



Full wwPDB EM Validation Report ⓘ

Dec 10, 2022 – 10:59 am GMT

PDB ID : 6QEM
EMDB ID : EMD-4538
Title : E. coli DnaBC complex bound to ssDNA
Authors : Arias-Palomo, E.; Puri, N.; O'Shea Murray, V.L.; Yan, Q.; Berger, J.M.
Deposited on : 2019-01-08
Resolution : 3.40 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.dev43
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

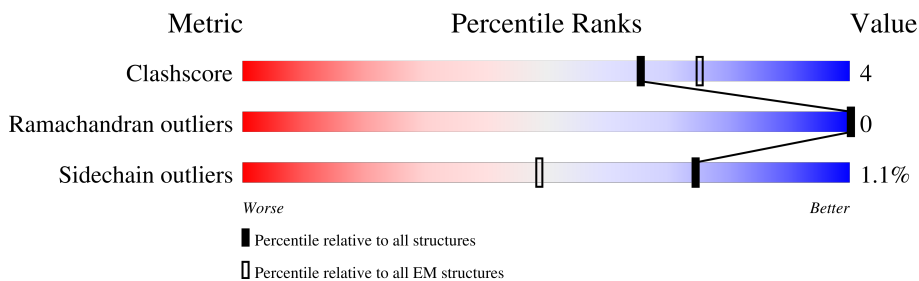
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 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.



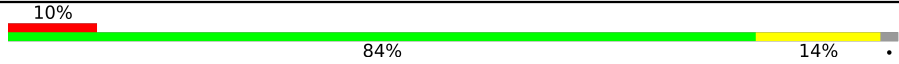

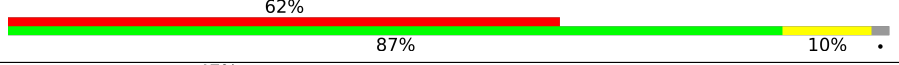
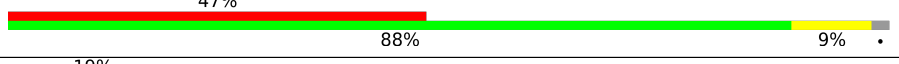

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	471	
1	B	471	
1	C	471	
1	D	471	
1	E	471	
1	F	471	
2	G	245	
2	H	245	

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Mol	Chain	Length	Quality of chain
2	I	245	
2	J	245	
2	K	245	
2	L	245	
3	M	36	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 65880 atoms, of which 32782 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 Replicative DNA helicase.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	A	445	6941	2158	3467	620	683	13	0	0
1	B	445	6941	2158	3467	620	683	13	0	0
1	C	445	6940	2158	3466	620	683	13	0	0
1	D	445	6941	2158	3467	620	683	13	0	0
1	E	445	6942	2158	3468	620	683	13	0	0
1	F	445	6942	2158	3468	620	683	13	0	0

- Molecule 2 is a protein called DNA replication protein DnaC.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	G	239	3825	1179	1923	348	358	17	0	0
2	H	239	3825	1179	1923	348	358	17	0	0
2	I	239	3825	1179	1923	348	358	17	0	0
2	J	239	3825	1179	1923	348	358	17	0	0
2	K	239	3825	1179	1923	348	358	17	0	0
2	L	239	3825	1179	1923	348	358	17	0	0

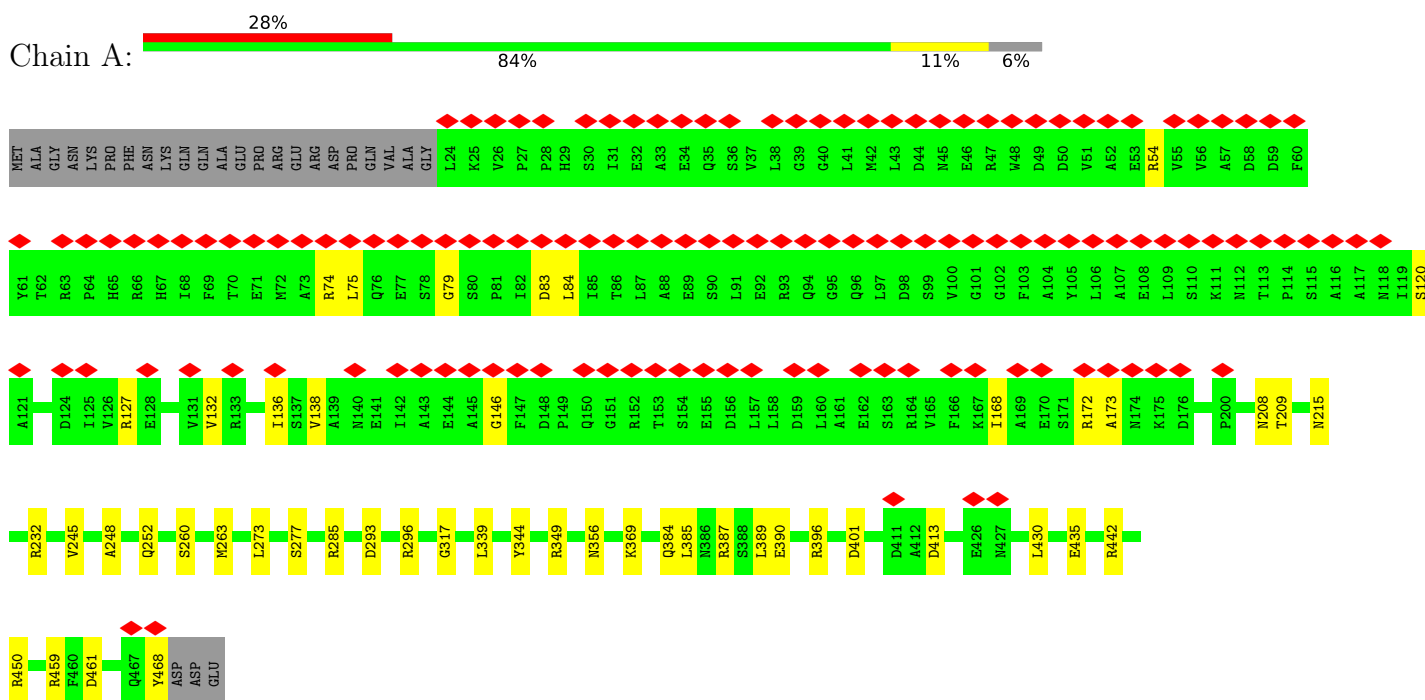
- Molecule 3 is a DNA chain called ssDNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
3	M	26	831	260	311	52	182	26	0	0

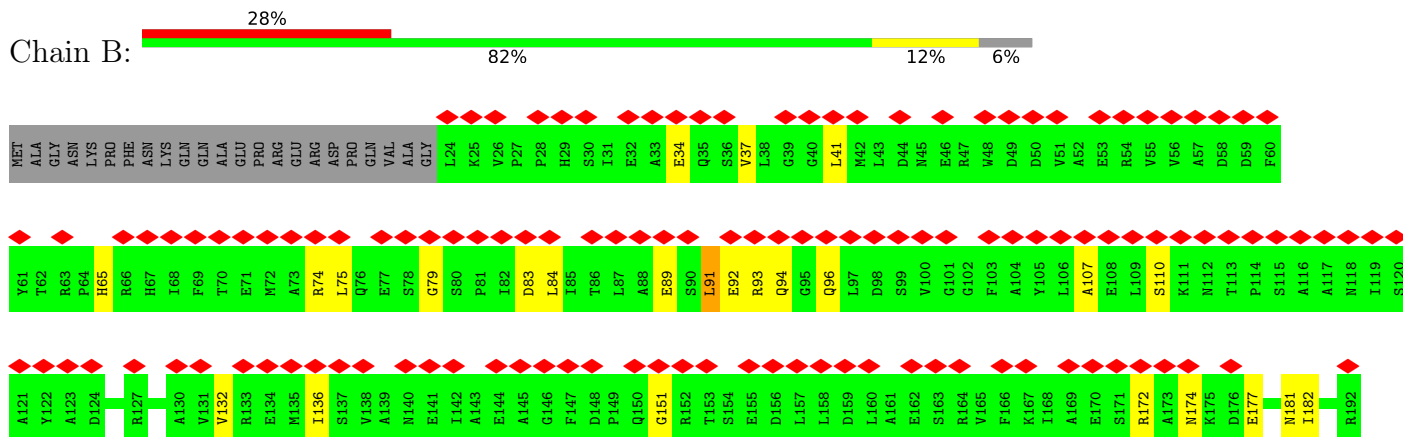
3 Residue-property plots

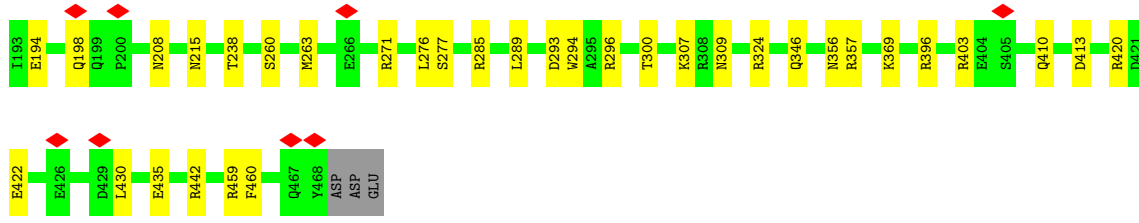
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

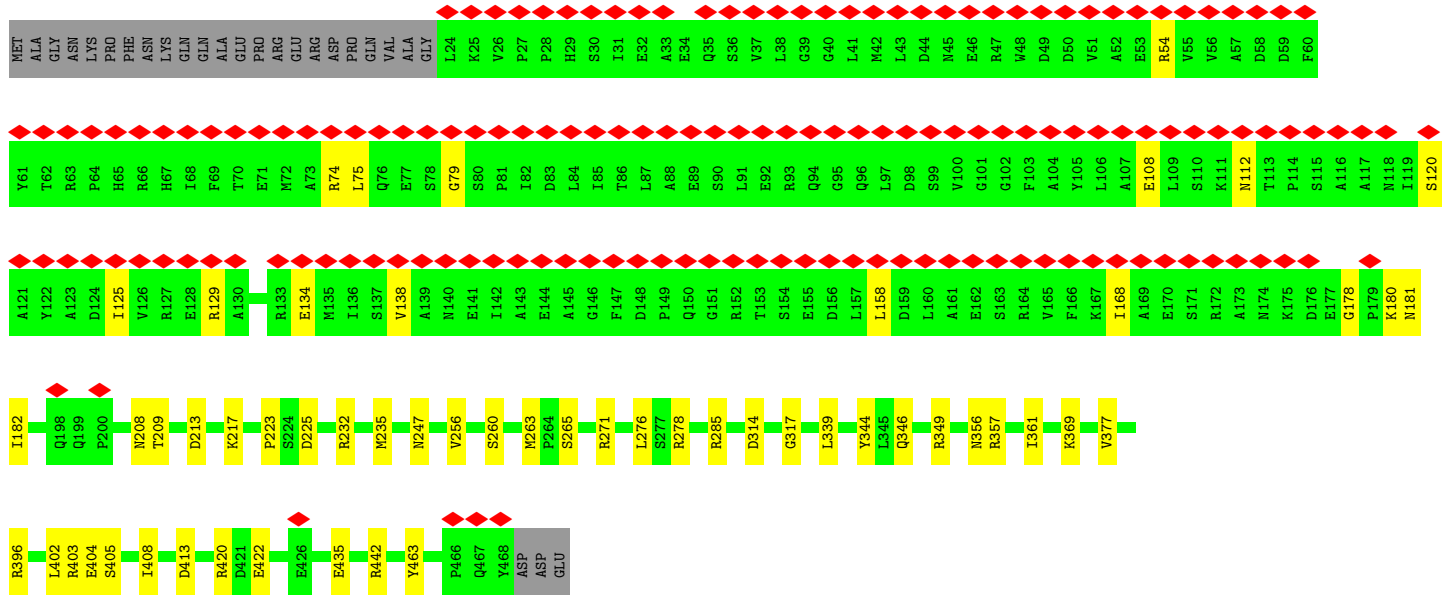
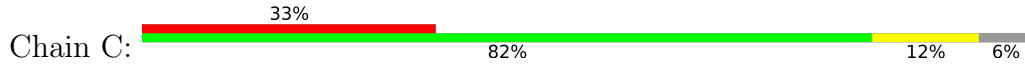


- Molecule 1: Replicative DNA helicase

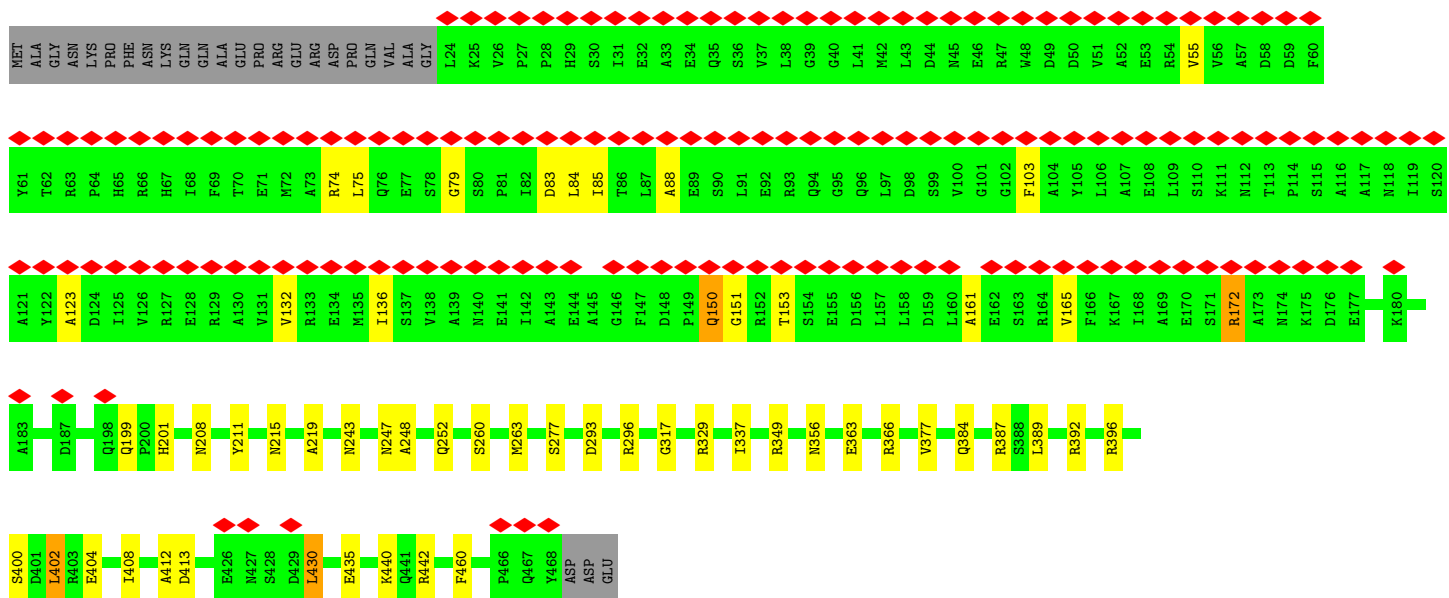
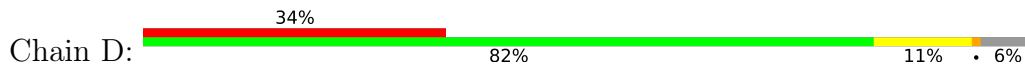




