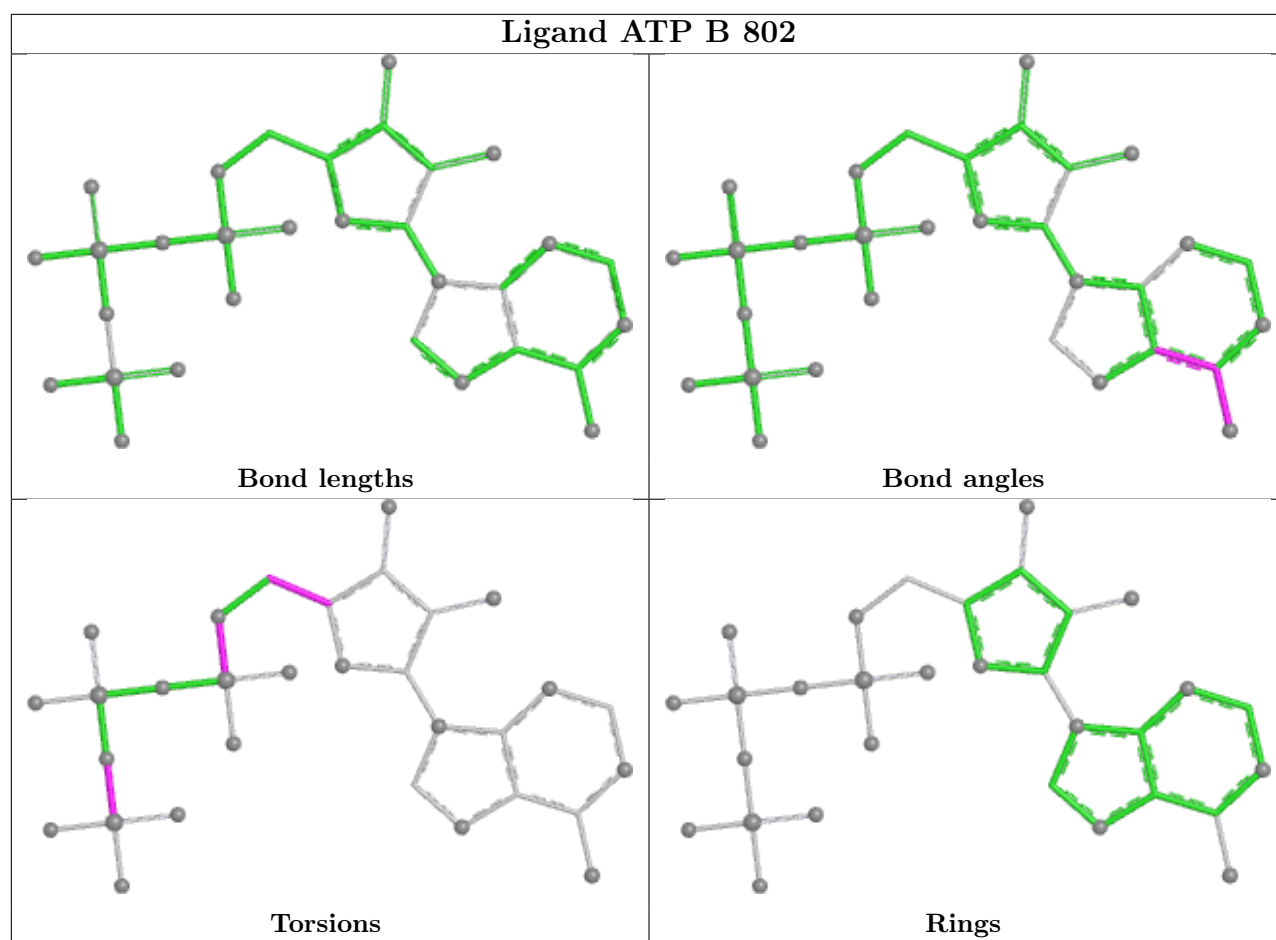
Ligand ADP A 802











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.

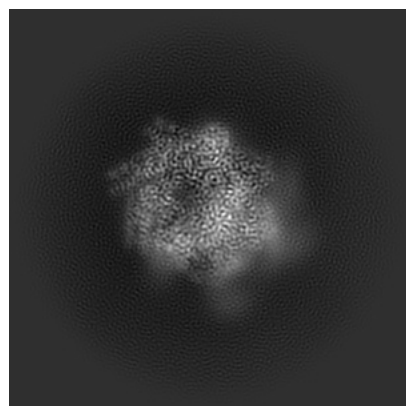
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-71600. These allow visual inspection of the internal detail of the map and identification of artifacts.

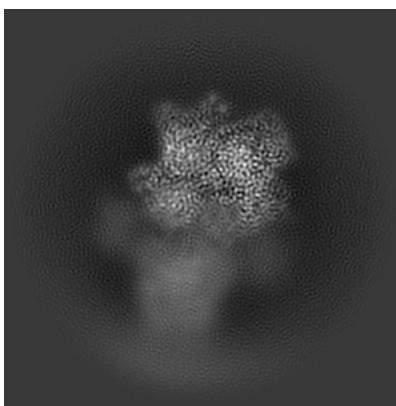
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

