



Full wwPDB EM Validation Report ⓘ

Mar 10, 2026 – 12:49 PM UTC

PDB ID : 7CTF / pdb_00007ctf
EMDB ID : EMD-30463
Title : Human origin recognition complex 1-5 State II
Authors : Cheng, J.; Li, N.; Wang, X.; Hu, J.; Zhai, Y.; Gao, N.
Deposited on : 2020-08-18
Resolution : 4.80 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:

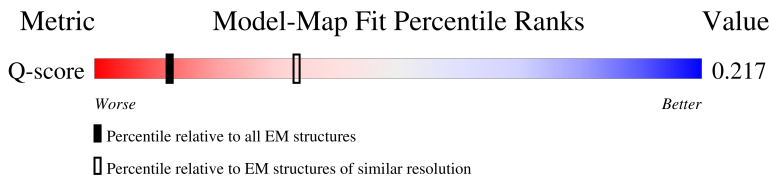
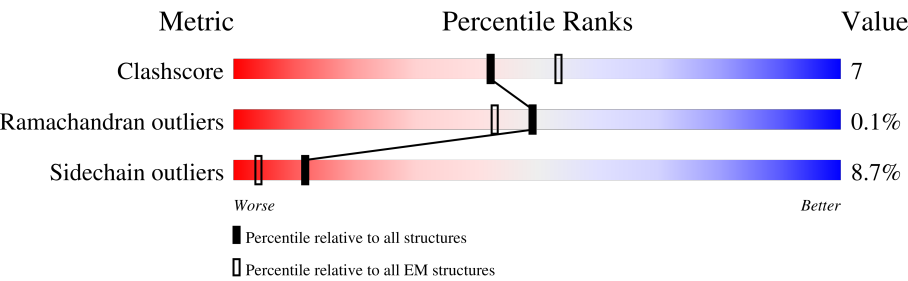
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 4.80 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	1575 (4.30 - 5.30)

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	861	 9% .. 88%
2	B	577	 14% 39% 12% . 48%
3	C	711	 5% 62% 19% . 17%
4	D	436	 6% 71% 21% . 7%

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Mol	Chain	Length	Quality of chain
5	E	435	12% 68% 15% • 14%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 14504 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Origin recognition complex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	102	Total	C	N	O	S	0	0
			805	504	140	155	6		

- Molecule 2 is a protein called Origin recognition complex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	302	Total	C	N	O	S	1	0
			2460	1581	411	462	6		

- Molecule 3 is a protein called Origin recognition complex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	592	Total	C	N	O	S	0	0
			4828	3109	811	881	27		

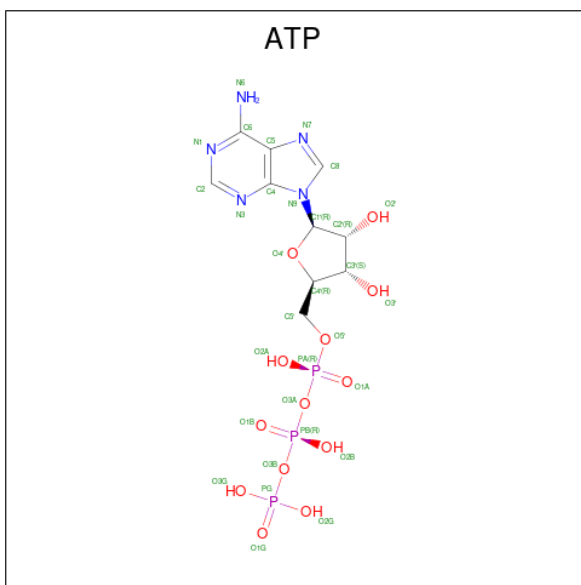
- Molecule 4 is a protein called Origin recognition complex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	406	Total	C	N	O	S	0	0
			3305	2115	571	598	21		

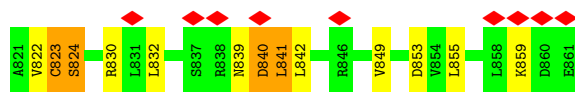
- Molecule 5 is a protein called Origin recognition complex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	373	Total	C	N	O	S	0	0
			3044	1985	504	545	10		