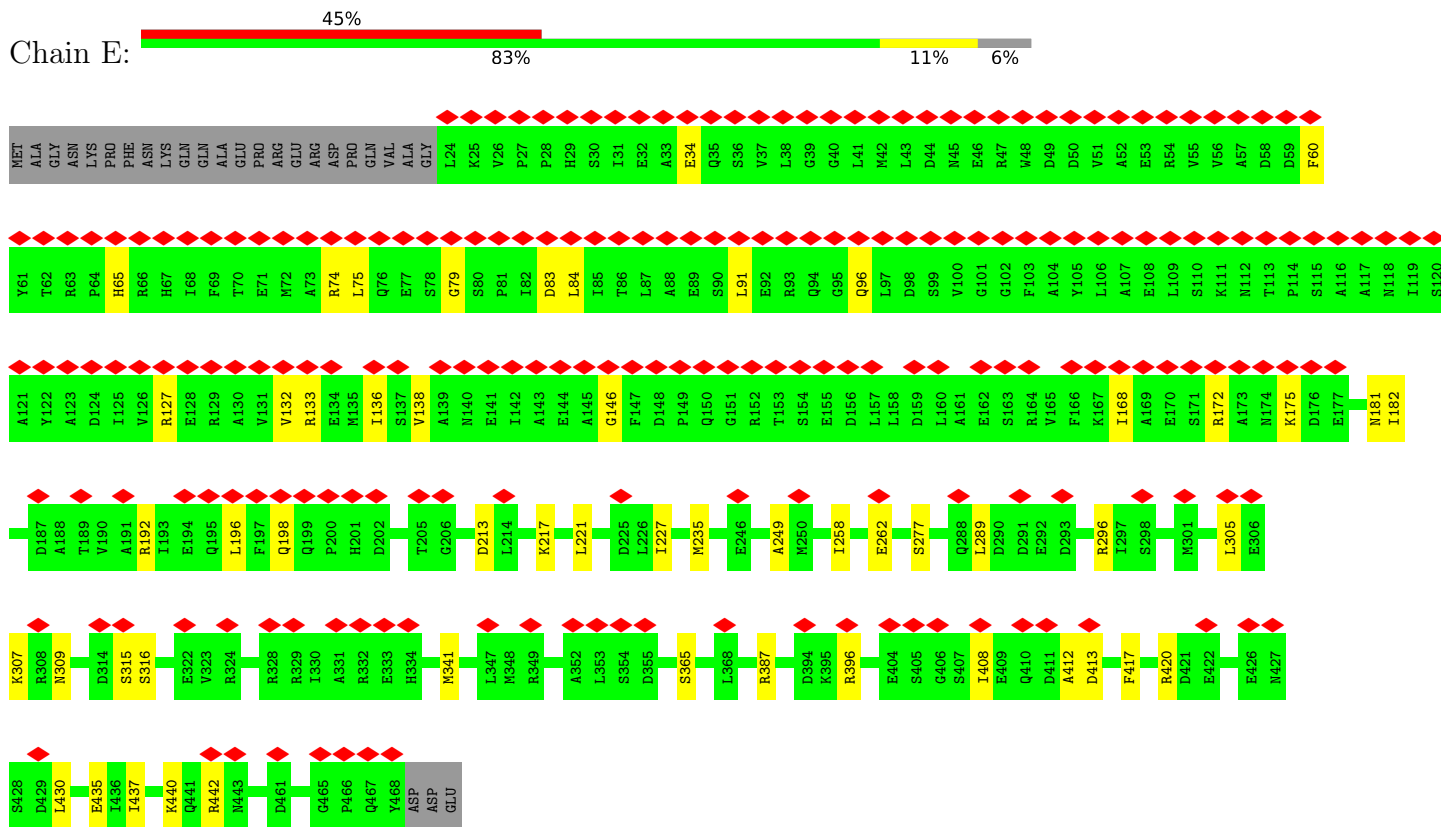
• Molecule 1: Replicative DNA helicase



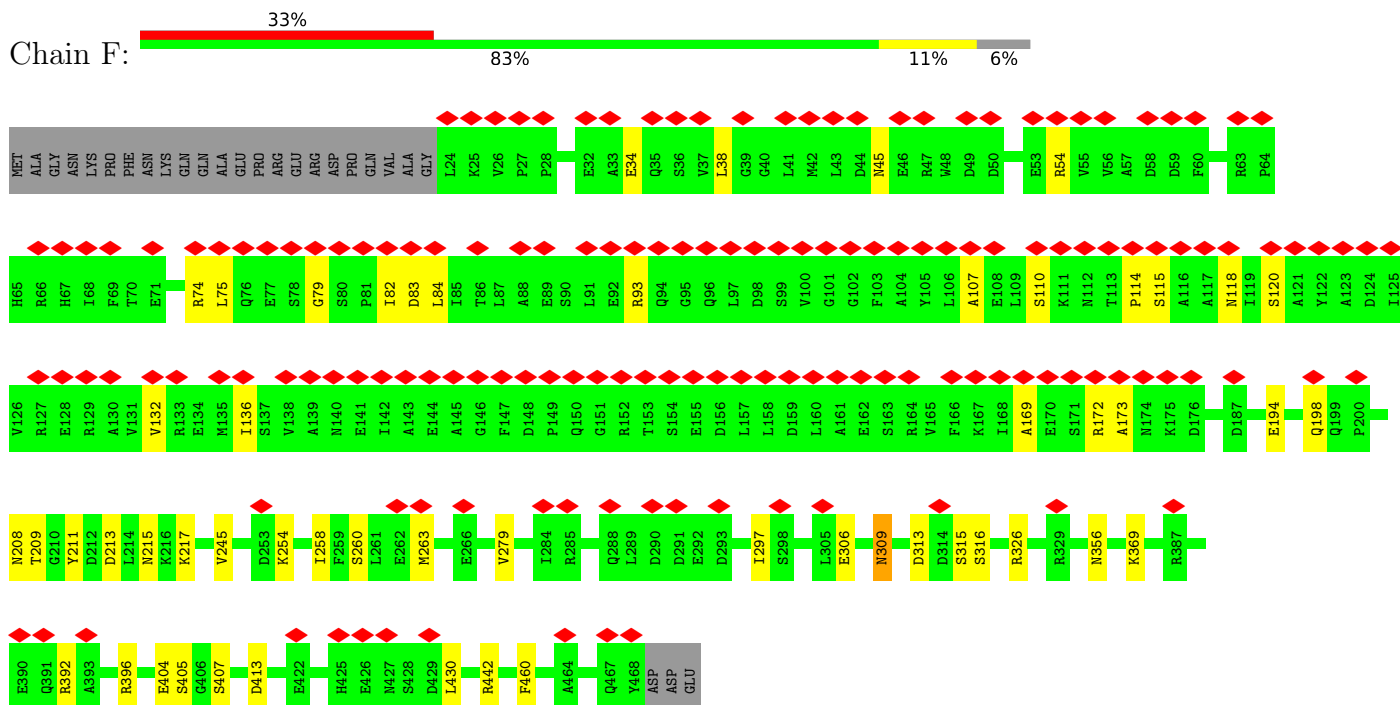
• Molecule 1: Replicative DNA helicase



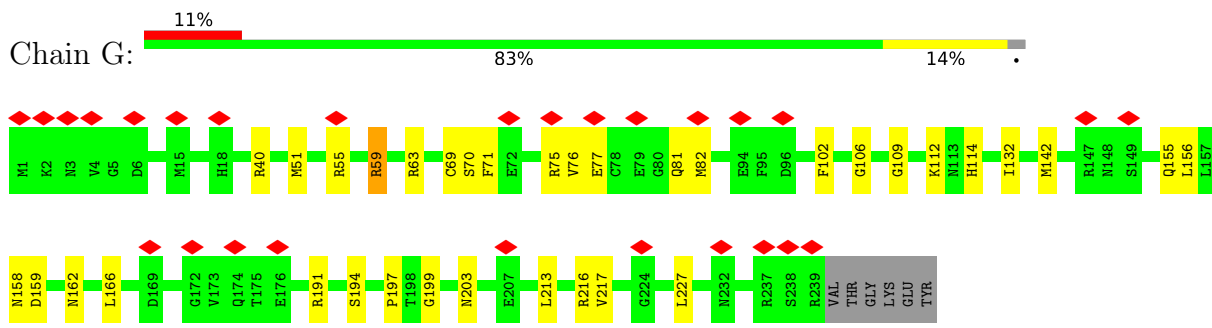
• Molecule 1: Replicative DNA helicase



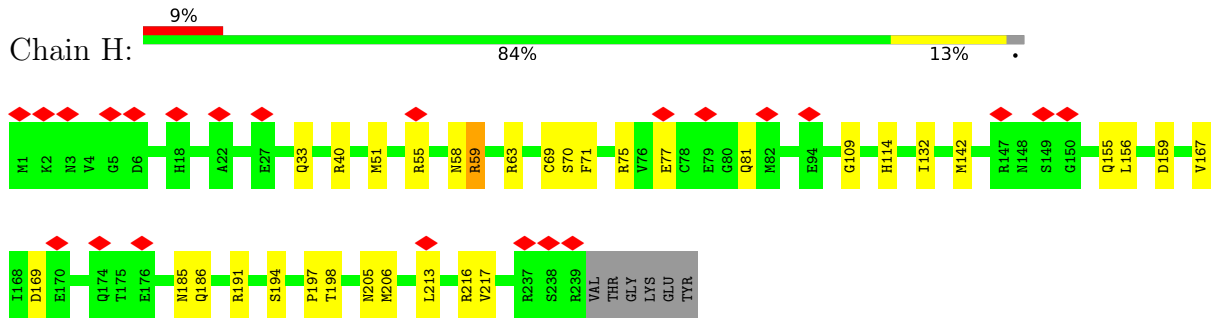
• Molecule 1: Replicative DNA helicase



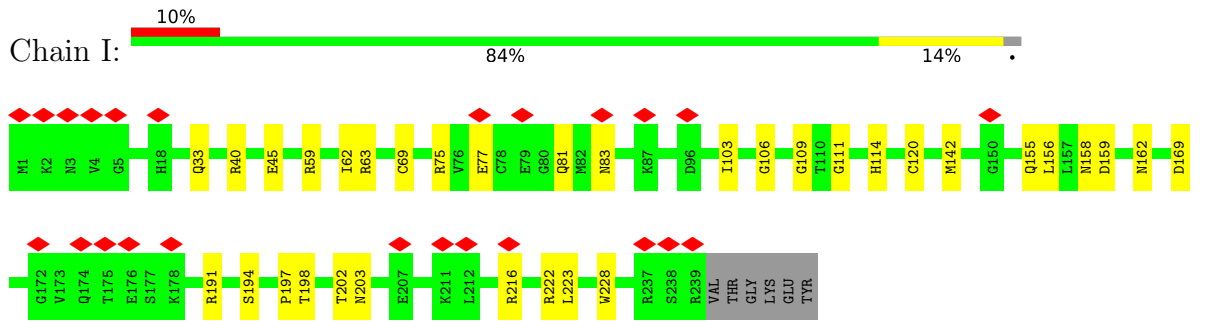
• Molecule 2: DNA replication protein DnaC



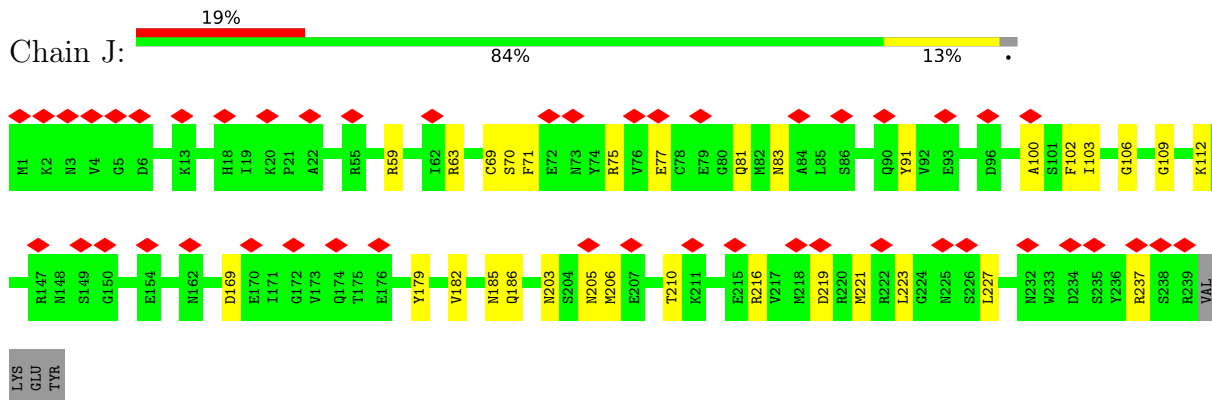
• Molecule 2: DNA replication protein DnaC



• Molecule 2: DNA replication protein DnaC

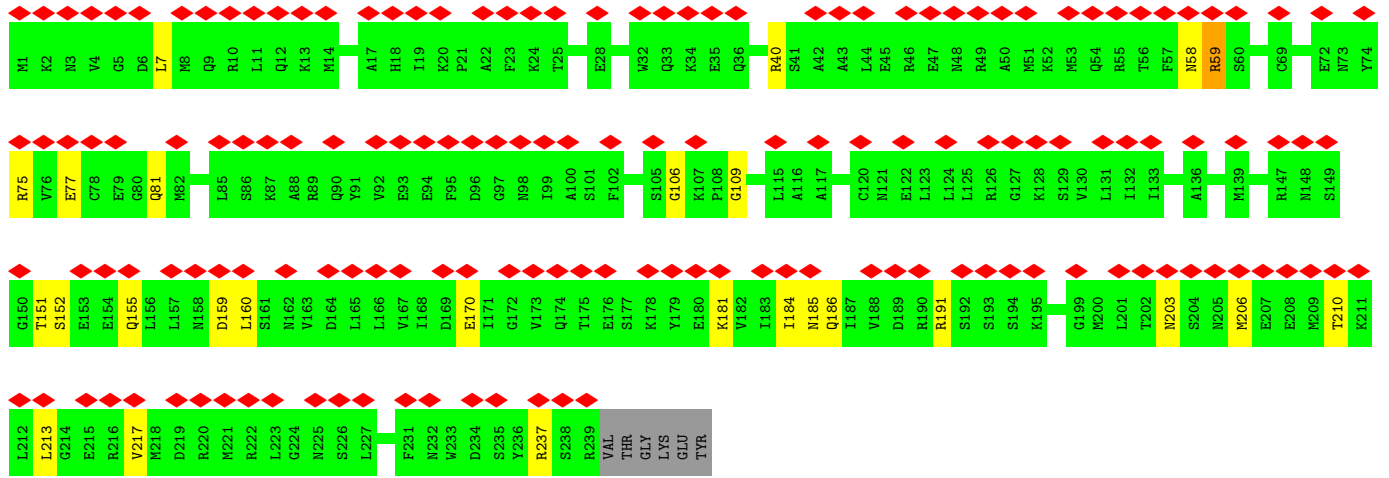


• Molecule 2: DNA replication protein DnaC

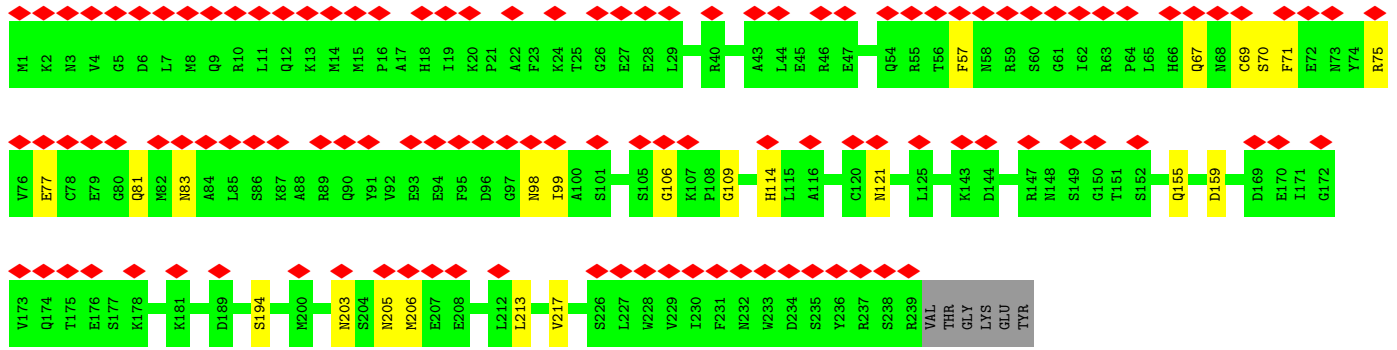
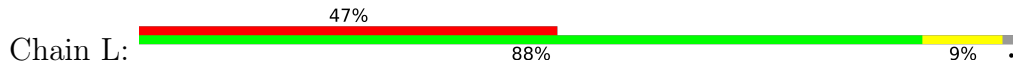


• Molecule 2: DNA replication protein DnaC

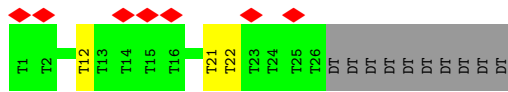




• Molecule 2: DNA replication protein DnaC



• Molecule 3: ssDNA



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	229097	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 ($e^-/\text{\AA}^2$)	58	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2700	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.388	Depositor
Minimum map value	-0.222	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	301.536, 301.536, 301.536	wwPDB
Map dimensions	288, 288, 288	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.047, 1.047, 1.047	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: 08T, ADP, MG

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	0.63	0/3524	0.73	3/4765 (0.1%)
1	B	0.65	0/3524	0.77	7/4765 (0.1%)
1	C	0.66	0/3524	0.76	3/4765 (0.1%)
1	D	0.60	0/3524	0.75	4/4765 (0.1%)
1	E	0.38	0/3524	0.66	0/4765
1	F	0.45	0/3524	0.66	0/4765
2	G	0.49	0/1927	0.63	0/2582
2	H	0.55	0/1927	0.68	1/2582 (0.0%)
2	I	0.51	0/1927	0.67	0/2582
2	J	0.43	0/1927	0.67	0/2582
2	K	0.35	0/1927	0.64	0/2582
2	L	0.36	0/1927	0.62	0/2582
3	M	1.06	0/571	1.52	1/880 (0.1%)
All	All	0.55	0/33277	0.73	19/44962 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	D	0	1
1	F	0	2
2	L	0	1
All	All	0	4

There are no bond length outliers.