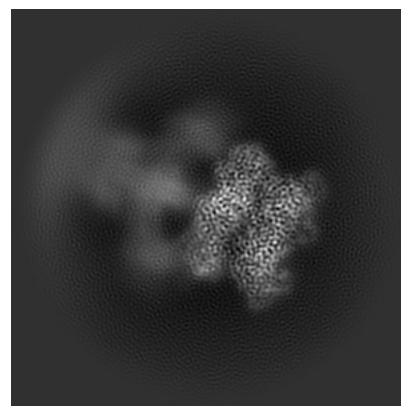
6.1.1 Primary map



X

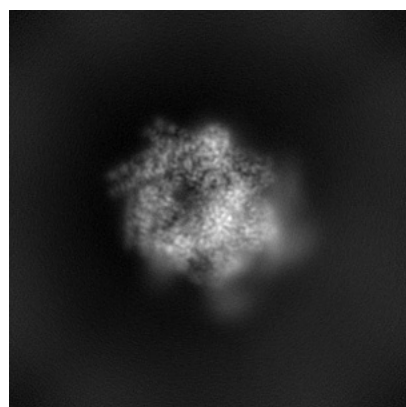


Y

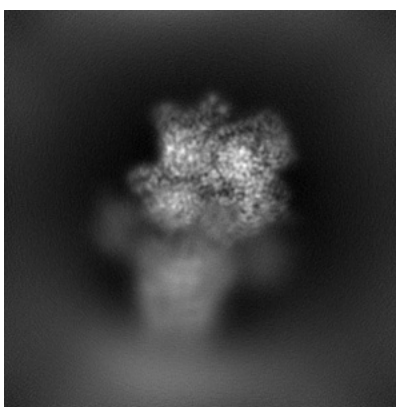


Z

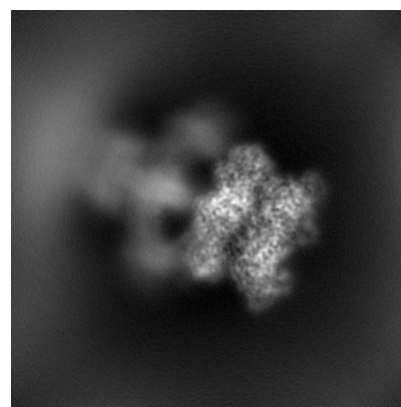
6.1.2 Raw map



X



Y

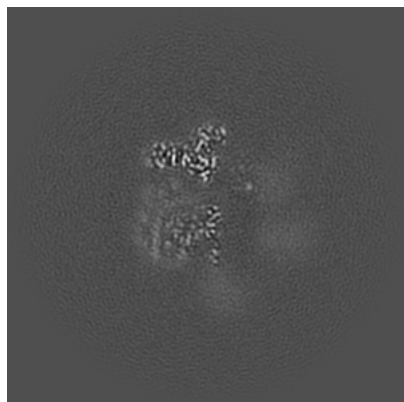


Z

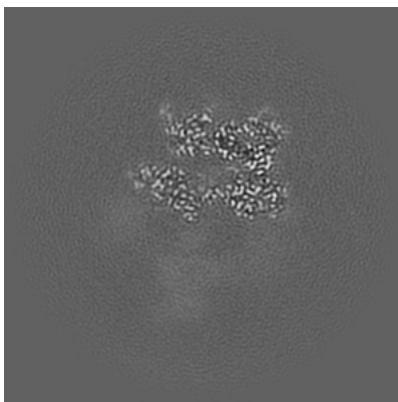
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

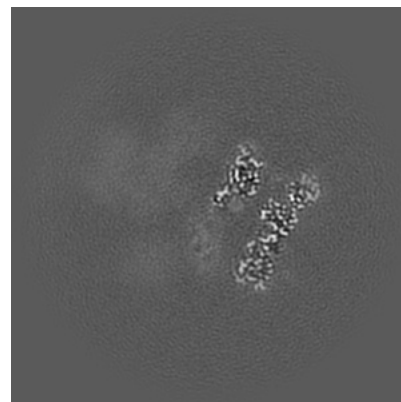
6.2.1 Primary map



X Index: 147

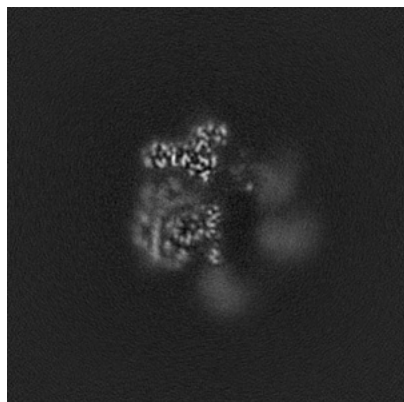


Y Index: 147

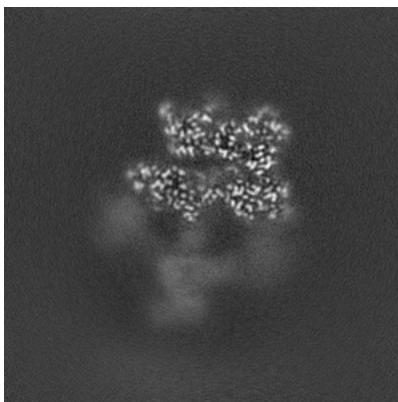


Z Index: 147

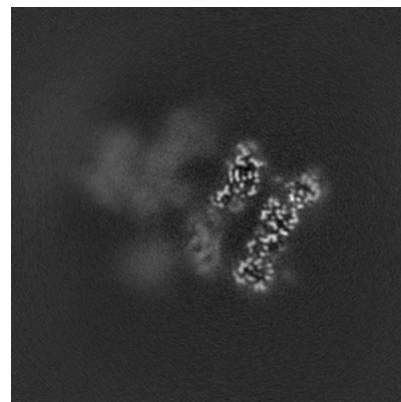
6.2.2 Raw map



X Index: 147



Y Index: 147

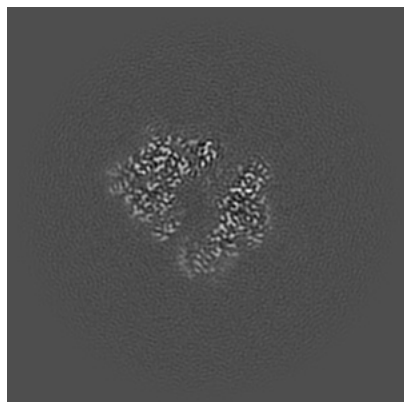


Z Index: 147

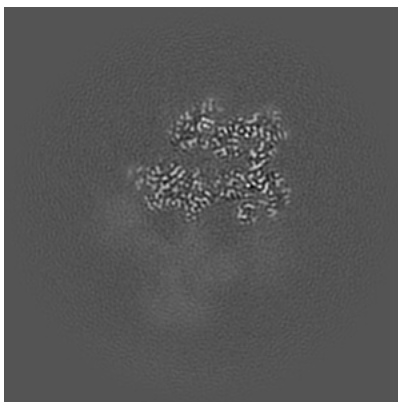
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