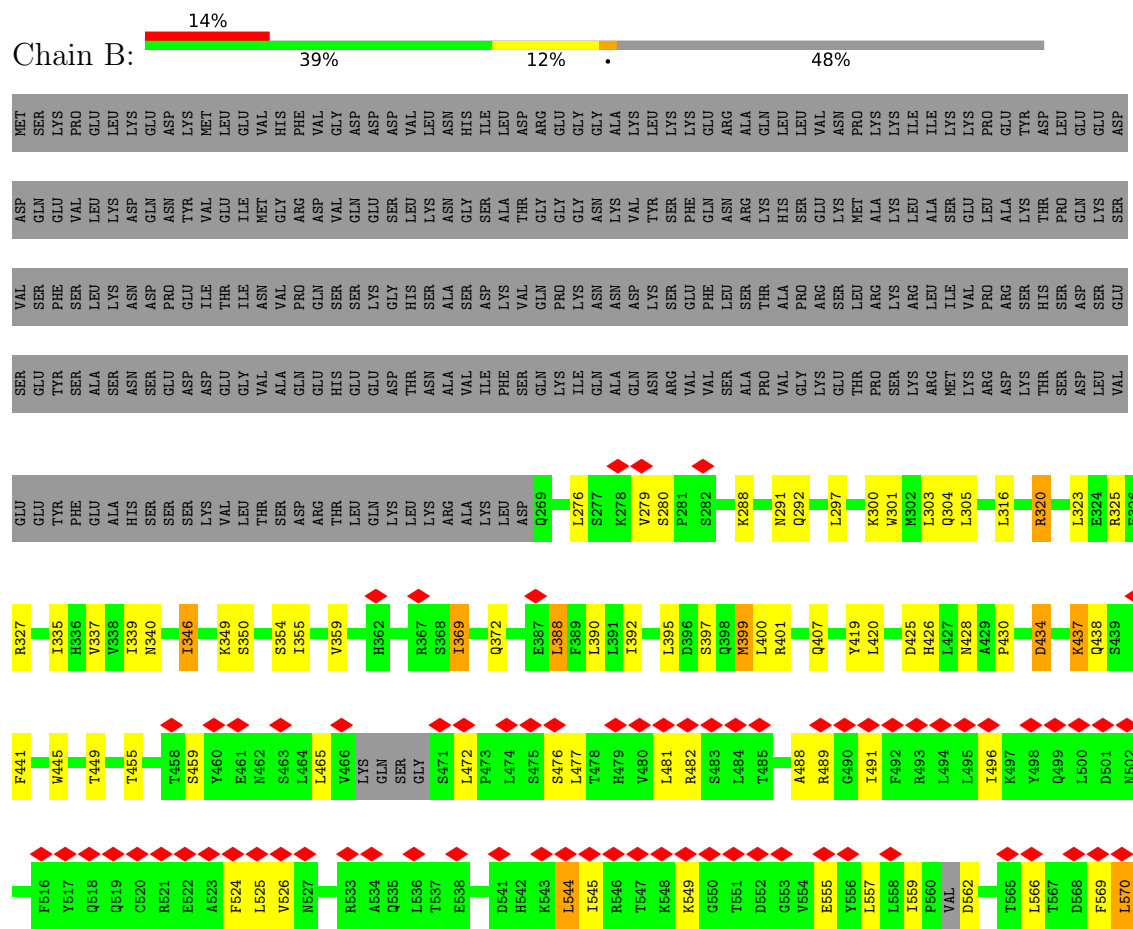
- Molecule 6 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