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	285	ARG	NE-CZ-NH2	6.49	123.55	120.30
1	B	91	LEU	CA-CB-CG	6.48	130.21	115.30
1	B	324	ARG	NE-CZ-NH1	6.36	123.48	120.30
1	A	387	ARG	NE-CZ-NH1	6.23	123.41	120.30
1	B	324	ARG	NE-CZ-NH2	-6.10	117.25	120.30
1	A	430	LEU	CA-CB-CG	6.02	129.15	115.30
1	B	285	ARG	NE-CZ-NH1	-5.86	117.37	120.30
2	H	59	ARG	NE-CZ-NH1	5.60	123.10	120.30
1	B	403	ARG	NE-CZ-NH1	-5.52	117.54	120.30
1	B	430	LEU	CA-CB-CG	5.50	127.96	115.30
1	C	403	ARG	NE-CZ-NH1	-5.43	117.58	120.30
1	A	285	ARG	NE-CZ-NH2	5.29	122.95	120.30
1	D	402	LEU	CA-CB-CG	5.21	127.28	115.30
1	D	387	ARG	NE-CZ-NH1	5.19	122.89	120.30
1	D	329	ARG	NE-CZ-NH1	5.18	122.89	120.30
1	C	232	ARG	NE-CZ-NH1	-5.18	117.71	120.30
3	M	12	DT	O4'-C4'-C3'	-5.14	102.44	104.50
1	C	278	ARG	NE-CZ-NH2	-5.09	117.75	120.30
1	D	430	LEU	CA-CB-CG	5.04	126.90	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	150	GLN	Peptide
1	F	114	PRO	Peptide
1	F	404	GLU	Peptide
2	L	57	PHE	Peptide

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	3474	3467	3467	25	0
1	B	3474	3467	3467	36	0
1	C	3474	3466	3467	33	0
1	D	3474	3467	3467	32	0
1	E	3474	3468	3468	31	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3474	3468	3468	27	0
2	G	1902	1923	1923	20	0
2	H	1902	1923	1923	20	0
2	I	1902	1923	1923	23	0
2	J	1902	1923	1923	20	0
2	K	1902	1923	1923	16	0
2	L	1902	1923	1923	13	0
3	M	520	311	313	2	0
4	A	31	12	12	0	0
4	B	31	12	12	2	0
4	C	31	12	12	0	0
4	D	31	12	12	1	0
4	E	31	12	12	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
5	E	1	0	0	0	0
6	G	27	12	12	2	0
6	H	27	12	12	1	0
6	I	27	12	12	2	0
6	J	27	10	12	2	0
6	K	27	12	12	1	0
6	L	27	12	12	1	0
All	All	33098	32782	32787	268	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 4.

All (268) 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:D:277:SER:O	1:D:296:ARG:NH1	2.08	0.86
2:G:194:SER:OG	2:H:63:ARG:NH2	2.11	0.83
2:I:194:SER:OG	2:J:63:ARG:NH2	2.15	0.79
2:G:63:ARG:NH2	2:L:194:SER:OG	2.17	0.78
1:C:420:ARG:NH1	1:C:422:GLU:OE2	2.17	0.77
1:B:396:ARG:NH1	1:B:435:GLU:OE2	2.18	0.77
1:E:307:LYS:NZ	1:E:309:ASN:OD1	2.18	0.76
2:H:194:SER:OG	2:I:63:ARG:NH2	2.17	0.76
1:D:412:ALA:O	1:D:440:LYS:NZ	2.20	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:277:SER:O	1:B:296:ARG:NH1	2.19	0.75
1:D:392:ARG:NH2	1:D:396:ARG:O	2.20	0.75
1:F:115:SER:OG	1:F:118:ASN:OD1	2.05	0.74
1:A:75:LEU:O	1:A:79:GLY:N	2.20	0.74
1:D:248:ALA:O	1:D:252:GLN:N	2.21	0.74
2:L:75:ARG:NH2	2:L:77:GLU:OE2	2.20	0.73
1:C:75:LEU:O	1:C:79:GLY:N	2.21	0.72
2:J:216:ARG:NE	2:K:170:GLU:OE2	2.21	0.72
1:B:293:ASP:OD1	1:B:296:ARG:NH2	2.23	0.72
1:E:75:LEU:O	1:E:79:GLY:N	2.23	0.72
2:I:75:ARG:NH2	2:I:77:GLU:OE2	2.23	0.72
1:B:75:LEU:O	1:B:79:GLY:N	2.23	0.72
1:E:127:ARG:NH2	1:E:172:ARG:O	2.23	0.71
2:K:155:GLN:NE2	2:K:159:ASP:OD2	2.23	0.71
1:C:260:SER:OG	1:C:263:MET:O	2.07	0.71
1:C:396:ARG:NH1	1:C:435:GLU:OE2	2.23	0.71
2:G:75:ARG:NH2	2:G:77:GLU:OE2	2.23	0.71
2:H:75:ARG:NH2	2:H:77:GLU:OE2	2.23	0.70
1:E:249:ALA:O	1:E:307:LYS:NZ	2.21	0.70
1:F:260:SER:OG	1:F:263:MET:O	2.07	0.70
1:E:412:ALA:O	1:E:440:LYS:NZ	2.23	0.70
1:D:363:GLU:OE1	1:D:366:ARG:NH1	2.24	0.70
1:D:75:LEU:O	1:D:79:GLY:N	2.25	0.69
1:C:108:GLU:OE2	1:C:112:ASN:ND2	2.25	0.69
1:A:260:SER:OG	1:A:263:MET:O	2.06	0.69
2:K:77:GLU:N	2:K:81:GLN:OE1	2.26	0.68
2:J:91:TYR:OH	2:J:100:ALA:O	2.06	0.68
1:A:396:ARG:NH1	1:A:435:GLU:OE2	2.27	0.68
1:F:306:GLU:N	1:F:306:GLU:OE1	2.27	0.67
2:G:155:GLN:NE2	2:G:159:ASP:OD2	2.27	0.67
1:A:54:ARG:NH1	1:A:120:SER:OG	2.28	0.67
1:B:410:GLN:OE1	1:C:344:TYR:OH	2.09	0.66
1:B:260:SER:OG	1:B:263:MET:O	2.13	0.66
2:K:160:LEU:O	2:K:191:ARG:NH1	2.28	0.66
2:L:77:GLU:N	2:L:81:GLN:OE1	2.28	0.66
1:F:313:ASP:OD2	1:F:326:ARG:NH1	2.28	0.66
1:B:194:GLU:O	1:B:198:GLN:N	2.28	0.66
1:E:277:SER:O	1:E:296:ARG:NH1	2.29	0.66
1:C:463:TYR:OH	2:I:45:GLU:OE2	2.07	0.66
2:G:69:CYS:SG	2:G:114:HIS:ND1	2.68	0.66
2:H:51:MET:SD	2:H:55:ARG:NH1	2.69	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:216:ARG:NH1	2:H:169:ASP:OD2	2.30	0.64
2:K:75:ARG:NH2	2:K:77:GLU:OE2	2.30	0.64
2:I:77:GLU:N	2:I:81:GLN:OE1	2.28	0.64
1:C:54:ARG:NH1	1:C:120:SER:OG	2.29	0.64
2:L:155:GLN:NE2	2:L:159:ASP:OD2	2.31	0.64
1:D:199:GLN:OE1	1:D:201:HIS:ND1	2.31	0.64
2:K:206:MET:O	2:K:210:THR:OG1	2.09	0.64
2:J:77:GLU:N	2:J:81:GLN:OE1	2.30	0.64
1:B:413:ASP:OD1	1:B:442:ARG:NH1	2.30	0.63
1:B:420:ARG:NH1	1:B:422:GLU:OE2	2.31	0.63
1:D:260:SER:OG	1:D:263:MET:O	2.15	0.63
2:G:77:GLU:N	2:G:81:GLN:OE1	2.32	0.63
1:B:89:GLU:O	1:C:129:ARG:NH1	2.31	0.63
2:L:109:GLY:N	6:L:301:ADP:O1B	2.31	0.63
2:L:67:GLN:O	2:L:121:ASN:ND2	2.31	0.63
2:I:111:GLY:N	6:I:301:ADP:O1A	2.32	0.63
1:E:213:ASP:O	1:E:217:LYS:NZ	2.25	0.62
1:A:127:ARG:NH2	1:A:172:ARG:O	2.32	0.62
2:G:158:ASN:OD1	2:G:162:ASN:ND2	2.32	0.62
2:H:109:GLY:N	6:H:301:ADP:O1B	2.33	0.61
1:C:225:ASP:HB2	1:C:413:ASP:HB2	1.82	0.61
1:B:132:VAL:O	1:B:136:ILE:HD12	2.01	0.61
3:M:21:DT:H72	3:M:22:DT:H71	1.83	0.61
1:B:96:GLN:NE2	1:D:150:GLN:OE1	2.34	0.61
1:F:54:ARG:NH1	1:F:120:SER:OG	2.33	0.60
1:B:276:LEU:O	2:H:33:GLN:NE2	2.35	0.59
2:L:69:CYS:SG	2:L:114:HIS:ND1	2.75	0.59
2:J:75:ARG:NH2	2:J:77:GLU:OE2	2.36	0.59
1:B:442:ARG:O	1:C:271:ARG:NH1	2.36	0.58
2:I:158:ASN:OD1	2:I:162:ASN:ND2	2.35	0.58
1:F:132:VAL:O	1:F:136:ILE:HD12	2.04	0.57
1:F:211:TYR:OH	1:F:460:PHE:O	2.13	0.57
1:A:459:ARG:NE	1:A:461:ASP:OD1	2.37	0.57
1:D:132:VAL:O	1:D:136:ILE:HD12	2.04	0.57
1:A:442:ARG:NH2	4:B:1001:08T:F1	2.28	0.57
1:E:396:ARG:NH1	1:E:435:GLU:OE2	2.38	0.57
1:A:369:LYS:NZ	1:A:413:ASP:OD2	2.38	0.56
1:B:208:ASN:OD1	1:B:215:ASN:ND2	2.38	0.56
2:H:77:GLU:N	2:H:81:GLN:OE1	2.37	0.56
1:C:265:SER:OG	1:C:314:ASP:OD2	2.13	0.55
1:D:317:GLY:O	1:D:349:ARG:NH2	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:181:ASN:OD1	1:E:182:ILE:N	2.40	0.55
1:E:192:ARG:HA	1:E:196:LEU:HD23	1.88	0.55
1:D:211:TYR:OH	1:D:460:PHE:O	2.18	0.55
2:J:185:ASN:OD1	2:J:186:GLN:N	2.40	0.55
1:E:412:ALA:O	1:E:442:ARG:NH2	2.40	0.54
2:J:102:PHE:HB2	2:J:227:LEU:HD22	1.90	0.54
2:I:216:ARG:NH2	2:J:169:ASP:OD2	2.40	0.54
1:F:75:LEU:O	1:F:79:GLY:N	2.40	0.54
2:J:106:GLY:O	2:J:203:ASN:ND2	2.39	0.54
2:I:223:LEU:HD11	2:J:237:ARG:NH1	2.23	0.54
1:C:276:LEU:O	2:I:33:GLN:NE2	2.41	0.53
2:H:155:GLN:NE2	2:H:159:ASP:OD2	2.41	0.53
1:B:94:GLN:O	1:D:151:GLY:N	2.39	0.53
1:D:293:ASP:OD1	1:D:296:ARG:NH2	2.41	0.53
1:A:208:ASN:OD1	1:A:215:ASN:ND2	2.40	0.53
1:B:83:ASP:OD1	1:B:84:LEU:N	2.42	0.53
1:D:442:ARG:NH2	1:E:262:GLU:OE2	2.42	0.53
2:J:69:CYS:SG	2:J:114:HIS:ND1	2.80	0.53
1:D:55:VAL:HG23	1:D:123:ALA:HB1	1.91	0.53
2:I:155:GLN:NE2	2:I:159:ASP:OD2	2.42	0.52
2:I:106:GLY:O	2:I:203:ASN:ND2	2.42	0.52
1:F:194:GLU:O	1:F:198:GLN:N	2.37	0.52
1:F:369:LYS:NZ	1:F:413:ASP:OD2	2.42	0.52
1:A:317:GLY:O	1:A:349:ARG:NH2	2.43	0.52
1:B:93:ARG:HE	1:D:153:THR:HA	1.74	0.52
2:G:106:GLY:O	2:G:203:ASN:ND2	2.38	0.52
1:D:413:ASP:OD1	1:D:442:ARG:NH1	2.43	0.52
2:G:59:ARG:NH2	2:G:132:ILE:O	2.43	0.52
2:H:213:LEU:HD12	2:H:217:VAL:HG11	1.92	0.52
2:G:109:GLY:N	6:G:301:ADP:O1B	2.44	0.51
2:J:109:GLY:N	6:J:301:ADP:O1B	2.43	0.51
1:F:279:VAL:HG21	1:F:297:ILE:HD11	1.92	0.51
1:C:213:ASP:OD1	1:C:217:LYS:NZ	2.43	0.51
1:E:132:VAL:O	1:E:136:ILE:HD12	2.10	0.51
1:E:83:ASP:OD1	1:E:84:LEU:N	2.44	0.51
1:E:138:VAL:HG21	1:E:168:ILE:HD11	1.92	0.50
1:F:254:LYS:O	1:F:309:ASN:ND2	2.40	0.50
2:H:69:CYS:SG	2:H:114:HIS:ND1	2.84	0.50
2:K:58:ASN:OD1	2:K:59:ARG:N	2.44	0.50
1:F:208:ASN:OD1	1:F:209:THR:N	2.45	0.50
1:C:208:ASN:OD1	1:C:209:THR:N	2.44	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:69:CYS:SG	2:I:114:HIS:ND1	2.85	0.50
2:K:106:GLY:O	2:K:203:ASN:ND2	2.43	0.50
3:M:21:DT:C7	3:M:22:DT:H71	2.40	0.50
1:F:315:SER:OG	1:F:316:SER:N	2.45	0.49
2:J:206:MET:O	2:J:210:THR:OG1	2.22	0.49
1:E:146:GLY:HA3	1:F:136:ILE:HD11	1.94	0.49
2:H:70:SER:OG	2:H:71:PHE:N	2.46	0.49
2:I:191:ARG:NH2	2:I:197:PRO:O	2.42	0.49
2:K:109:GLY:N	6:K:301:ADP:O1B	2.45	0.49
1:B:289:LEU:O	1:B:294:TRP:NE1	2.45	0.49
1:D:83:ASP:OD1	1:D:84:LEU:N	2.46	0.48
2:G:51:MET:SD	2:G:55:ARG:NH2	2.86	0.48
1:F:430:LEU:HD13	1:F:430:LEU:O	2.13	0.48
2:H:194:SER:HG	2:I:63:ARG:NH2	2.11	0.48
2:I:142:MET:CE	2:I:156:LEU:HD12	2.44	0.48
1:C:317:GLY:O	1:C:349:ARG:NH2	2.46	0.48
1:C:369:LYS:NZ	1:C:413:ASP:OD2	2.47	0.48
1:C:235:MET:SD	1:C:420:ARG:HG2	2.54	0.48
1:B:151:GLY:N	1:F:93:ARG:O	2.44	0.47
1:F:169:ALA:O	1:F:173:ALA:N	2.46	0.47
1:A:146:GLY:HA3	1:B:136:ILE:HD11	1.96	0.47
1:B:89:GLU:HG3	1:C:125:ILE:HD12	1.96	0.47
1:A:293:ASP:OD1	1:A:296:ARG:NH2	2.43	0.47
1:F:245:VAL:HG21	1:F:258:ILE:HD11	1.96	0.47
2:I:103:ILE:HG21	2:I:228:TRP:CZ3	2.50	0.47
2:I:222:ARG:C	2:I:223:LEU:HD12	2.34	0.47
1:B:91:LEU:HD22	1:B:96:GLN:HB2	1.97	0.47
1:C:134:GLU:O	1:C:138:VAL:HG23	2.15	0.47
1:C:225:ASP:HB2	1:C:413:ASP:CB	2.45	0.47
1:A:208:ASN:OD1	1:A:209:THR:N	2.48	0.46
1:B:346:GLN:O	1:B:357:ARG:NH1	2.43	0.46
1:D:208:ASN:OD1	1:D:215:ASN:ND2	2.45	0.46
1:D:215:ASN:O	1:D:219:ALA:N	2.44	0.46
2:K:185:ASN:OD1	2:K:186:GLN:N	2.49	0.46
1:A:83:ASP:OD1	1:A:84:LEU:N	2.48	0.46
2:G:102:PHE:HB2	2:G:227:LEU:HD22	1.97	0.46
1:B:238:THR:OG1	4:B:1001:08T:O2B	2.34	0.46
2:K:151:THR:O	2:K:152:SER:OG	2.32	0.46
1:D:384:GLN:NE2	4:D:1001:08T:F3	2.36	0.46
1:B:459:ARG:NE	1:B:460:PHE:O	2.49	0.46
1:A:232:ARG:NH2	1:A:390:GLU:OE2	2.49	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:60:PHE:O	1:E:133:ARG:NH1	2.49	0.46
1:E:91:LEU:HD22	1:E:96:GLN:HB2	1.97	0.46
2:G:112:LYS:N	6:G:301:ADP:O1A	2.49	0.46
2:H:185:ASN:OD1	2:H:186:GLN:N	2.49	0.46
2:G:70:SER:OG	2:G:71:PHE:N	2.49	0.46
2:G:213:LEU:HD12	2:G:217:VAL:HG11	1.97	0.46
1:F:107:ALA:O	1:F:110:SER:OG	2.22	0.45
2:G:191:ARG:NH2	2:G:197:PRO:O	2.45	0.45
1:B:307:LYS:NZ	1:B:309:ASN:OD1	2.49	0.45
1:B:369:LYS:NZ	1:B:413:ASP:OD2	2.49	0.45
1:C:413:ASP:OD1	1:C:442:ARG:NH1	2.50	0.45
2:L:213:LEU:HD12	2:L:217:VAL:HG11	1.98	0.45
1:A:132:VAL:O	1:A:136:ILE:HD12	2.17	0.45
2:L:70:SER:OG	2:L:71:PHE:N	2.49	0.45
1:C:346:GLN:O	1:C:357:ARG:NH1	2.41	0.45
1:B:37:VAL:O	1:B:41:LEU:HD23	2.17	0.45
1:E:430:LEU:O	1:E:430:LEU:HD13	2.17	0.45
1:F:213:ASP:O	1:F:217:LYS:NZ	2.42	0.45
1:A:138:VAL:HG21	1:A:168:ILE:HD11	1.97	0.45
1:B:91:LEU:HD22	1:B:96:GLN:CB	2.47	0.45
2:J:205:ASN:OD1	2:J:206:MET:N	2.49	0.44
1:A:248:ALA:O	1:A:252:GLN:N	2.50	0.44
1:D:389:LEU:HD23	1:D:389:LEU:H	1.82	0.44
1:A:273:LEU:O	1:A:277:SER:OG	2.20	0.44
1:C:181:ASN:OD1	1:C:182:ILE:N	2.48	0.44
1:F:413:ASP:OD1	1:F:442:ARG:NH1	2.50	0.44
2:L:98:ASN:OD1	2:L:99:ILE:N	2.50	0.44
1:E:235:MET:O	1:E:420:ARG:NH2	2.50	0.44
1:F:83:ASP:OD1	1:F:84:LEU:N	2.47	0.44
2:K:213:LEU:HD12	2:K:217:VAL:HG11	1.99	0.44
1:C:213:ASP:O	1:C:217:LYS:NZ	2.48	0.44
1:E:258:ILE:HG23	1:E:341:MET:HE3	1.98	0.44
2:I:62:ILE:HD11	2:I:120:CYS:HB2	1.99	0.44
1:D:430:LEU:HD13	1:D:430:LEU:O	2.18	0.43
1:C:178:GLY:O	1:C:180:LYS:N	2.51	0.43
1:C:256:VAL:HG12	1:C:339:LEU:HB3	2.01	0.43
1:C:265:SER:N	1:C:314:ASP:OD2	2.50	0.43
2:J:179:TYR:HA	2:J:182:VAL:HG12	1.99	0.43
1:C:158:LEU:HD22	1:D:172:ARG:HD2	2.00	0.43
2:J:223:LEU:HD11	2:K:237:ARG:NH1	2.33	0.43
1:E:258:ILE:HG23	1:E:341:MET:CE	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:305:LEU:HD21	2:K:7:LEU:HD23	2.01	0.43
1:D:88:ALA:HB2	1:D:103:PHE:CE1	2.53	0.43
1:C:361:ILE:HB	1:C:405:SER:OG	2.18	0.43
2:K:181:LYS:HA	2:K:184:ILE:HG22	2.01	0.43
1:C:223:PRO:O	1:C:377:VAL:C	2.56	0.43
1:D:396:ARG:NH1	1:D:435:GLU:OE2	2.52	0.42
2:J:103:ILE:HD11	2:J:221:MET:HG2	2.00	0.42
1:B:92:GLU:OE1	1:C:129:ARG:NE	2.52	0.42
2:L:69:CYS:HG	2:L:114:HIS:CE1	2.37	0.42
1:B:174:ASN:ND2	1:B:177:GLU:OE2	2.53	0.42
1:F:392:ARG:NH2	1:F:396:ARG:O	2.52	0.42
2:I:191:ARG:HE	2:I:198:THR:HB	1.84	0.42
1:A:344:TYR:HE1	1:A:384:GLN:HG3	1.85	0.42
1:E:365:SER:HB2	1:E:408:ILE:HG22	2.00	0.42
1:B:181:ASN:OD1	1:B:182:ILE:N	2.52	0.42
2:H:191:ARG:HE	2:H:198:THR:HB	1.84	0.42
2:H:216:ARG:NH2	2:I:169:ASP:OD2	2.45	0.42
1:A:245:VAL:HG12	1:A:339:LEU:HD11	2.01	0.42
1:E:315:SER:OG	1:E:316:SER:N	2.53	0.42
2:I:109:GLY:N	6:I:301:ADP:O1B	2.43	0.42
1:A:385:LEU:HG	1:A:401:ASP:O	2.20	0.42
2:H:191:ARG:NH2	2:H:197:PRO:O	2.44	0.41
2:J:219:ASP:O	2:K:237:ARG:NH1	2.45	0.41
1:D:161:ALA:O	1:D:165:VAL:HG23	2.19	0.41
1:E:34:GLU:OE2	1:E:65:HIS:ND1	2.54	0.41
1:A:127:ARG:HH21	1:A:173:ALA:HB3	1.85	0.41
2:G:142:MET:CE	2:G:156:LEU:HD12	2.49	0.41
2:J:112:LYS:N	6:J:301:ADP:O1A	2.53	0.41
1:D:337:ILE:HG13	1:D:377:VAL:HG11	2.02	0.41
1:E:413:ASP:OD1	1:E:442:ARG:NH1	2.53	0.41
1:E:221:LEU:HD22	1:E:227:ILE:HG12	2.03	0.41
2:L:205:ASN:OD1	2:L:206:MET:N	2.48	0.41
1:B:34:GLU:OE2	1:B:65:HIS:ND1	2.54	0.41
1:D:243:ASN:O	1:D:247:ASN:ND2	2.54	0.41
1:A:389:LEU:H	1:A:389:LEU:HD23	1.85	0.41
2:H:132:ILE:HG22	2:H:167:VAL:CG2	2.51	0.41
1:A:450:ARG:HB3	1:A:468:TYR:CZ	2.55	0.41
1:D:400:SER:O	1:E:387:ARG:NH1	2.50	0.41
1:F:34:GLU:O	1:F:38:LEU:HD23	2.21	0.41
2:G:76:VAL:HG22	2:G:82:MET:HE3	2.02	0.41
2:H:142:MET:CE	2:H:156:LEU:HD12	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:205:ASN:OD1	2:H:206:MET:N	2.51	0.41
2:I:202:THR:OG1	2:I:203:ASN:N	2.54	0.41
1:F:45:ASN:ND2	1:F:82:ILE:O	2.43	0.41
1:B:276:LEU:HD13	1:B:300:THR:OG1	2.21	0.40
1:E:417:PHE:N	1:E:437:ILE:O	2.52	0.40
1:F:405:SER:O	1:F:407:SER:N	2.54	0.40
2:G:166:LEU:O	2:G:199:GLY:N	2.54	0.40
1:D:85:ILE:O	1:D:88:ALA:HB3	2.21	0.40
2:J:70:SER:OG	2:J:71:PHE:N	2.54	0.40
2:L:106:GLY:O	2:L:203:ASN:ND2	2.48	0.40
1:C:138:VAL:HG21	1:C:168:ILE:CD1	2.52	0.40
1:E:289:LEU:HD23	1:E:289:LEU:H	1.87	0.40
1:B:107:ALA:O	1:B:110:SER:OG	2.33	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	443/471 (94%)	392 (88%)	51 (12%)	0	100	100
1	B	443/471 (94%)	399 (90%)	44 (10%)	0	100	100
1	C	443/471 (94%)	384 (87%)	59 (13%)	0	100	100
1	D	443/471 (94%)	382 (86%)	61 (14%)	0	100	100
1	E	443/471 (94%)	387 (87%)	56 (13%)	0	100	100
1	F	443/471 (94%)	395 (89%)	48 (11%)	0	100	100
2	G	237/245 (97%)	223 (94%)	14 (6%)	0	100	100
2	H	237/245 (97%)	211 (89%)	26 (11%)	0	100	100
2	I	237/245 (97%)	214 (90%)	23 (10%)	0	100	100
2	J	237/245 (97%)	213 (90%)	24 (10%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	K	237/245 (97%)	213 (90%)	24 (10%)	0	100	100
2	L	237/245 (97%)	216 (91%)	21 (9%)	0	100	100
All	All	4080/4296 (95%)	3629 (89%)	451 (11%)	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	377/398 (95%)	375 (100%)	2 (0%)	88	94
1	B	377/398 (95%)	373 (99%)	4 (1%)	73	86
1	C	377/398 (95%)	370 (98%)	7 (2%)	57	78
1	D	377/398 (95%)	371 (98%)	6 (2%)	62	81
1	E	377/398 (95%)	374 (99%)	3 (1%)	81	91
1	F	377/398 (95%)	372 (99%)	5 (1%)	69	84
2	G	209/214 (98%)	207 (99%)	2 (1%)	76	88
2	H	209/214 (98%)	206 (99%)	3 (1%)	67	83
2	I	209/214 (98%)	206 (99%)	3 (1%)	67	83
2	J	209/214 (98%)	207 (99%)	2 (1%)	76	88
2	K	209/214 (98%)	207 (99%)	2 (1%)	76	88
2	L	209/214 (98%)	208 (100%)	1 (0%)	88	94
All	All	3516/3672 (96%)	3476 (99%)	40 (1%)	74	86