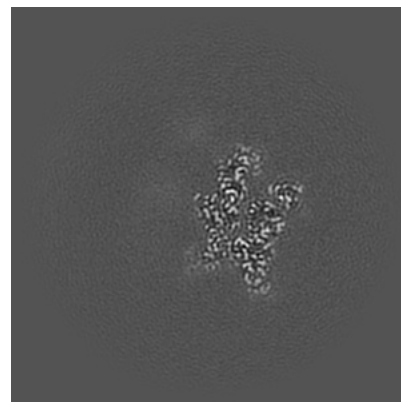
6.3.1 Primary map



X Index: 176

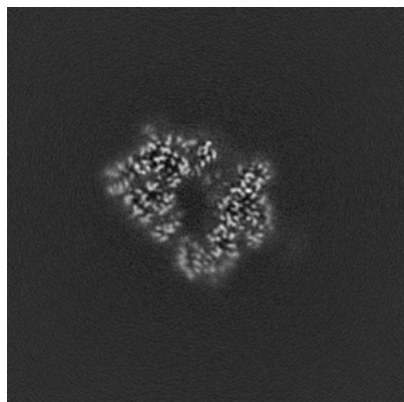


Y Index: 152

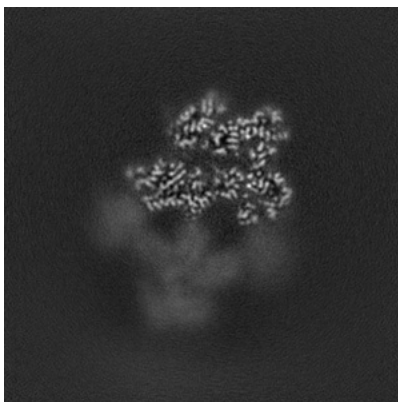


Z Index: 179

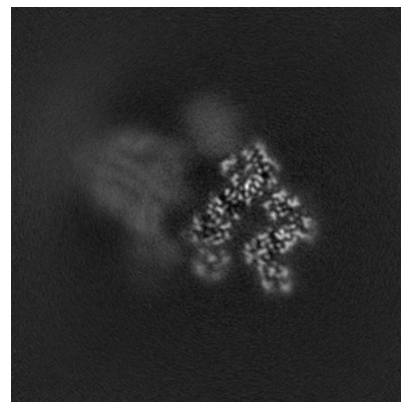
6.3.2 Raw map



X Index: 176



Y Index: 153

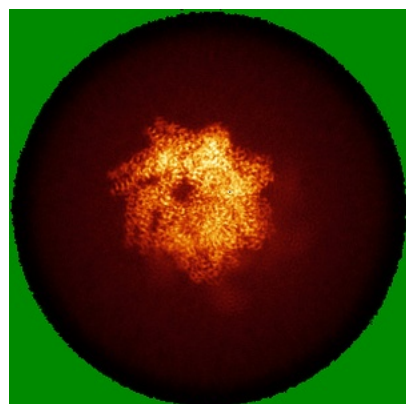


Z Index: 127

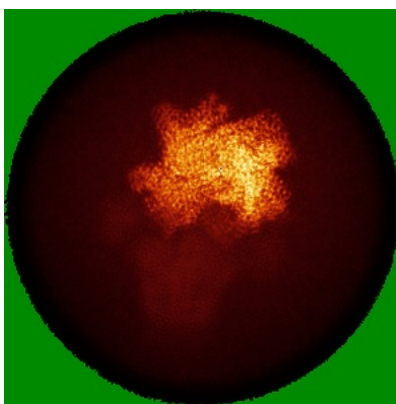
The images above show the largest variance slices of the map in three orthogonal directions.