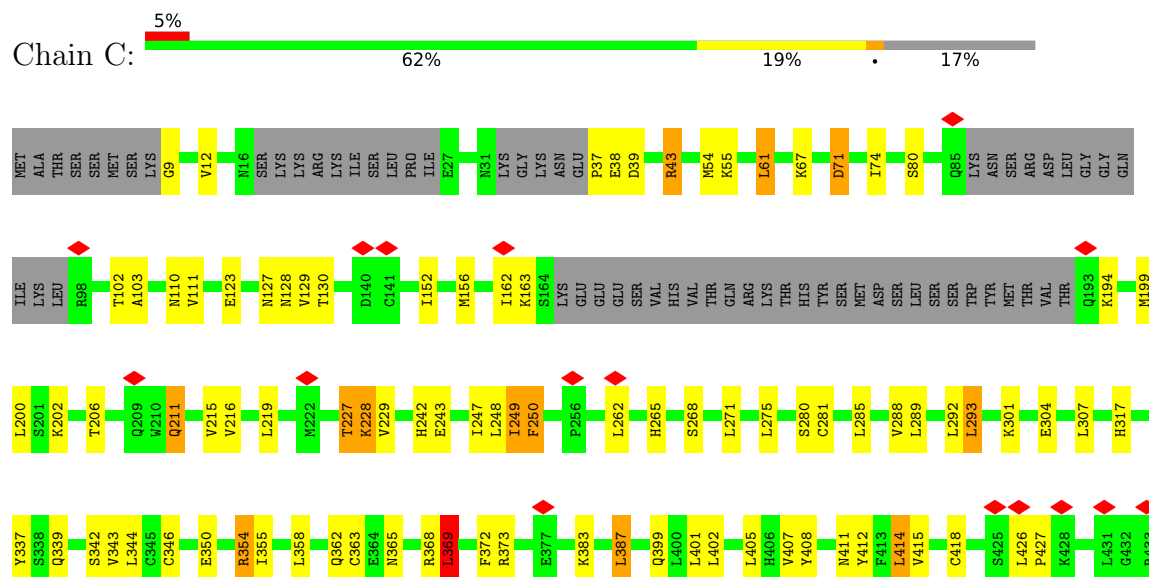
Mol	Chain	Residues	Atoms					AltConf
6	D	1	Total 31	C 10	N 5	O 13	P 3	0
6	E	1	Total 31	C 10	N 5	O 13	P 3	0