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	74	ARG
1	A	356	ASN
1	B	74	ARG
1	B	172	ARG

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Mol	Chain	Res	Type
1	B	271	ARG
1	B	356	ASN
1	C	74	ARG
1	C	247	ASN
1	C	285	ARG
1	C	356	ASN
1	C	402	LEU
1	C	404	GLU
1	C	408	ILE
1	D	74	ARG
1	D	172	ARG
1	D	356	ASN
1	D	402	LEU
1	D	404	GLU
1	D	408	ILE
1	E	74	ARG
1	E	175	LYS
1	E	198	GLN
1	F	74	ARG
1	F	172	ARG
1	F	215	ASN
1	F	309	ASN
1	F	356	ASN
2	G	40	ARG
2	G	59	ARG
2	H	40	ARG
2	H	58	ASN
2	H	59	ARG
2	I	40	ARG
2	I	59	ARG
2	I	83	ASN
2	J	59	ARG
2	J	83	ASN
2	K	40	ARG
2	K	59	ARG
2	L	83	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	45	ASN
1	A	222	GLN

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Mol	Chain	Res	Type
1	B	356	ASN
1	D	356	ASN
1	E	67	HIS
1	E	201	HIS
1	F	96	GLN
1	F	215	ASN
1	F	356	ASN
1	F	384	GLN
2	J	54	GLN
2	L	33	GLN
2	L	113	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 5 are monoatomic - leaving 11 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	08T	A	1001	5	26,33,33	5.21	14 (53%)	25,52,52	2.38	6 (24%)
6	ADP	I	301	-	24,29,29	0.96	1 (4%)	29,45,45	1.54	5 (17%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	08T	B	1001	5	26,33,33	5.17	14 (53%)	25,52,52	2.40	6 (24%)
4	08T	D	1001	5	26,33,33	5.25	14 (53%)	25,52,52	2.38	6 (24%)
6	ADP	H	301	-	24,29,29	0.91	1 (4%)	29,45,45	1.51	4 (13%)
6	ADP	J	301	-	24,29,29	0.89	1 (4%)	29,45,45	1.53	5 (17%)
4	08T	E	1001	5	26,33,33	5.25	14 (53%)	25,52,52	2.40	6 (24%)
6	ADP	L	301	-	24,29,29	0.95	1 (4%)	29,45,45	1.57	4 (13%)
4	08T	C	1001	5	26,33,33	5.20	14 (53%)	25,52,52	2.42	6 (24%)
6	ADP	K	301	-	24,29,29	0.91	1 (4%)	29,45,45	1.47	4 (13%)
6	ADP	G	301	-	24,29,29	0.92	1 (4%)	29,45,45	1.47	3 (10%)

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	08T	A	1001	5	-	5/12/38/38	0/3/3/3
6	ADP	I	301	-	-	3/12/32/32	0/3/3/3
4	08T	B	1001	5	-	5/12/38/38	0/3/3/3
4	08T	D	1001	5	-	5/12/38/38	0/3/3/3
6	ADP	H	301	-	-	0/12/32/32	0/3/3/3
6	ADP	J	301	-	-	0/12/32/32	0/3/3/3
4	08T	E	1001	5	-	5/12/38/38	0/3/3/3
6	ADP	L	301	-	-	5/12/32/32	0/3/3/3
4	08T	C	1001	5	-	5/12/38/38	0/3/3/3
6	ADP	K	301	-	-	2/12/32/32	0/3/3/3
6	ADP	G	301	-	-	2/12/32/32	0/3/3/3

All (76) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	1001	08T	C2'-C1'	-14.74	1.31	1.53
4	C	1001	08T	C2'-C1'	-14.70	1.31	1.53
4	E	1001	08T	C2'-C1'	-14.63	1.31	1.53
4	B	1001	08T	C2'-C1'	-14.60	1.31	1.53
4	A	1001	08T	C2'-C1'	-14.50	1.31	1.53
4	A	1001	08T	O4'-C1'	14.23	1.60	1.41
4	E	1001	08T	O4'-C1'	14.09	1.60	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	1001	08T	O4'-C1'	14.08	1.60	1.41
4	B	1001	08T	O4'-C1'	14.03	1.60	1.41
4	C	1001	08T	O4'-C1'	14.00	1.60	1.41
4	E	1001	08T	F2-BE	-8.45	1.33	1.54
4	D	1001	08T	F3-BE	-7.98	1.34	1.54
4	A	1001	08T	F2-BE	-7.88	1.35	1.54
4	D	1001	08T	F1-BE	-7.87	1.35	1.54
4	E	1001	08T	F1-BE	-7.78	1.35	1.54
4	D	1001	08T	F2-BE	-7.72	1.35	1.54
4	C	1001	08T	F1-BE	-7.68	1.35	1.54
4	B	1001	08T	F1-BE	-7.63	1.35	1.54
4	A	1001	08T	F1-BE	-7.62	1.35	1.54
4	C	1001	08T	F2-BE	-7.61	1.35	1.54
4	B	1001	08T	F2-BE	-7.58	1.35	1.54
4	E	1001	08T	F3-BE	-7.57	1.35	1.54
4	C	1001	08T	F3-BE	-7.51	1.35	1.54
4	A	1001	08T	F3-BE	-7.51	1.35	1.54
4	B	1001	08T	F3-BE	-7.35	1.36	1.54
4	B	1001	08T	O4'-C4'	-6.97	1.29	1.45
4	D	1001	08T	O4'-C4'	-6.95	1.29	1.45
4	A	1001	08T	O4'-C4'	-6.88	1.29	1.45
4	C	1001	08T	O4'-C4'	-6.85	1.29	1.45
4	E	1001	08T	O4'-C4'	-6.82	1.29	1.45
4	C	1001	08T	C5-C4	-3.51	1.31	1.40
4	A	1001	08T	C5-C4	-3.42	1.31	1.40
4	B	1001	08T	C5-C4	-3.38	1.32	1.40
4	D	1001	08T	C5-C4	-3.37	1.32	1.40
4	E	1001	08T	C5-C4	-3.31	1.32	1.40
4	C	1001	08T	C6-N6	3.24	1.45	1.34
4	A	1001	08T	C6-N6	3.20	1.45	1.34
4	E	1001	08T	C6-N6	3.19	1.45	1.34
4	B	1001	08T	C6-N6	3.16	1.45	1.34
4	D	1001	08T	C6-N6	3.13	1.45	1.34
4	D	1001	08T	O3'-C3'	-3.02	1.35	1.43
4	C	1001	08T	O3'-C3'	-2.97	1.36	1.43
4	B	1001	08T	O3'-C3'	-2.96	1.36	1.43
4	A	1001	08T	O3'-C3'	-2.92	1.36	1.43
4	E	1001	08T	O3'-C3'	-2.89	1.36	1.43
4	A	1001	08T	C2-N3	2.73	1.36	1.32
4	B	1001	08T	C2-N3	2.73	1.36	1.32
4	E	1001	08T	C2-N3	2.71	1.36	1.32
4	A	1001	08T	O2'-C2'	2.71	1.49	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	1001	08T	O2'-C2'	2.70	1.49	1.43
4	D	1001	08T	C2-N3	2.70	1.36	1.32
4	D	1001	08T	O2'-C2'	2.68	1.49	1.43
4	C	1001	08T	O2'-C2'	2.63	1.49	1.43
4	B	1001	08T	O2'-C2'	2.61	1.49	1.43
4	C	1001	08T	C2-N3	2.58	1.36	1.32
6	L	301	ADP	C5-C4	2.40	1.47	1.40
4	C	1001	08T	C6-C5	-2.33	1.34	1.43
4	D	1001	08T	C6-C5	-2.30	1.34	1.43
6	I	301	ADP	C5-C4	2.30	1.47	1.40
4	B	1001	08T	C6-C5	-2.29	1.34	1.43
4	E	1001	08T	C6-C5	-2.29	1.34	1.43
4	E	1001	08T	C2-N1	2.27	1.38	1.33
6	J	301	ADP	C5-C4	2.24	1.46	1.40
4	A	1001	08T	C6-C5	-2.24	1.35	1.43
6	K	301	ADP	C5-C4	2.24	1.46	1.40
4	C	1001	08T	C2-N1	2.23	1.38	1.33
4	D	1001	08T	C2-N1	2.22	1.38	1.33
6	G	301	ADP	C5-C4	2.17	1.46	1.40
4	A	1001	08T	C2-N1	2.14	1.37	1.33
4	C	1001	08T	C5-N7	-2.12	1.32	1.39
6	H	301	ADP	C5-C4	2.05	1.46	1.40
4	B	1001	08T	C5-N7	-2.03	1.32	1.39
4	B	1001	08T	C2-N1	2.02	1.37	1.33
4	D	1001	08T	C5-N7	-2.02	1.32	1.39
4	A	1001	08T	C5-N7	-2.01	1.32	1.39
4	E	1001	08T	C5-N7	-2.00	1.32	1.39