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

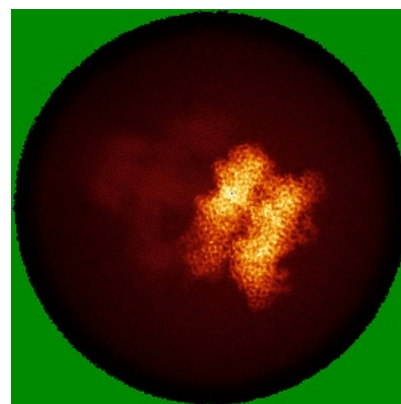
6.4.1 Primary map



X

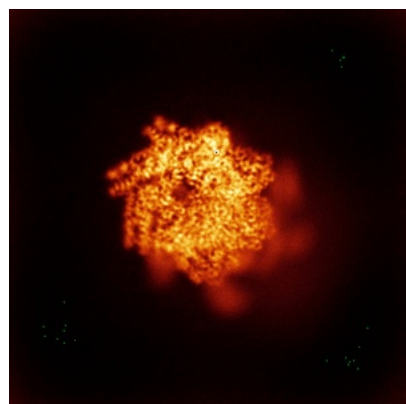


Y

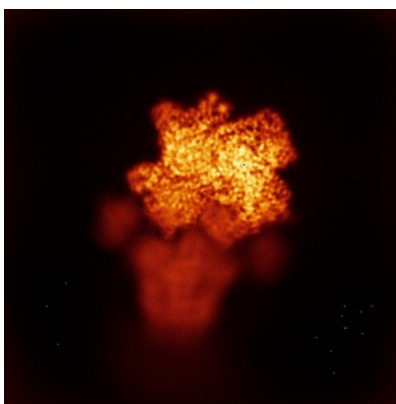


Z

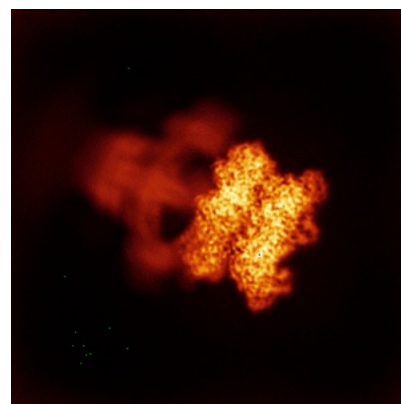
6.4.2 Raw map



X



Y

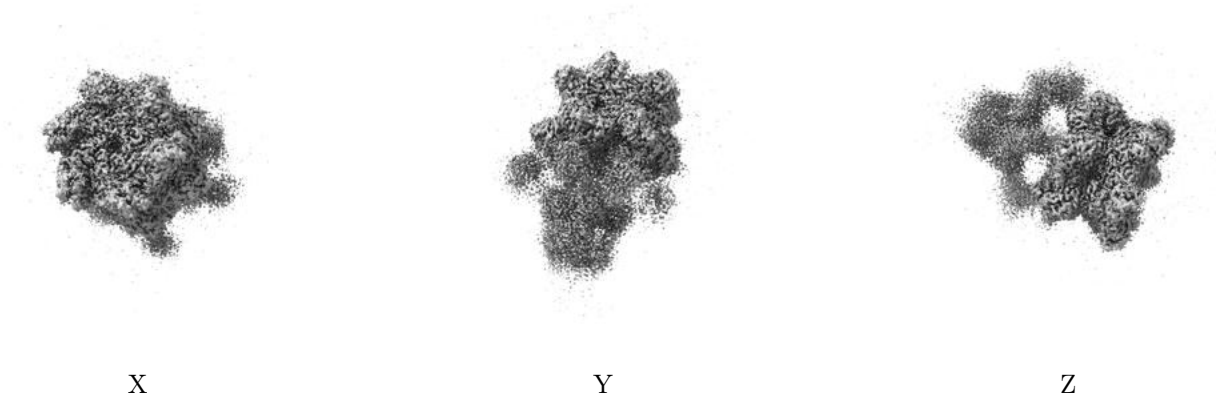


Z

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.

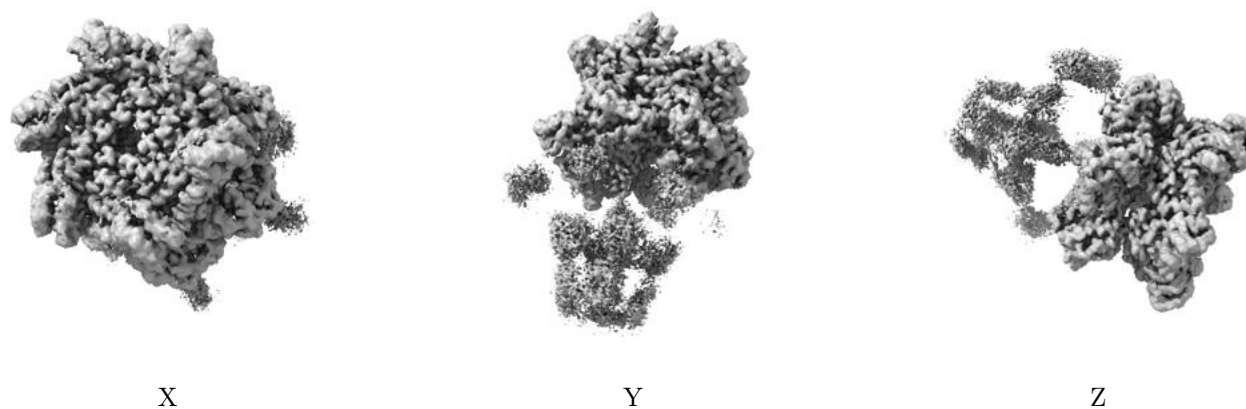
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.3. 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



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.

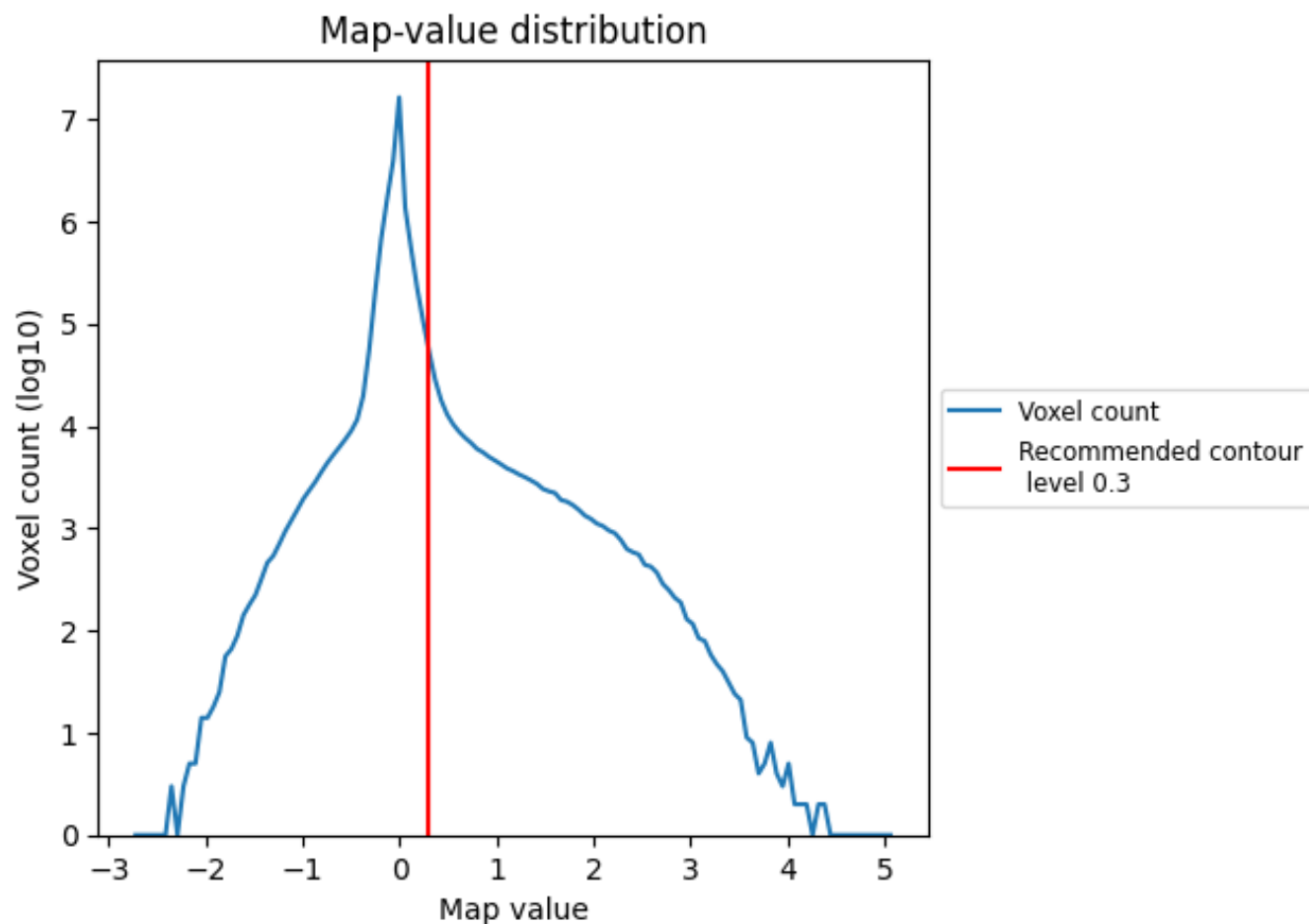
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