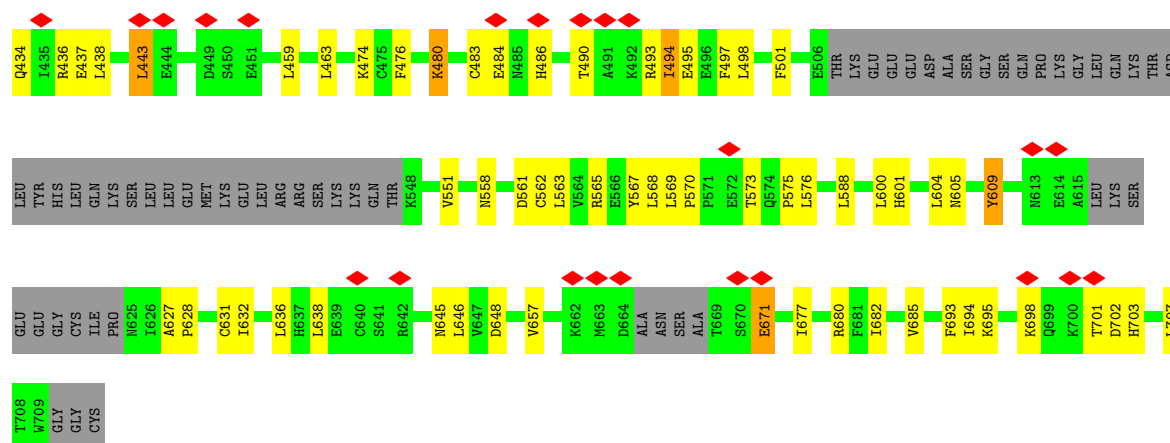


• Molecule 2: Origin recognition complex subunit 2

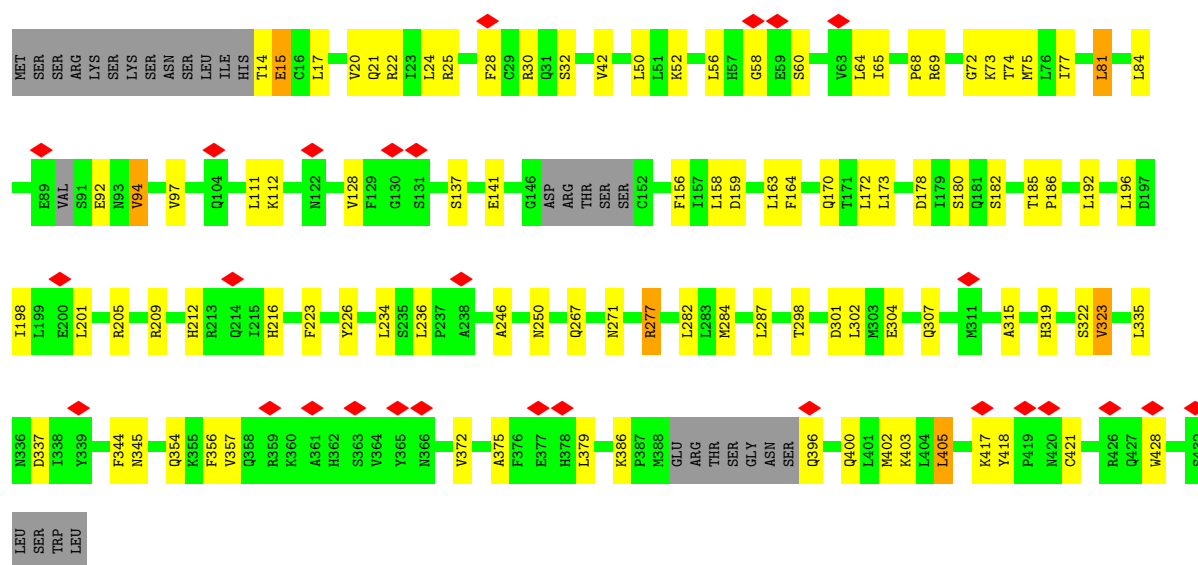


• Molecule 3: Origin recognition complex subunit 3

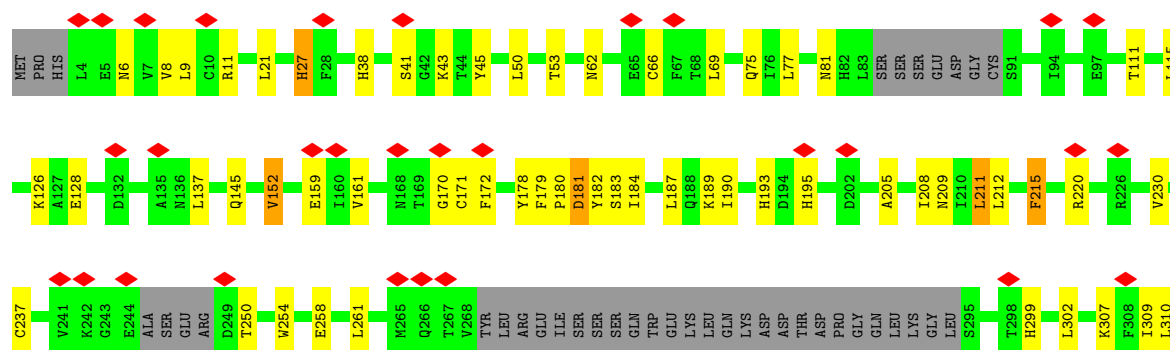




• Molecule 4: Origin recognition complex subunit 4



• Molecule 5: Origin recognition complex subunit 5





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	627000	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 ($e^-/\text{\AA}^2$)	65	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.258	Depositor
Minimum map value	-0.129	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.010	Depositor
Recommended contour level	0.06	Depositor
Map size (Å)	248.58, 248.58, 248.58	wwPDB
Map dimensions	150, 150, 150	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.6572, 1.6572, 1.6572	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

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	0.43	0/816	0.73	1/1102 (0.1%)
2	B	0.43	0/2512	0.70	0/3402
3	C	0.42	1/4927 (0.0%)	0.79	6/6663 (0.1%)
4	D	0.40	0/3366	0.77	1/4534 (0.0%)
5	E	0.46	0/3117	0.79	3/4233 (0.1%)
All	All	0.43	1/14738 (0.0%)	0.77	11/19934 (0.1%)

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
2	B	0	3
3	C	0	9
4	D	0	5
5	E	0	2
All	All	0	19

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	570	PRO	C-N	5.67	1.41	1.34

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	841	LEU	N-CA-C	-7.65	105.11	114.75
4	D	277	ARG	N-CA-C	-7.47	106.11	114.62
3	C	369	LEU	CA-CB-CG	6.03	137.41	116.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	423	VAL	CA-C-N	5.51	130.24	122.46
5	E	423	VAL	C-N-CA	5.51	130.24	122.46
3	C	609	TYR	CA-CB-CG	-5.49	104.02	113.90
3	C	698	LYS	CA-C-N	5.36	131.77	121.54
3	C	698	LYS	C-N-CA	5.36	131.77	121.54
3	C	427	PRO	CA-C-N	5.25	131.57	121.54
3	C	427	PRO	C-N-CA	5.25	131.57	121.54
5	E	254	TRP	CA-CB-CG	5.22	123.53	113.60

There are no chirality outliers.