All (55) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	1001	08T	C5-C6-N6	6.37	130.03	120.35
4	E	1001	08T	C5-C6-N6	6.13	129.67	120.35
4	D	1001	08T	C5-C6-N6	6.05	129.54	120.35
4	A	1001	08T	C5-C6-N6	6.03	129.51	120.35
4	B	1001	08T	C5-C6-N6	5.98	129.44	120.35
4	E	1001	08T	N3-C2-N1	-5.70	119.78	128.68
4	A	1001	08T	N3-C2-N1	-5.63	119.88	128.68
4	B	1001	08T	N3-C2-N1	-5.60	119.93	128.68
4	C	1001	08T	N3-C2-N1	-5.58	119.96	128.68
4	D	1001	08T	N3-C2-N1	-5.54	120.02	128.68
6	I	301	ADP	PA-O3A-PB	-4.67	116.81	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	1001	08T	PB-O3A-PA	-4.57	117.15	132.83
4	B	1001	08T	PB-O3A-PA	-4.38	117.81	132.83
4	B	1001	08T	N6-C6-N1	-4.35	109.55	118.57
4	A	1001	08T	N6-C6-N1	-4.32	109.62	118.57
4	D	1001	08T	N6-C6-N1	-4.25	109.75	118.57
4	E	1001	08T	N6-C6-N1	-4.23	109.80	118.57
4	D	1001	08T	PB-O3A-PA	-4.22	118.34	132.83
6	L	301	ADP	PA-O3A-PB	-4.22	118.34	132.83
4	C	1001	08T	N6-C6-N1	-4.21	109.83	118.57
4	E	1001	08T	C3'-C2'-C1'	4.12	107.19	100.98
4	D	1001	08T	C3'-C2'-C1'	4.09	107.14	100.98
4	B	1001	08T	C3'-C2'-C1'	4.05	107.08	100.98
4	E	1001	08T	PB-O3A-PA	-4.04	118.97	132.83
4	A	1001	08T	C3'-C2'-C1'	4.02	107.03	100.98
4	C	1001	08T	C3'-C2'-C1'	4.01	107.02	100.98
4	A	1001	08T	PB-O3A-PA	-3.98	119.17	132.83
6	K	301	ADP	PA-O3A-PB	-3.87	119.56	132.83
6	H	301	ADP	PA-O3A-PB	-3.83	119.68	132.83
4	A	1001	08T	O4'-C1'-C2'	-3.74	101.46	106.93
6	K	301	ADP	N3-C2-N1	-3.72	122.87	128.68
4	E	1001	08T	O4'-C1'-C2'	-3.67	101.56	106.93
4	B	1001	08T	O4'-C1'-C2'	-3.65	101.59	106.93
4	C	1001	08T	O4'-C1'-C2'	-3.62	101.64	106.93
6	G	301	ADP	PA-O3A-PB	-3.59	120.49	132.83
6	H	301	ADP	N3-C2-N1	-3.59	123.06	128.68
4	D	1001	08T	O4'-C1'-C2'	-3.59	101.68	106.93
6	G	301	ADP	N3-C2-N1	-3.52	123.18	128.68
6	J	301	ADP	N3-C2-N1	-3.50	123.20	128.68
6	I	301	ADP	N3-C2-N1	-3.47	123.25	128.68
6	L	301	ADP	N3-C2-N1	-3.43	123.31	128.68
6	J	301	ADP	PA-O3A-PB	-3.38	121.23	132.83
6	L	301	ADP	C3'-C2'-C1'	3.22	105.83	100.98
6	H	301	ADP	C3'-C2'-C1'	2.99	105.48	100.98
6	I	301	ADP	C3'-C2'-C1'	2.70	105.04	100.98
6	J	301	ADP	C3'-C2'-C1'	2.60	104.89	100.98
6	L	301	ADP	C4-C5-N7	-2.48	106.81	109.40
6	G	301	ADP	C3'-C2'-C1'	2.41	104.61	100.98
6	K	301	ADP	C4-C5-N7	-2.34	106.96	109.40
6	J	301	ADP	C4-C5-N7	-2.30	107.00	109.40
6	I	301	ADP	C4-C5-N7	-2.18	107.13	109.40
6	H	301	ADP	C4-C5-N7	-2.14	107.17	109.40
6	I	301	ADP	O3B-PB-O2B	2.13	115.77	107.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	J	301	ADP	C2-N1-C6	2.02	122.21	118.75
6	K	301	ADP	C3'-C2'-C1'	2.01	104.00	100.98

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1001	08T	C5'-O5'-PA-O2A
4	B	1001	08T	C5'-O5'-PA-O2A
4	C	1001	08T	C5'-O5'-PA-O2A
4	D	1001	08T	C5'-O5'-PA-O2A
4	E	1001	08T	C5'-O5'-PA-O2A
6	I	301	ADP	C5'-O5'-PA-O2A
6	I	301	ADP	C5'-O5'-PA-O3A
6	K	301	ADP	C5'-O5'-PA-O3A
6	L	301	ADP	C5'-O5'-PA-O3A
4	A	1001	08T	O4'-C4'-C5'-O5'
4	B	1001	08T	O4'-C4'-C5'-O5'
4	C	1001	08T	O4'-C4'-C5'-O5'
4	D	1001	08T	O4'-C4'-C5'-O5'
4	E	1001	08T	O4'-C4'-C5'-O5'
4	B	1001	08T	C3'-C4'-C5'-O5'
4	C	1001	08T	C3'-C4'-C5'-O5'
4	D	1001	08T	C3'-C4'-C5'-O5'
4	E	1001	08T	C3'-C4'-C5'-O5'
6	G	301	ADP	PB-O3A-PA-O1A
6	I	301	ADP	C5'-O5'-PA-O1A
6	K	301	ADP	C5'-O5'-PA-O1A
6	L	301	ADP	C5'-O5'-PA-O1A
6	L	301	ADP	C5'-O5'-PA-O2A
4	A	1001	08T	C3'-C4'-C5'-O5'
4	A	1001	08T	PA-O3A-PB-O3B
4	C	1001	08T	PA-O3A-PB-O3B
4	D	1001	08T	PA-O3A-PB-O3B
6	L	301	ADP	PB-O3A-PA-O1A
4	A	1001	08T	C5'-O5'-PA-O3A
4	B	1001	08T	C5'-O5'-PA-O3A
4	C	1001	08T	C5'-O5'-PA-O3A
4	D	1001	08T	C5'-O5'-PA-O3A
4	E	1001	08T	C5'-O5'-PA-O3A
6	G	301	ADP	PB-O3A-PA-O2A
6	L	301	ADP	PB-O3A-PA-O2A

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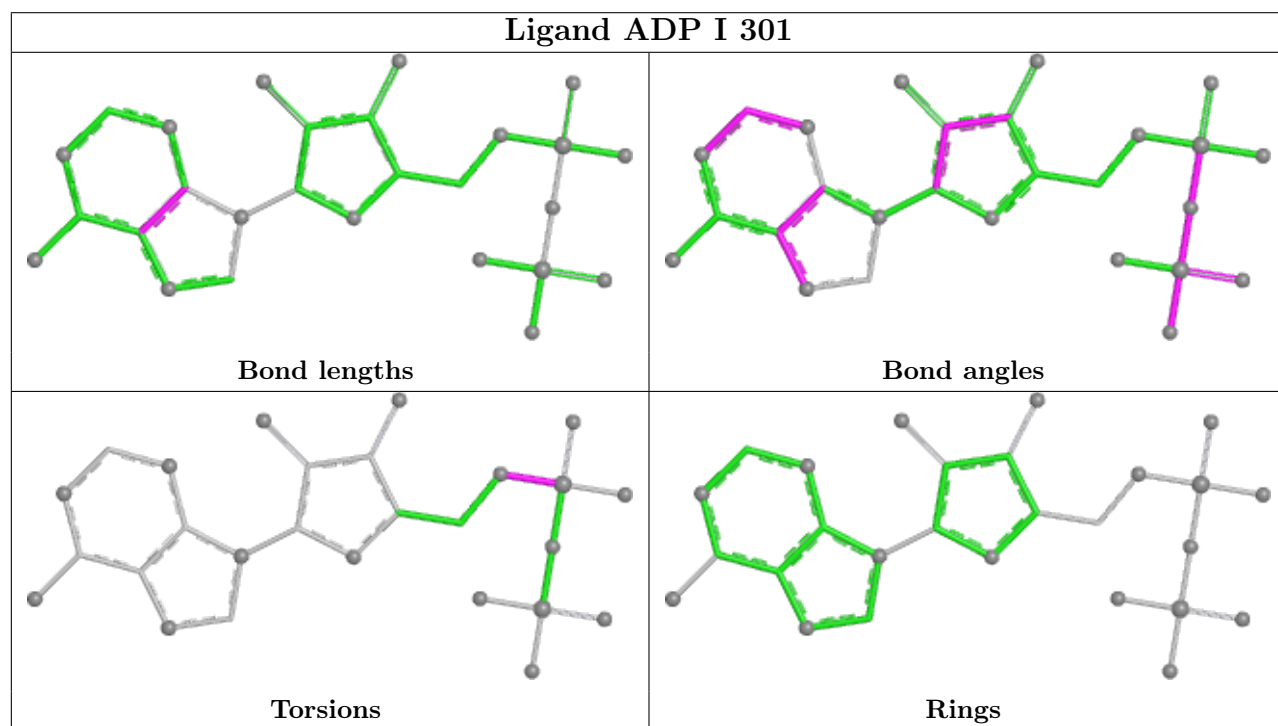
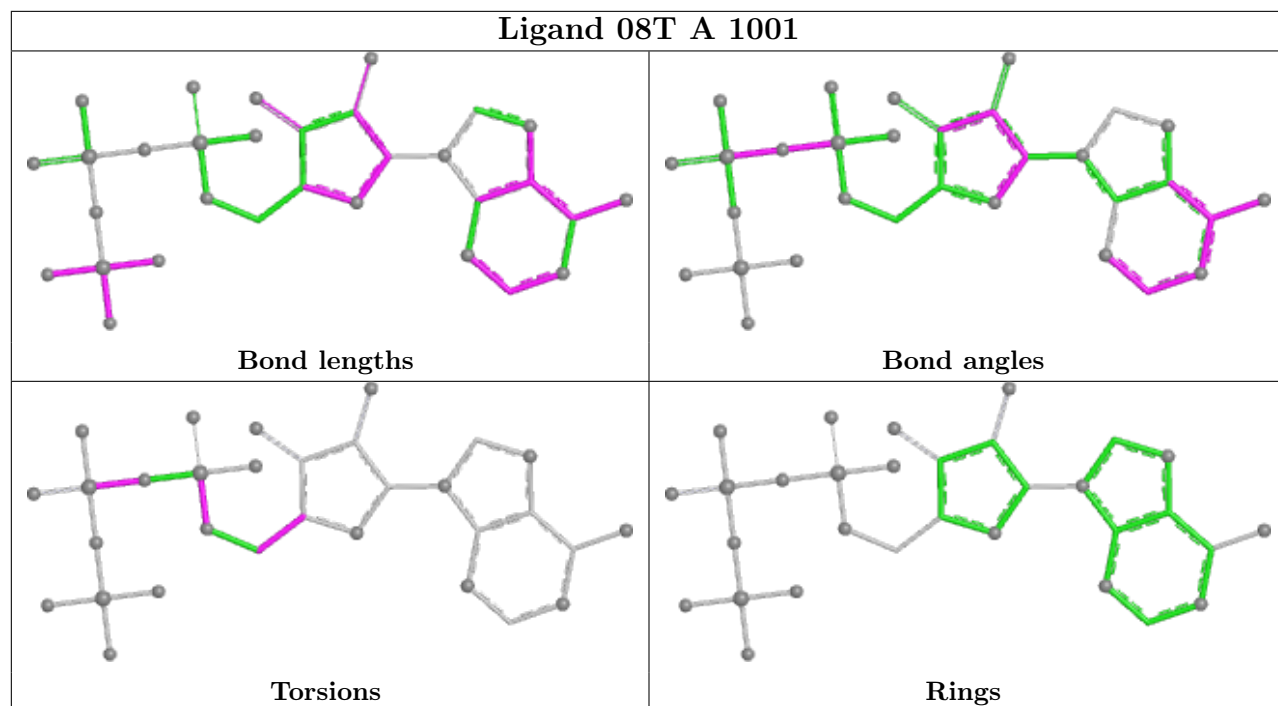
Mol	Chain	Res	Type	Atoms
4	B	1001	08T	PA-O3A-PB-O3B
4	E	1001	08T	PA-O3A-PB-O3B

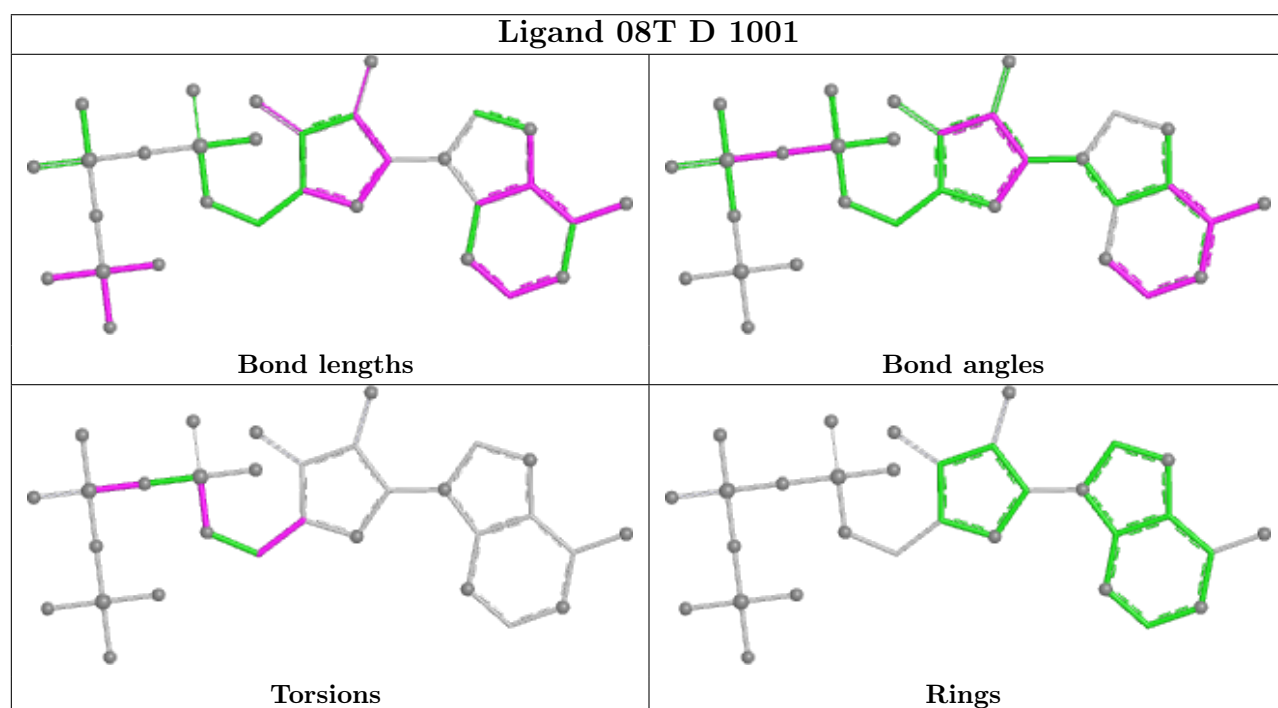
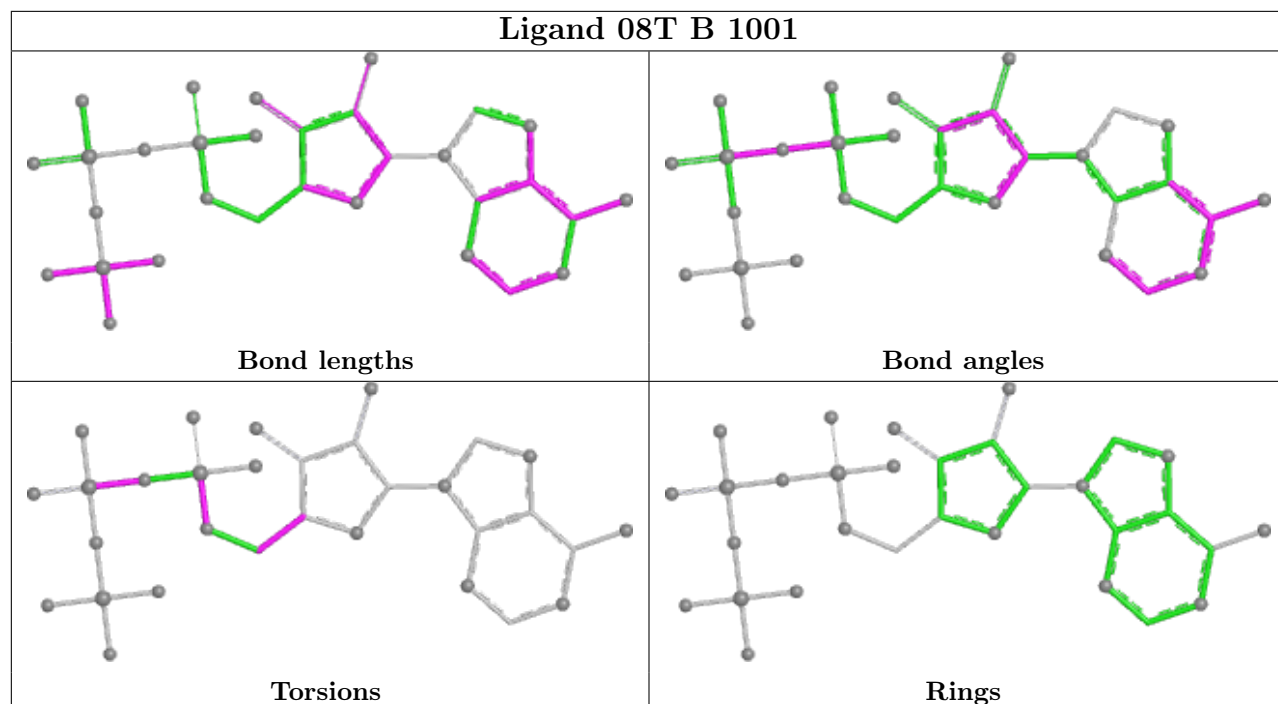
There are no ring outliers.