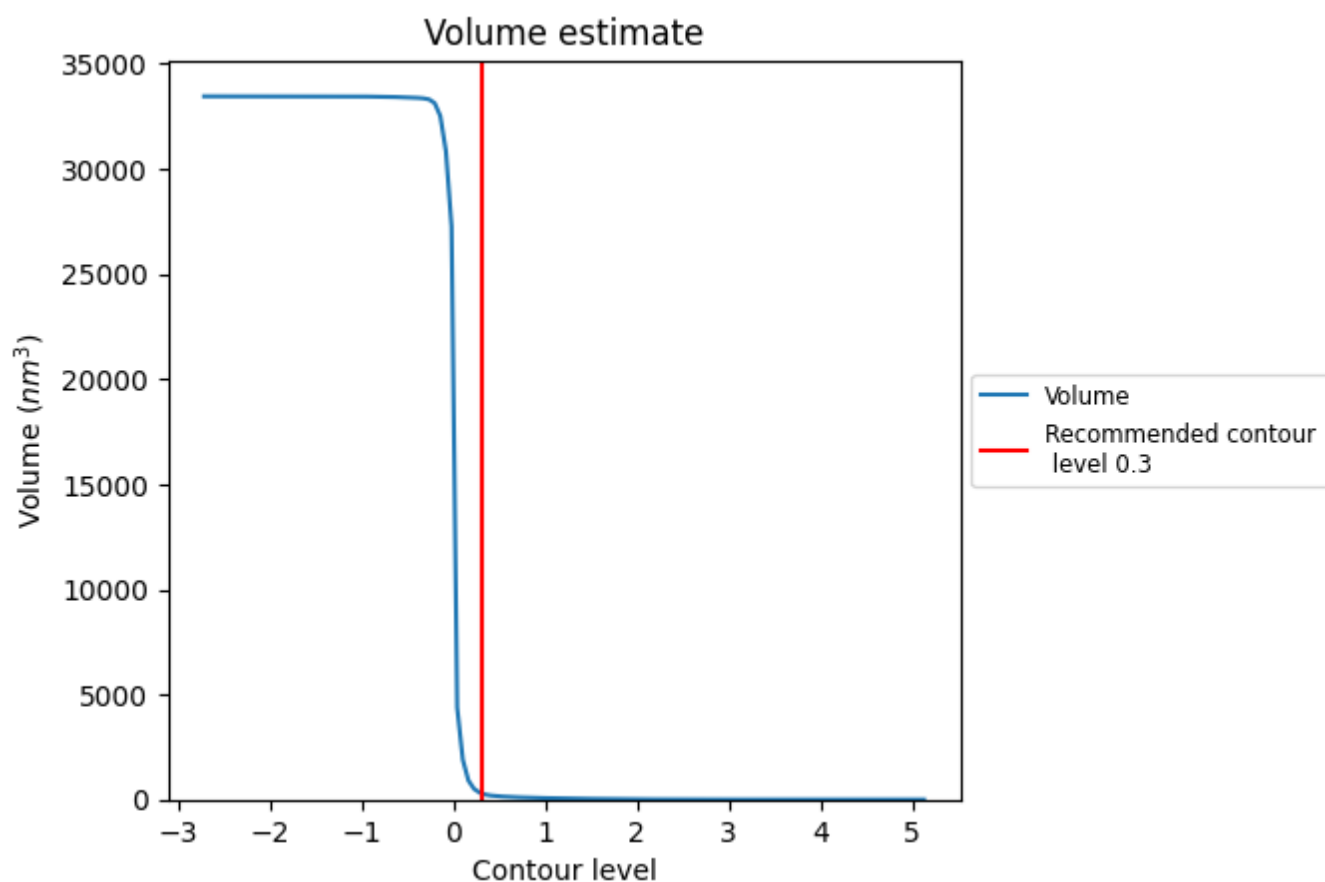
This section contains the results of statistical analysis of the map.

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.