All (19) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	280	SER	Peptide
2	B	346	ILE	Peptide
2	B	570	LEU	Peptide
3	C	242	HIS	Peptide
3	C	280	SER	Peptide
3	C	337	TYR	Peptide
3	C	39	ASP	Peptide
3	C	609	TYR	Peptide
3	C	627	ALA	Peptide
3	C	628	PRO	Peptide
3	C	693	PHE	Peptide
3	C	701	THR	Peptide
4	D	212	HIS	Peptide
4	D	337	ASP	Peptide
4	D	396	GLN	Peptide
4	D	400	GLN	Peptide
4	D	72	GLY	Peptide
5	E	195	HIS	Peptide
5	E	400	ASP	Peptide

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	A	805	0	811	11	0
2	B	2460	0	2423	41	0
3	C	4828	0	4849	73	0
4	D	3305	0	3352	42	0
5	E	3044	0	3058	37	0
6	D	31	0	12	1	0
6	E	31	0	12	2	0
All	All	14504	0	14517	194	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 7.

All (194) 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)
3:C:561:ASP:O	3:C:565:ARG:HB2	1.69	0.91
3:C:408:TYR:O	3:C:412:TYR:HB2	1.82	0.80
4:D:21:GLN:O	4:D:25:ARG:HB2	1.84	0.77
3:C:288:VAL:O	3:C:292:LEU:HB2	1.86	0.75
3:C:600:LEU:O	3:C:604:LEU:HB2	1.95	0.67
3:C:383:LYS:O	3:C:387:LEU:HB2	1.99	0.63
3:C:365:ASN:HA	3:C:368:ARG:HG2	1.80	0.62
2:B:477:LEU:O	2:B:481:LEU:HB2	1.99	0.62
2:B:288:LYS:O	2:B:292:GLN:HB2	2.02	0.60
4:D:205:ARG:O	4:D:209:ARG:HB2	2.02	0.59
2:B:291:ASN:OD1	2:B:325:ARG:NH1	2.36	0.58
2:B:482:ARG:NH2	5:E:400:ASP:O	2.36	0.58
2:B:549:LYS:HG3	2:B:555:GLU:HG2	1.86	0.57
5:E:182:TYR:O	5:E:220:ARG:NH2	2.37	0.57
3:C:402:LEU:HA	3:C:405:LEU:HD12	1.84	0.57
3:C:200:LEU:HD11	3:C:243:GLU:HB3	1.88	0.56
3:C:483:CYS:SG	3:C:484:GLU:N	2.78	0.56
5:E:77:LEU:O	5:E:81:ASN:ND2	2.38	0.56
5:E:11:ARG:NH1	5:E:182:TYR:OH	2.38	0.56
5:E:208:ILE:HG13	5:E:211:LEU:HD23	1.88	0.56
3:C:285:LEU:HA	3:C:288:VAL:HG12	1.87	0.55
2:B:472:LEU:HD22	2:B:544:LEU:HD21	1.88	0.55
4:D:22:ARG:HG2	5:E:27:HIS:HB3	1.87	0.55
4:D:246:ALA:O	4:D:250:ASN:ND2	2.40	0.55
5:E:11:ARG:NH1	5:E:41:SER:O	2.40	0.55
5:E:66:CYS:SG	5:E:75:GLN:NE2	2.76	0.54
3:C:401:LEU:HD21	3:C:575:PRO:HB2	1.88	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:340:ASN:ND2	3:C:9:GLY:O	2.40	0.54
3:C:38:GLU:OE2	3:C:43:ARG:NH1	2.41	0.54
3:C:646:LEU:HD13	3:C:702:ASP:HB3	1.88	0.54
2:B:300:LYS:O	2:B:304:GLN:HB2	2.08	0.54
4:D:267:GLN:O	4:D:271:ASN:ND2	2.41	0.54