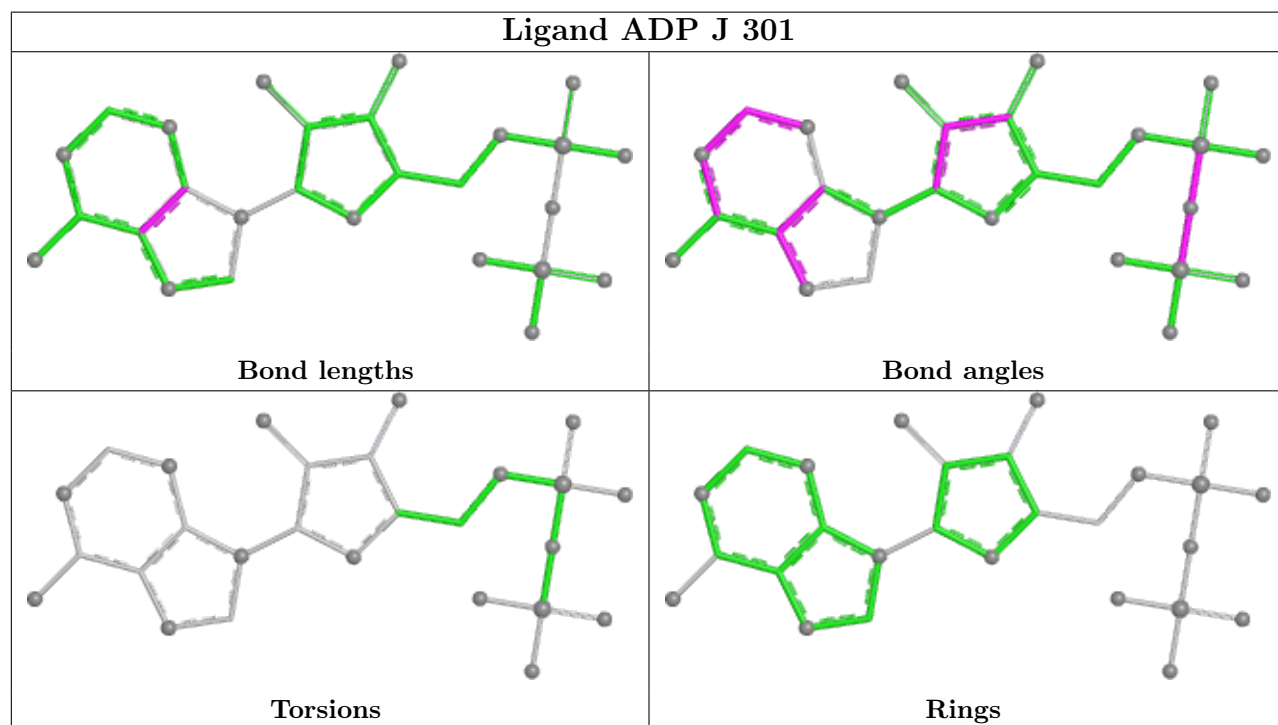
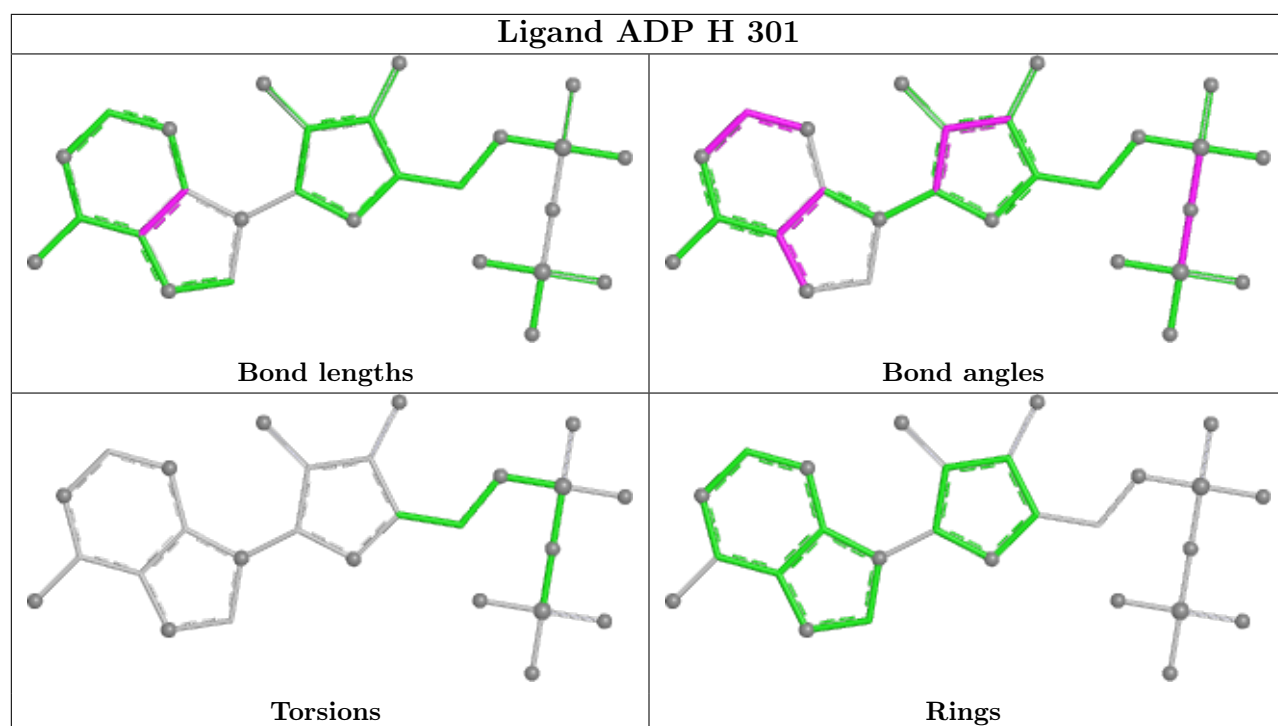
8 monomers are involved in 12 short contacts:

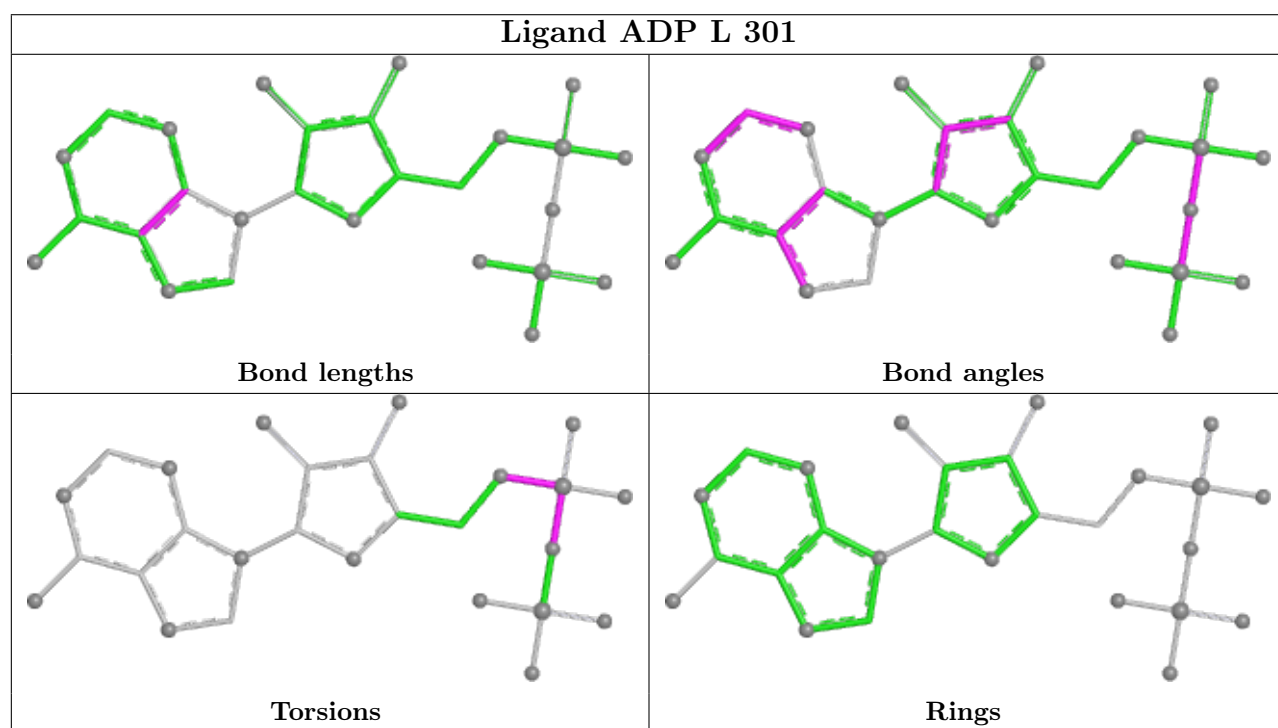
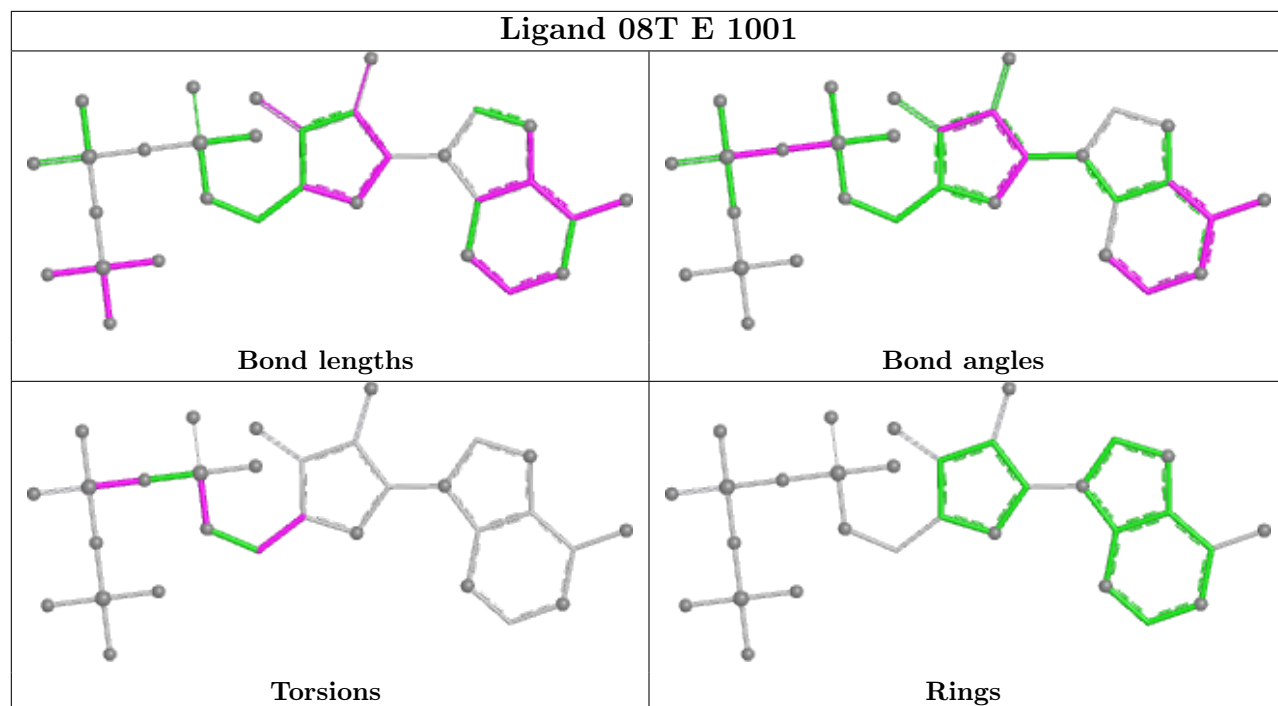
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	I	301	ADP	2	0
4	B	1001	08T	2	0
4	D	1001	08T	1	0
6	H	301	ADP	1	0
6	J	301	ADP	2	0
6	L	301	ADP	1	0
6	K	301	ADP	1	0
6	G	301	ADP	2	0

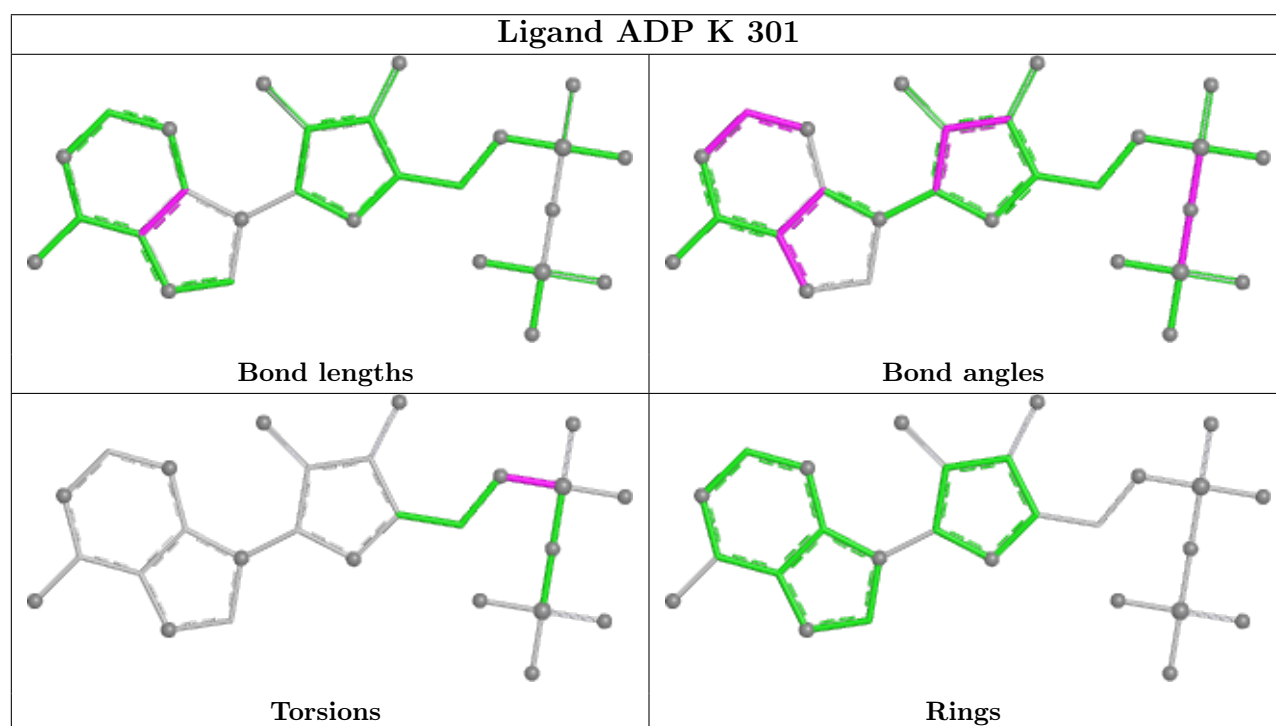
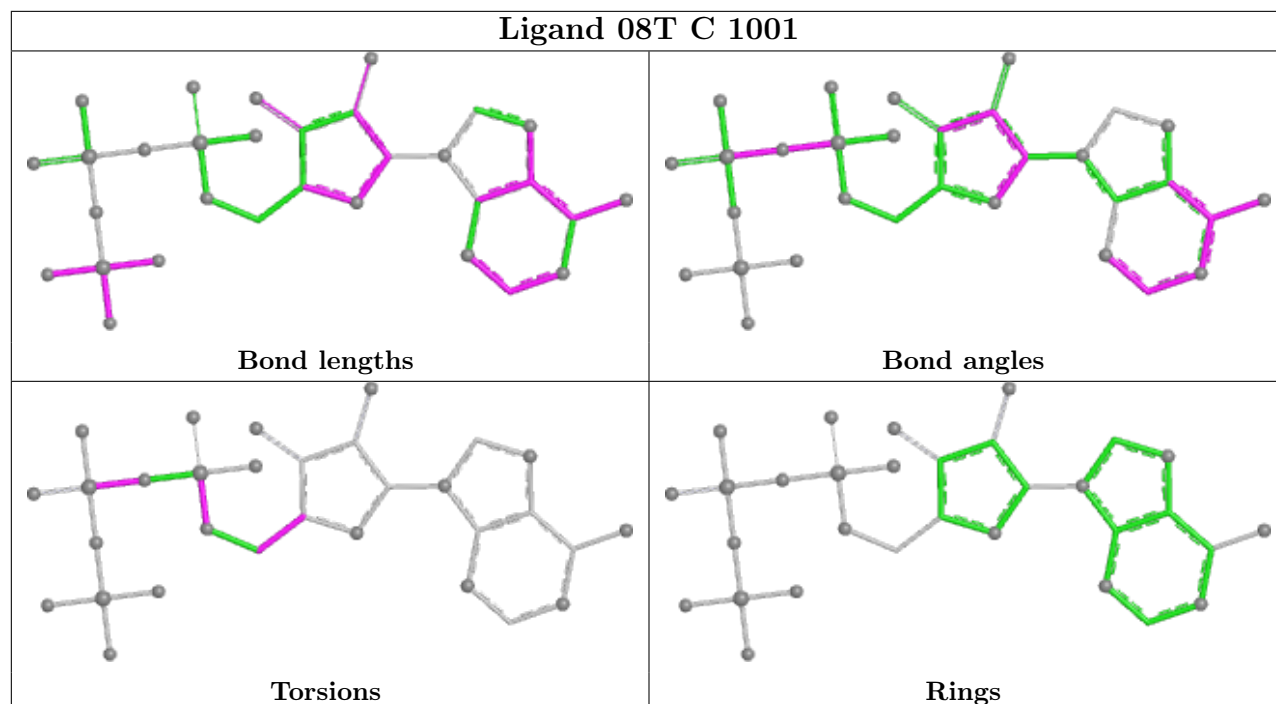
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