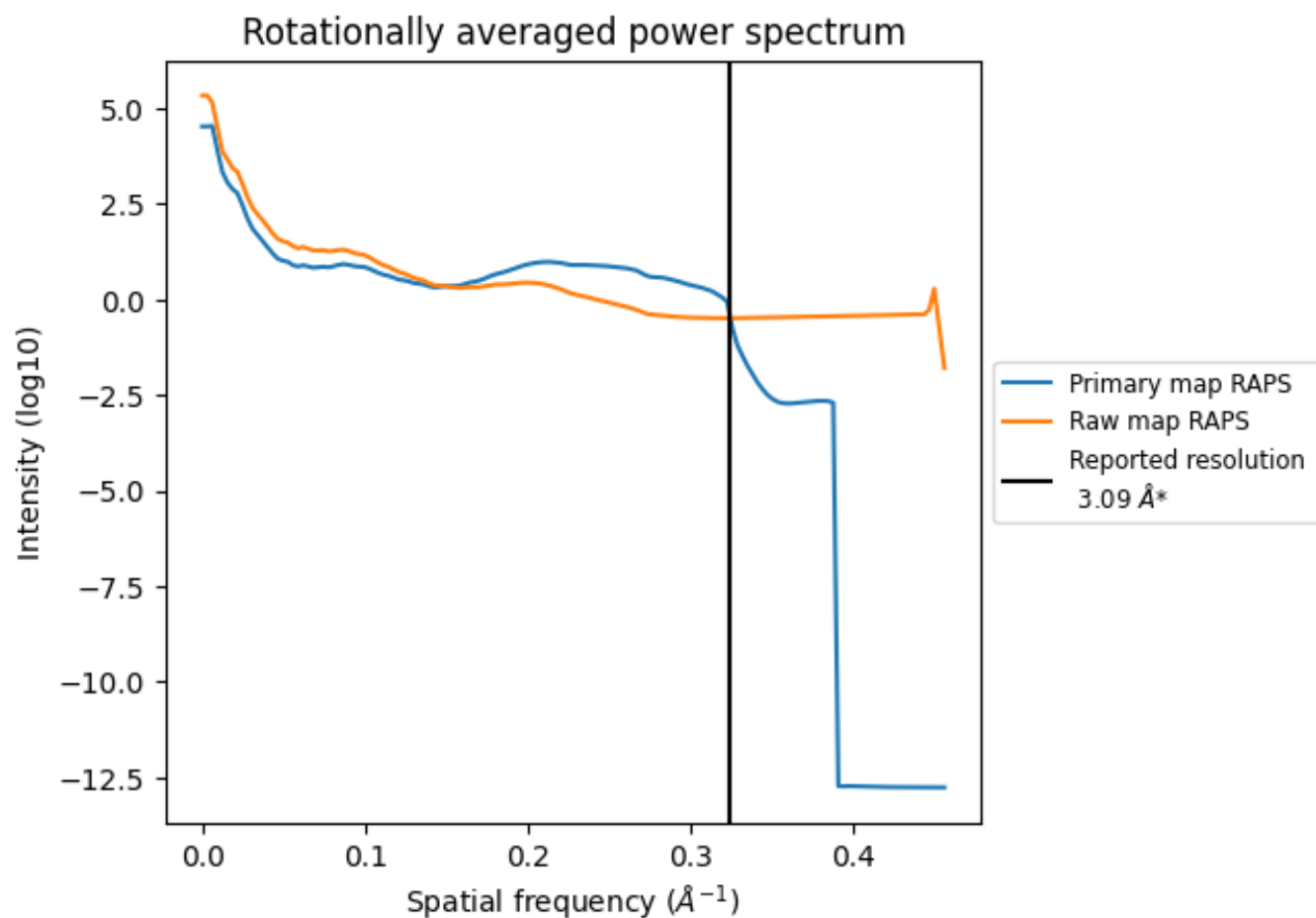
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 302 nm³; this corresponds to an approximate mass of 272 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