3:C:61:LEU:HD21	3:C:288:VAL:HG23	1.89	0.54
3:C:227:THR:HG23	3:C:228:LYS:HD2	1.90	0.54
3:C:411:ASN:ND2	3:C:490:THR:OG1	2.41	0.53
4:D:159:ASP:HA	4:D:192:LEU:HB2	1.89	0.53
5:E:171:CYS:SG	5:E:172:PHE:N	2.81	0.53
3:C:601:HIS:O	3:C:605:ASN:ND2	2.40	0.53
4:D:58:GLY:HA2	4:D:186:PRO:HG3	1.89	0.53
3:C:645:ASN:HA	3:C:703:HIS:HA	1.89	0.53
2:B:337:VAL:HG13	3:C:12:VAL:HG22	1.91	0.52
4:D:386:LYS:HB3	4:D:403:LYS:HB3	1.92	0.52
5:E:43:LYS:NZ	6:E:901:ATP:O2G	2.42	0.52
1:A:855:LEU:O	1:A:859:LYS:HB2	2.09	0.52
2:B:320:ARG:HA	2:B:323:LEU:HD12	1.90	0.52
3:C:436:ARG:NH1	3:C:437:GLU:OE2	2.43	0.52
4:D:30:ARG:NH1	4:D:30:ARG:O	2.41	0.52
3:C:346:CYS:HB3	3:C:350:GLU:HB2	1.90	0.51
1:A:855:LEU:O	1:A:859:LYS:CB	2.59	0.51
2:B:359:VAL:HG11	2:B:388:LEU:HD22	1.92	0.51
2:B:355:ILE:HD11	2:B:388:LEU:HD21	1.93	0.51
3:C:202:LYS:O	3:C:206:THR:OG1	2.29	0.51
4:D:14:THR:OG1	4:D:15:GLU:N	2.43	0.51
2:B:369:ILE:HA	2:B:372:GLN:HE21	1.75	0.51
1:A:764:ILE:HD11	1:A:853:ASP:HB3	1.93	0.51
4:D:73:LYS:HB3	4:D:192:LEU:HD22	1.93	0.50
4:D:315:ALA:O	4:D:319:HIS:HB3	2.12	0.50
3:C:434:GLN:OE1	3:C:436:ARG:NH2	2.45	0.50
5:E:45:TYR:HB2	6:E:901:ATP:H5'2	1.94	0.50
4:D:223:PHE:HA	4:D:226:TYR:HB3	1.94	0.50
3:C:494:ILE:O	3:C:498:LEU:HB2	2.12	0.49
2:B:496:ILE:HG21	2:B:570:LEU:HD13	1.92	0.49
2:B:397:SER:O	2:B:401:ARG:NE	2.43	0.49
4:D:60:SER:OG	4:D:180:SER:O	2.31	0.49
5:E:145:GLN:NE2	5:E:152:VAL:O	2.45	0.49
4:D:77:ILE:O	4:D:81:LEU:HB2	2.13	0.49
3:C:480:LYS:HA	3:C:483:CYS:HB3	1.94	0.49
3:C:368:ARG:O	3:C:373:ARG:NH2	2.46	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:277:ARG:NH2	6:D:901:ATP:O2B	2.46	0.49
2:B:570:LEU:HA	2:B:573[A]:GLU:HB2	1.93	0.49
5:E:258:GLU:HA	5:E:261:LEU:HB2	1.95	0.49
3:C:415:VAL:HA	3:C:418:CYS:HB3	1.95	0.48
5:E:126:LYS:NZ	5:E:128:GLU:OE2	2.46	0.48
4:D:137:SER:O	4:D:141:GLU:HB2	2.13	0.48
4:D:68:PRO:O	4:D:73:LYS:NZ	2.39	0.48
5:E:428:ILE:HA	5:E:431:LEU:HD23	1.96	0.48
5:E:187:LEU:HB3	5:E:212:LEU:HD21	1.96	0.48
3:C:289:LEU:HD22	3:C:436:ARG:HG2	1.96	0.47
3:C:369:LEU:HD12	3:C:372:PHE:H	1.79	0.47
2:B:455:THR:O	2:B:459:SER:HB3	2.14	0.47
2:B:279:VAL:O	3:C:680:ARG:NH2	2.47	0.47
2:B:430:PRO:HB3	2:B:445:TRP:HH2	1.80	0.47