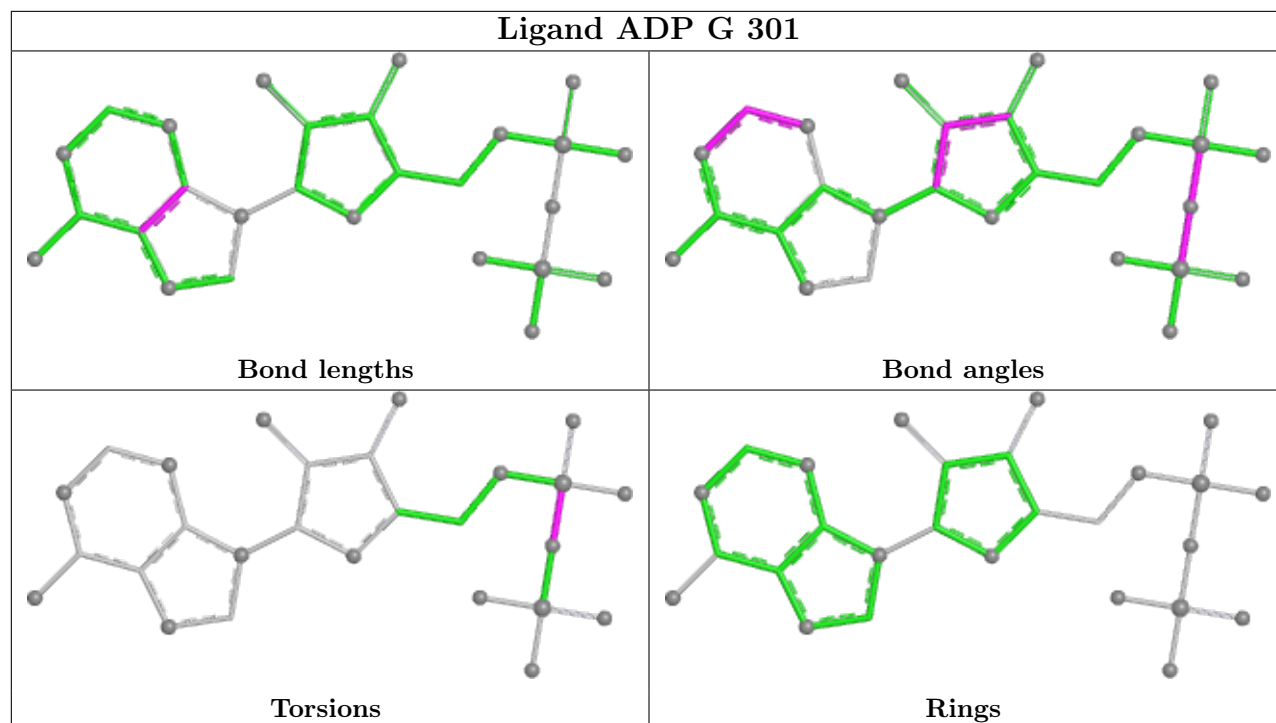












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

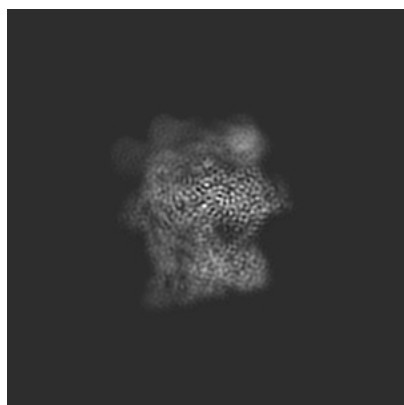
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4538. These allow visual inspection of the internal detail of the map and identification of artifacts.

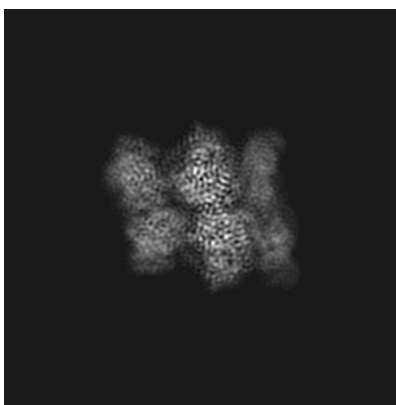
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

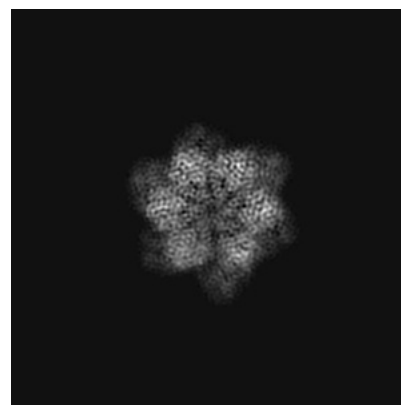
6.1.1 Primary map



X



Y

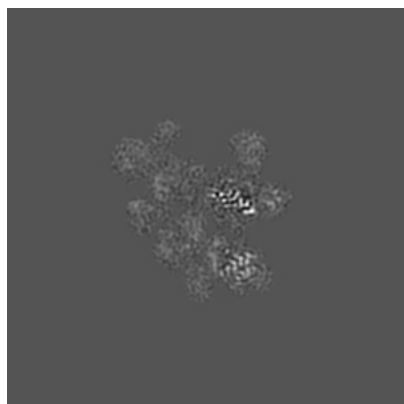


Z

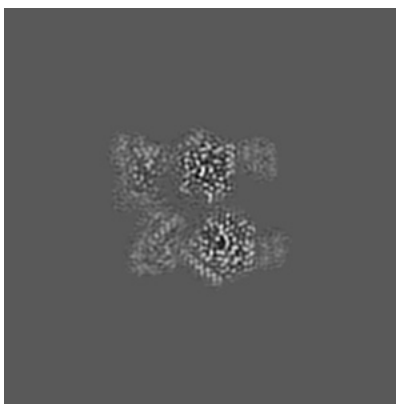
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

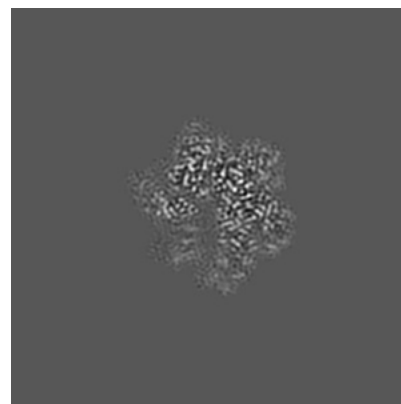
6.2.1 Primary map



X Index: 144



Y Index: 144

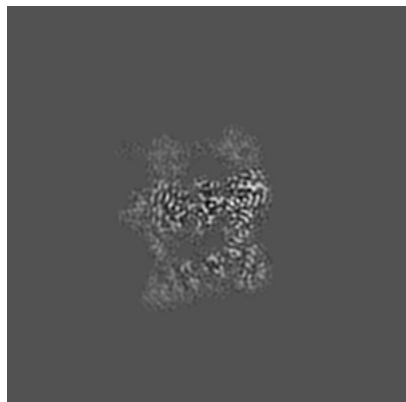


Z Index: 144

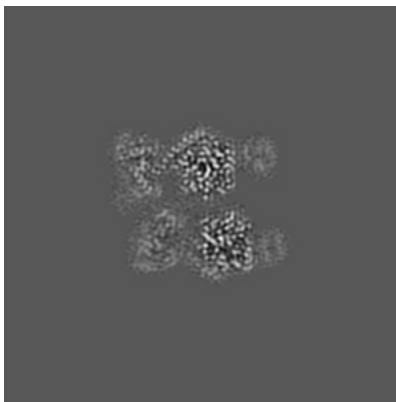
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

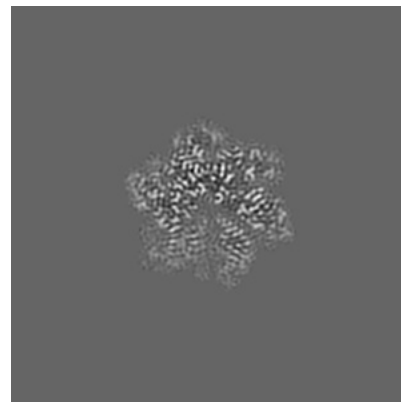
6.3.1 Primary map



X Index: 163



Y Index: 142

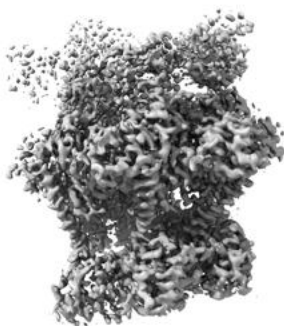


Z Index: 151

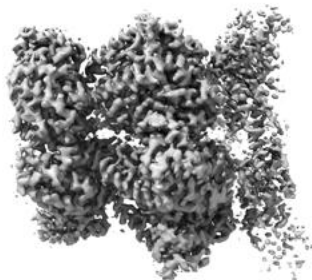
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

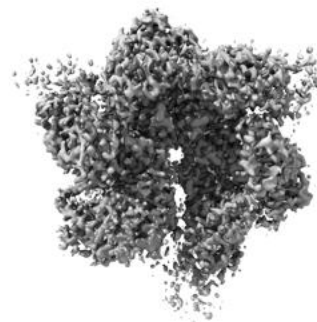
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.05. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

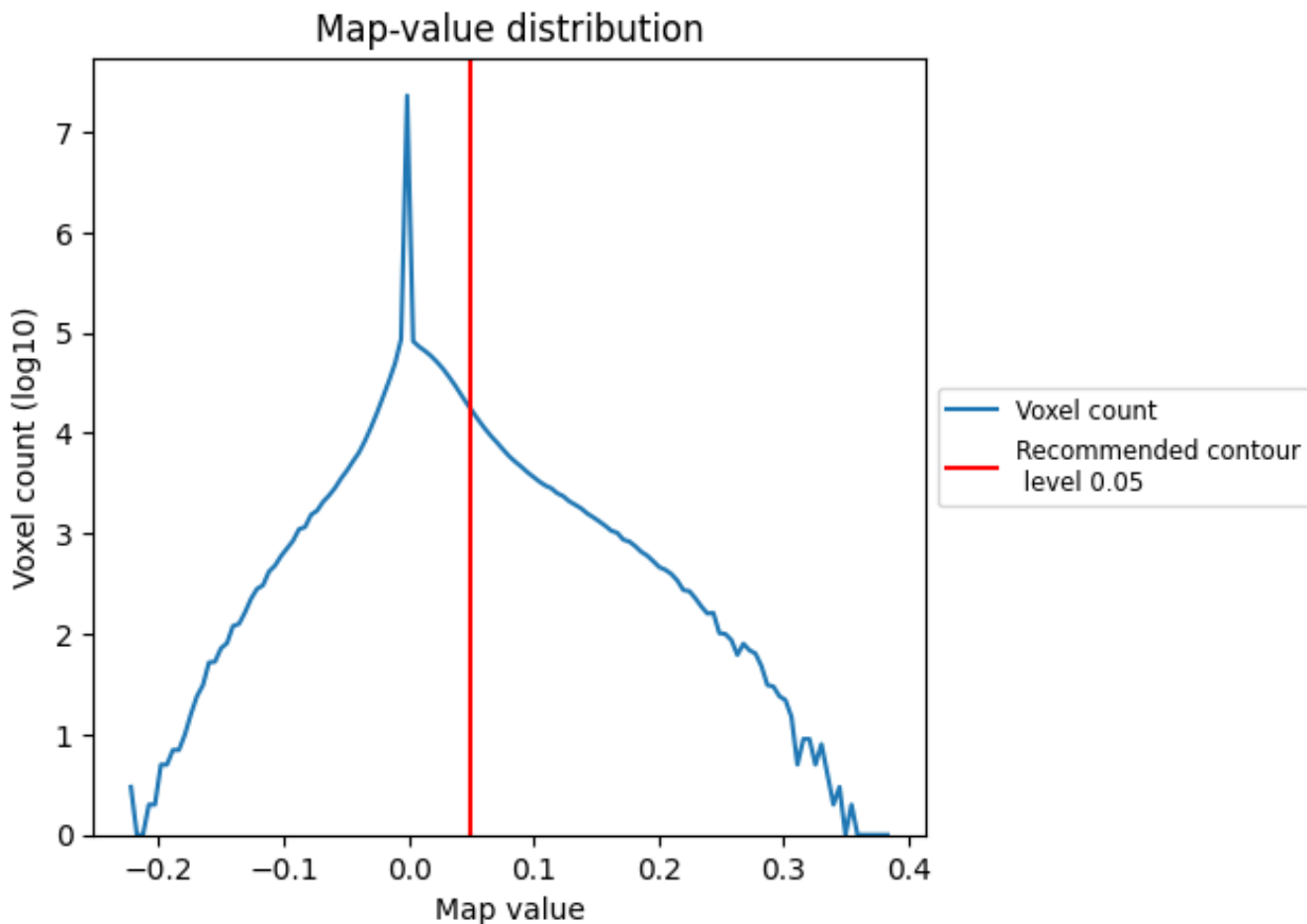
6.5 Mask visualisation

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

7 Map analysis [i](#)

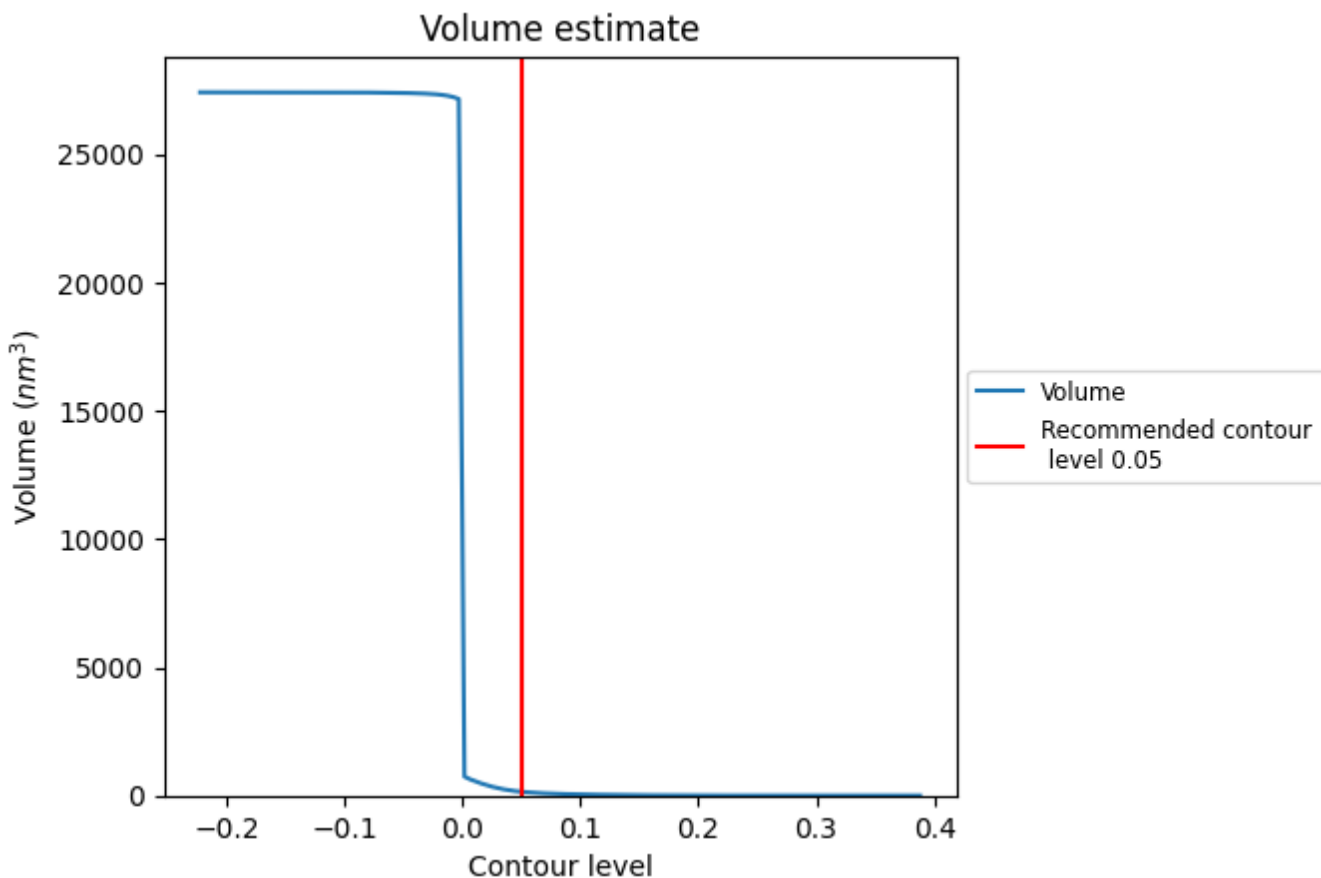
This section contains the results of statistical analysis of the map.

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.