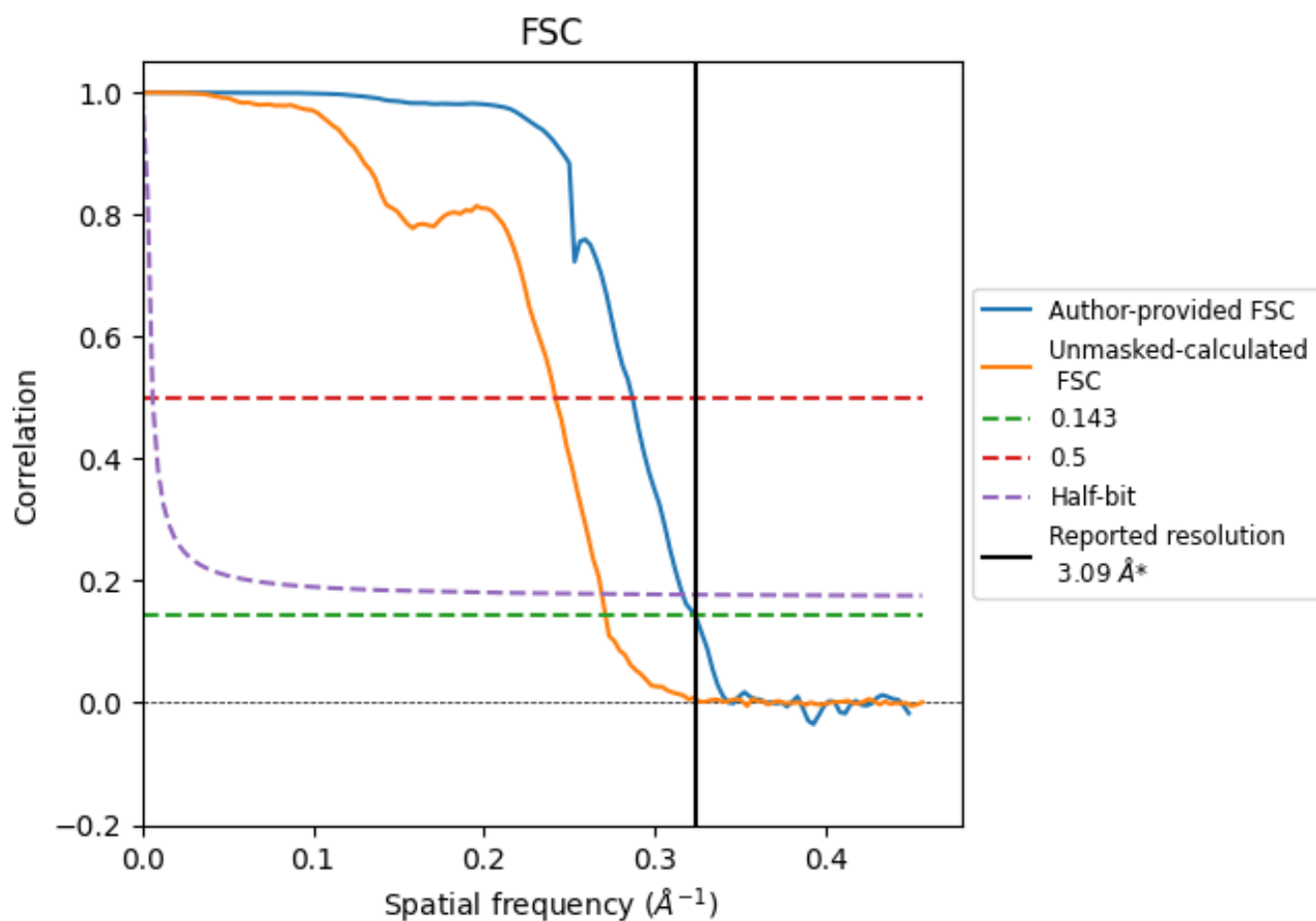


*Reported resolution corresponds to spatial frequency of 0.324 $\text{\AA}^{-1}$

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 0.324 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

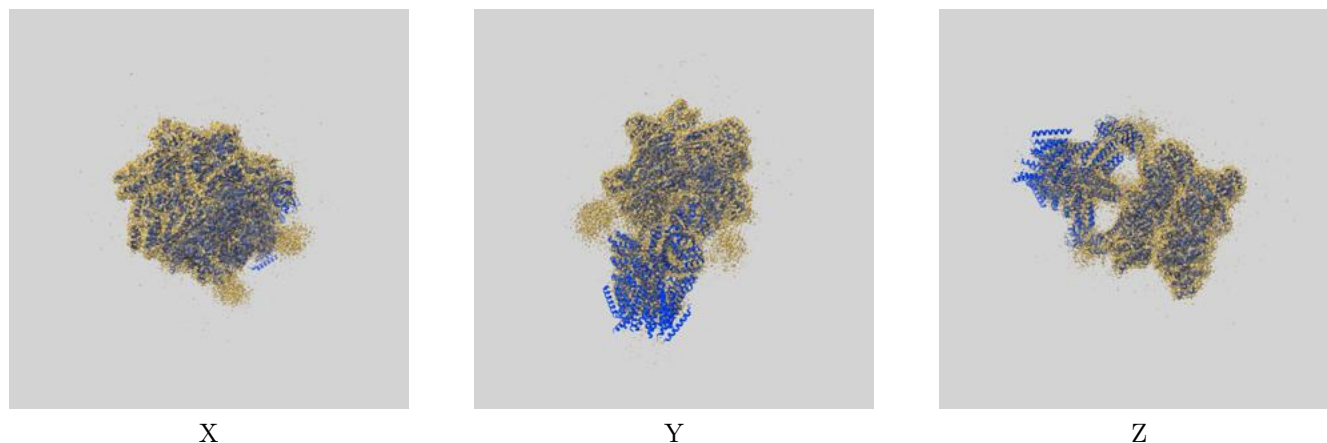
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.09	-	-
Author-provided FSC curve	3.10	3.49	3.16
Unmasked-calculated*	3.69	4.14	3.72

*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 3.69 differs from the reported value 3.09 by more than 10 %

9 Map-model fit [i](#)

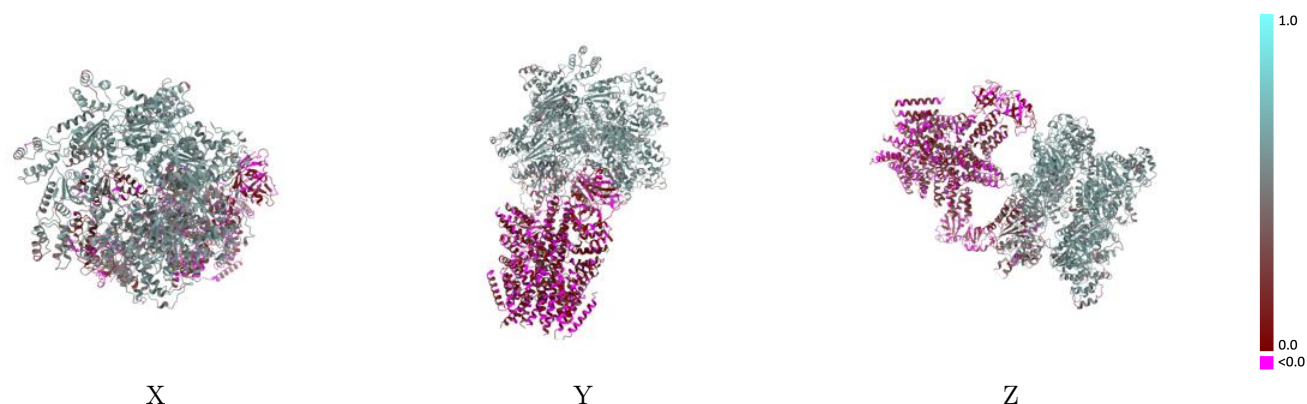
This section contains information regarding the fit between EMDB map EMD-71600 and PDB model 9PFF. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



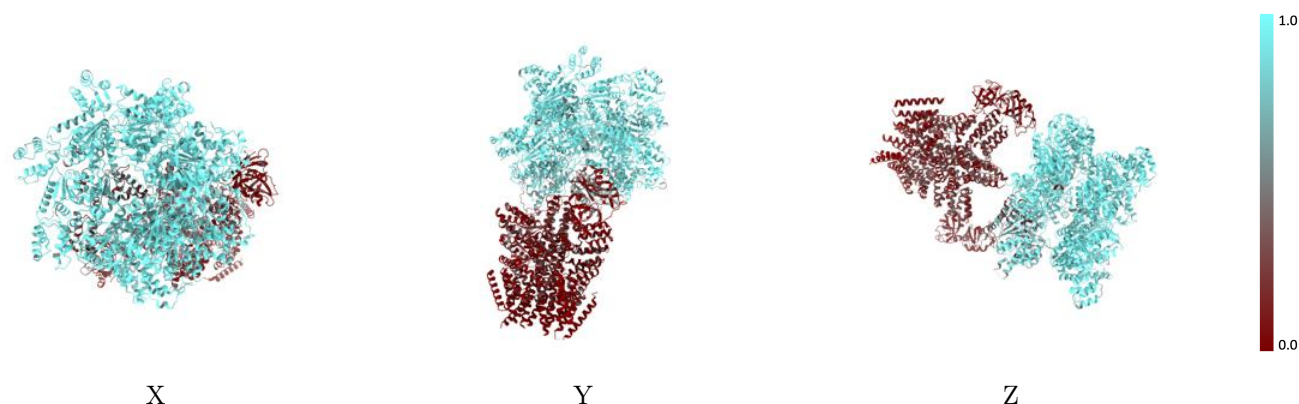
The images above show the 3D surface view of the map at the recommended contour level 0.3 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



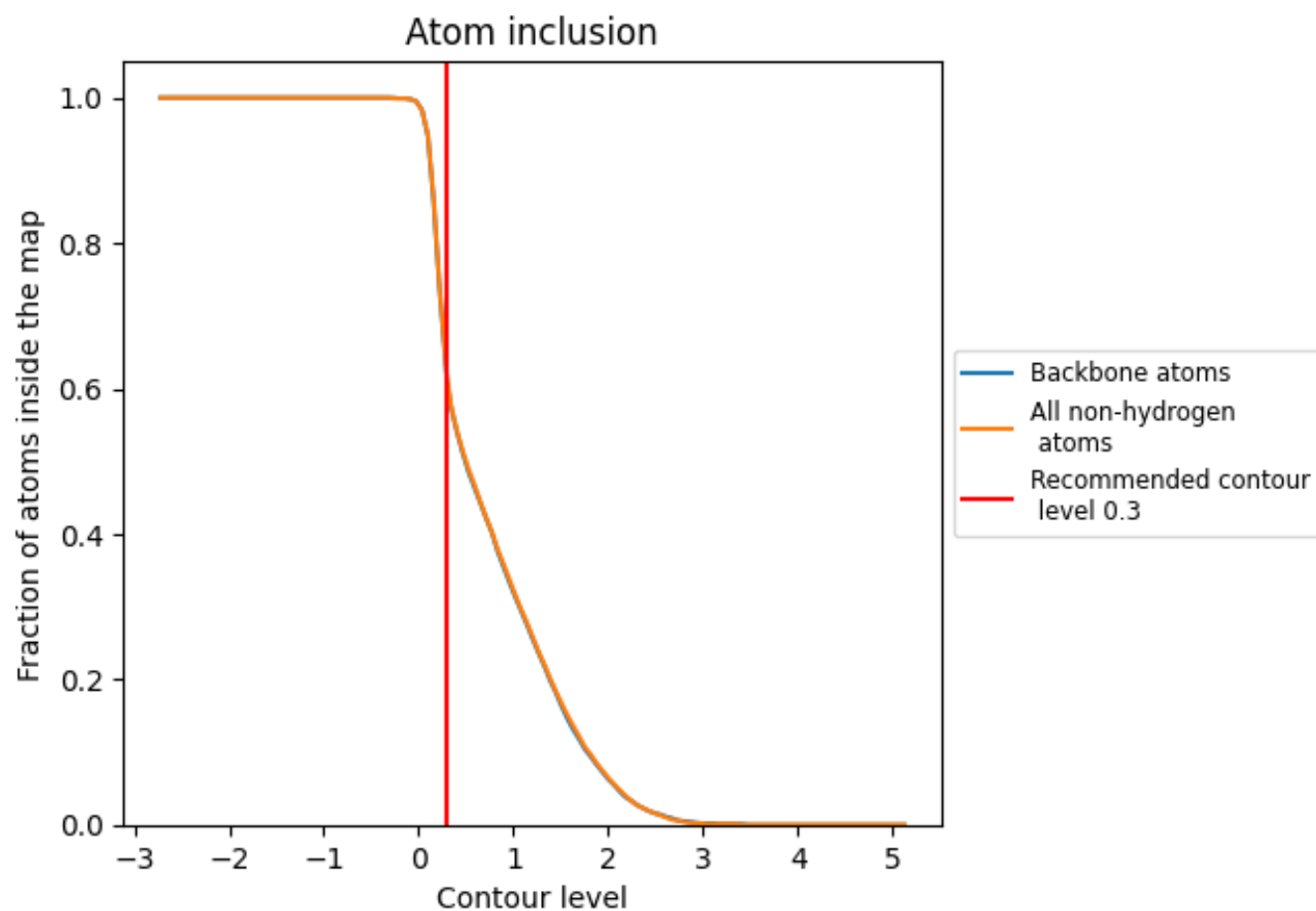
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.3).

9.4 Atom inclusion [i](#)



At the recommended contour level, 61% of all backbone atoms, 62% 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 (0.3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6150	 0.3700
A	 0.9380	 0.5550
B	 0.7190	 0.4410
C	 0.9550	 0.5780
D	 0.9500	 0.5650
E	 0.6970	 0.3920
F	 0.7310	 0.3660
G	 0.2800	 0.1840
H	 0.1470	 0.0770
I	 0.1210	 0.0860
J	 0.1160	 0.0870
L	 0.1040	 0.0910
M	 0.1110	 0.0990
N	 0.0880	 0.0840
O	 0.1040	 0.1070