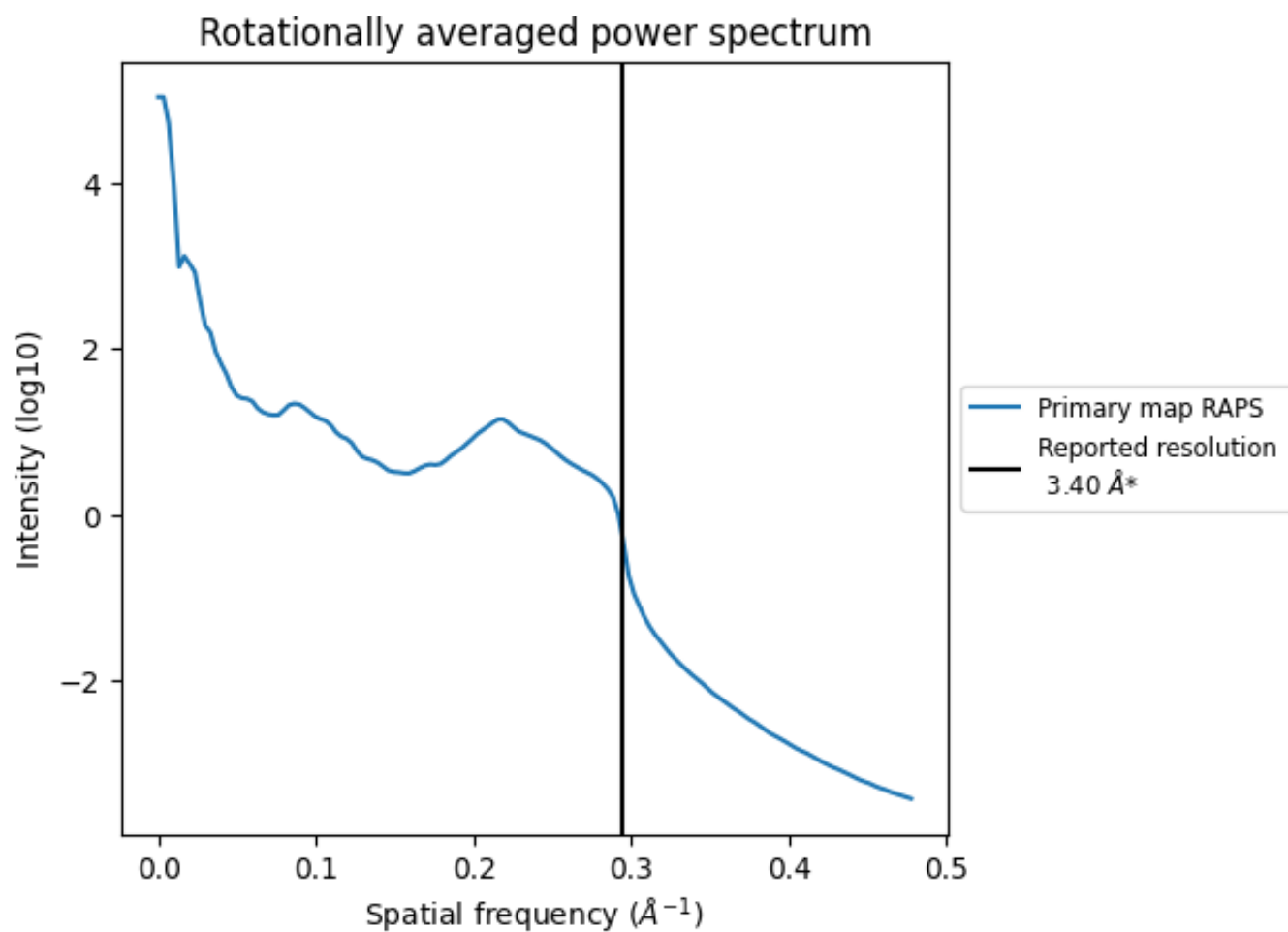
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 149 nm³; this corresponds to an approximate mass of 135 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](#)

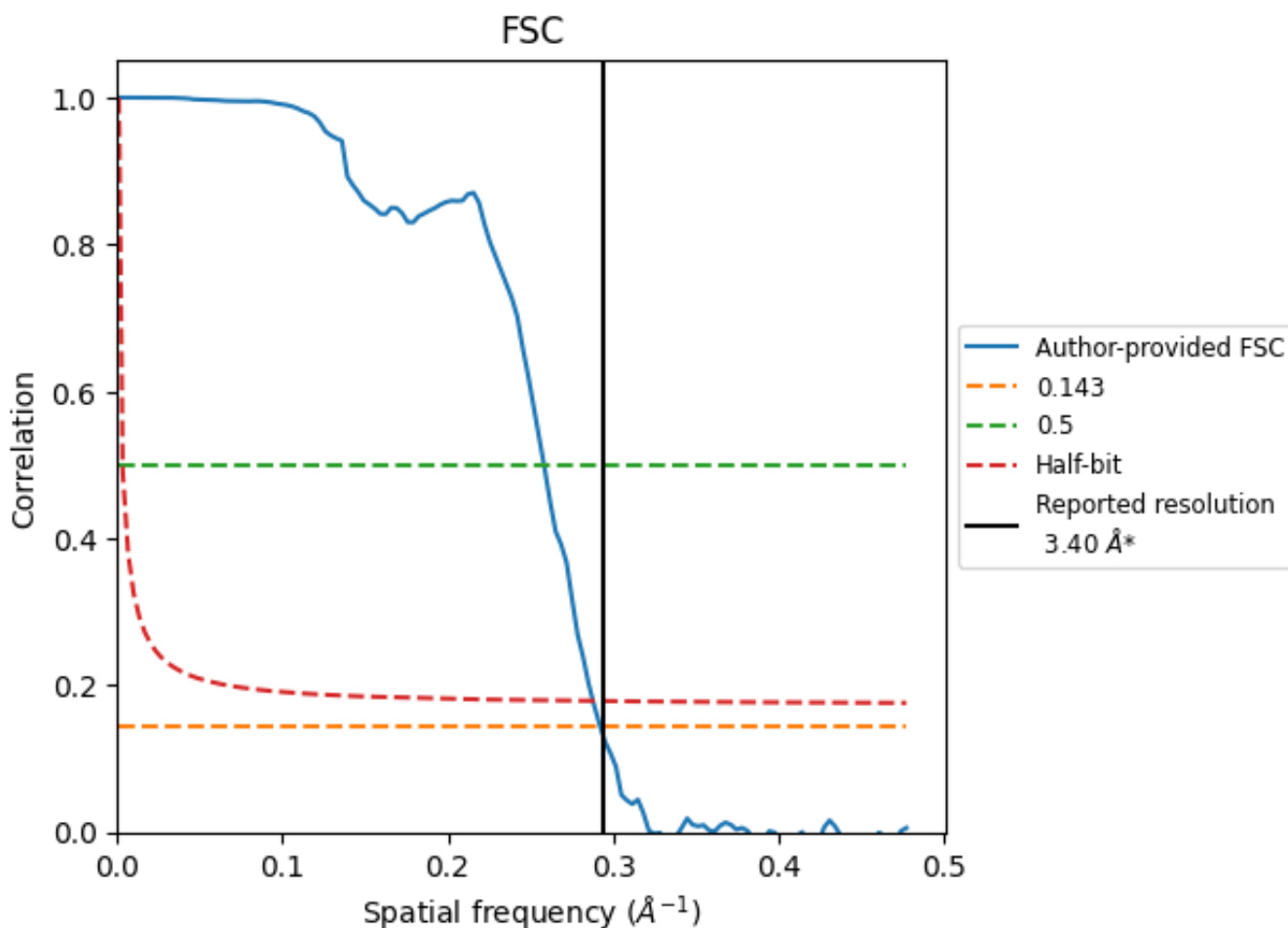


*Reported resolution corresponds to spatial frequency of 0.294\AA^{-1}

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 0.294 Å⁻¹

8.2 Resolution estimates [i](#)

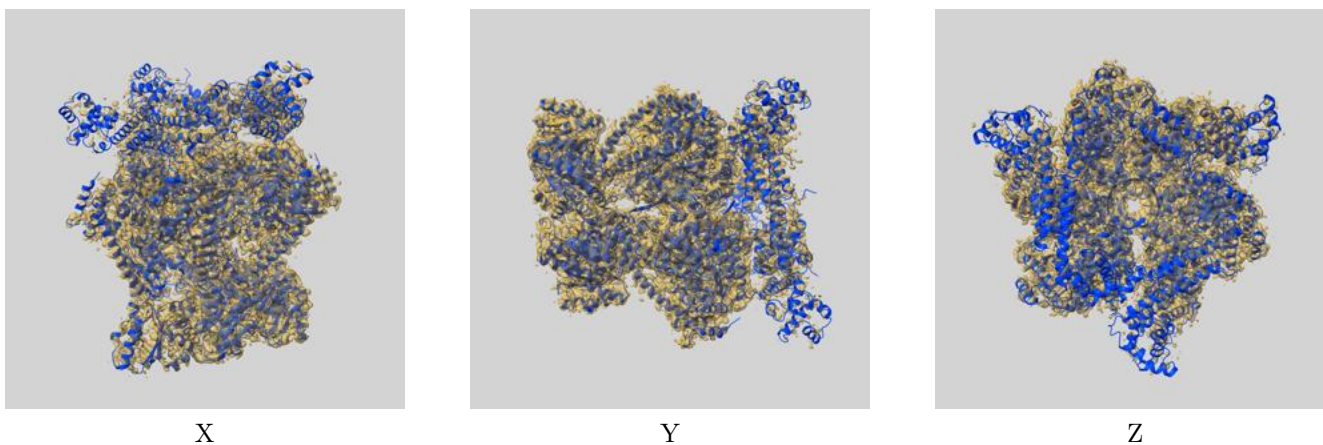
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.42	3.87	3.47
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

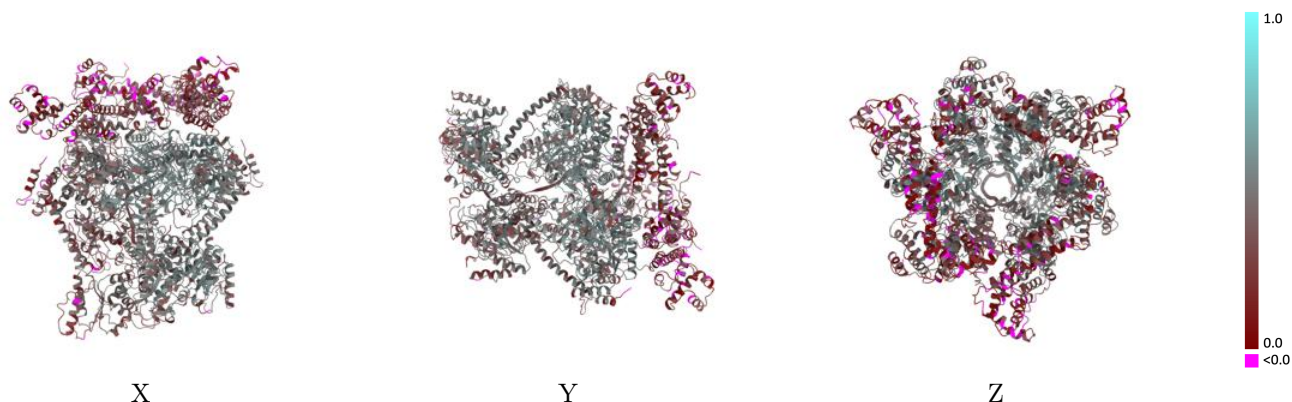
This section contains information regarding the fit between EMDB map EMD-4538 and PDB model 6QEM. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



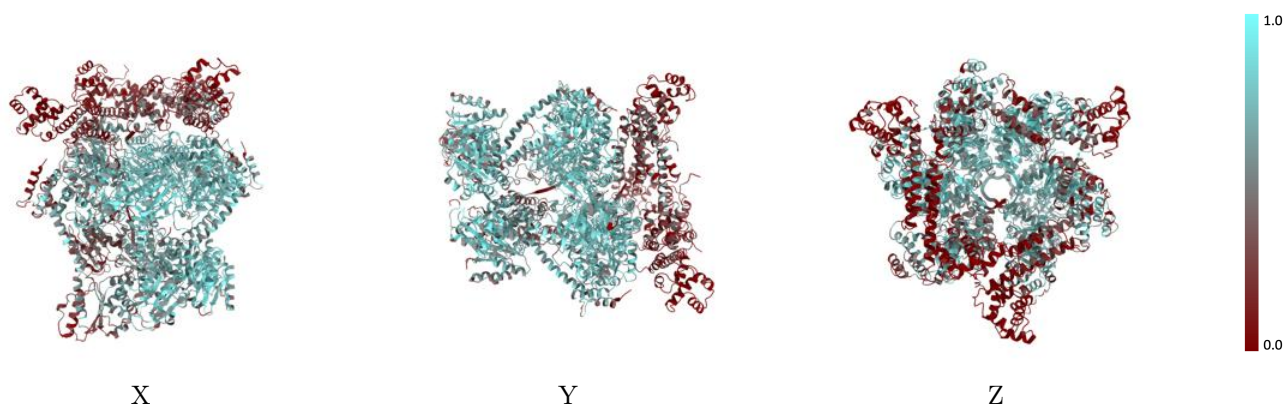
The images above show the 3D surface view of the map at the recommended contour level 0.05 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



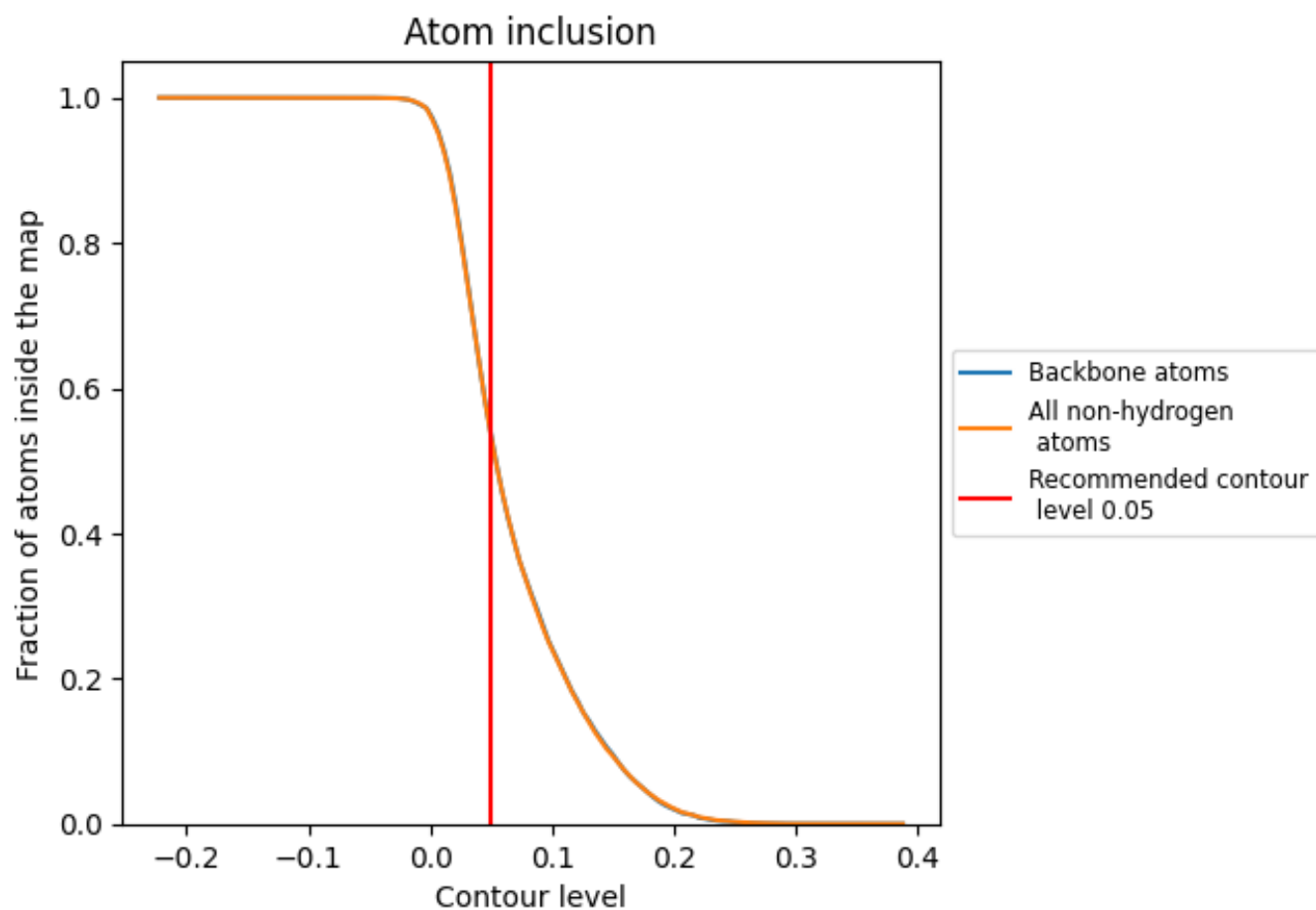
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.05).





























9.4 Atom inclusion [i](#)



At the recommended contour level, 54% of all backbone atoms, 53% 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 (0.05) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5339	 0.3770
A	 0.5790	 0.4070
B	 0.6053	 0.4080
C	 0.5408	 0.3870
D	 0.5209	 0.3710
E	 0.4102	 0.3070
F	 0.5149	 0.3600
G	 0.6640	 0.4360
H	 0.7075	 0.4500
I	 0.6783	 0.4260
J	 0.5892	 0.3730
K	 0.3455	 0.2810
L	 0.4029	 0.3230
M	 0.6192	 0.4180