4:D:69:ARG:NH1	5:E:170:GLY:O	2.48	0.47
3:C:414:LEU:HD13	3:C:486:HIS:HB2	1.96	0.47
4:D:298:THR:OG1	4:D:301:ASP:N	2.45	0.46
5:E:189:LYS:O	5:E:193:HIS:ND1	2.39	0.46
2:B:395:LEU:HA	2:B:400:LEU:HD23	1.97	0.46
3:C:110:ASN:OD1	3:C:110:ASN:N	2.41	0.46
4:D:170:GLN:HB3	4:D:173:LEU:HD12	1.97	0.46
5:E:205:ALA:O	5:E:209:ASN:HB2	2.15	0.46
3:C:54:MET:HE3	3:C:54:MET:HB2	1.80	0.46
3:C:202:LYS:HB3	3:C:202:LYS:HE3	1.72	0.46
3:C:476:PHE:O	3:C:480:LYS:HB2	2.15	0.46
2:B:488:ALA:HA	2:B:491:ILE:HD12	1.98	0.46
3:C:498:LEU:HA	3:C:501:PHE:HB2	1.98	0.46
2:B:316:LEU:HD13	3:C:600:LEU:HD22	1.96	0.46
3:C:123:GLU:OE2	3:C:127:ASN:ND2	2.48	0.46
3:C:304:GLU:HB2	3:C:443:LEU:HD22	1.98	0.46
3:C:37:PRO:O	3:C:362:GLN:NE2	2.49	0.46
3:C:354:ARG:HE	3:C:354:ARG:HB2	1.56	0.46
5:E:6:ASN:OD1	5:E:9:LEU:N	2.49	0.46
2:B:562:ASP:OD1	2:B:562:ASP:N	2.47	0.45
3:C:67:LYS:O	3:C:71:ASP:HB2	2.16	0.45
2:B:407:GLN:HG3	2:B:437:LYS:HD2	1.97	0.45
3:C:563:LEU:HA	3:C:567:TYR:HB3	1.97	0.45
5:E:356:PRO:HB3	5:E:396:VAL:HG21	1.98	0.45
4:D:322:SER:OG	4:D:323:VAL:N	2.50	0.45
2:B:434:ASP:O	2:B:438:GLN:N	2.48	0.45
3:C:163:LYS:HB3	3:C:163:LYS:HE3	1.73	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:496:ILE:HD11	2:B:566:LEU:HD22	1.98	0.44
4:D:375:ALA:O	4:D:379:LEU:HB2	2.17	0.44
3:C:695:LYS:HB2	3:C:707:LEU:HD22	1.98	0.44
4:D:178:ASP:O	4:D:182:SER:HB3	2.17	0.44
5:E:50:LEU:O	5:E:53:THR:OG1	2.36	0.44
2:B:512:SER:OG	2:B:513:PHE:N	2.50	0.44
4:D:25:ARG:HE	4:D:284:MET:HE1	1.82	0.44
2:B:489:ARG:NE	2:B:573[A]:GLU:OE1	2.48	0.44
3:C:671:GLU:H	3:C:671:GLU:HG3	1.52	0.44
3:C:211:GLN:O	3:C:211:GLN:NE2	2.50	0.44
2:B:300:LYS:HE3	2:B:300:LYS:HB2	1.78	0.44
5:E:211:LEU:O	5:E:215:PHE:HB2	2.17	0.44
1:A:830:ARG:HA	1:A:830:ARG:HD3	1.83	0.44
4:D:20:VAL:HG23	4:D:236:LEU:HD21	2.00	0.43
3:C:216:VAL:HG12	3:C:247:ILE:HB	2.00	0.43
3:C:494:ILE:HD13	3:C:494:ILE:HA	1.82	0.43
3:C:55:LYS:HE2	3:C:55:LYS:HB3	1.81	0.43
3:C:343:VAL:HG13	3:C:344:LEU:HG	2.00	0.43
5:E:410:THR:O	5:E:410:THR:OG1	2.34	0.43
3:C:474:LYS:HD3	3:C:474:LYS:HA	1.86	0.43
3:C:493:ARG:O	3:C:497:PHE:HB2	2.18	0.43
5:E:9:LEU:HD23	5:E:9:LEU:HA	1.84	0.43
1:A:823:CYS:SG	1:A:824:SER:N	2.91	0.43
3:C:293:LEU:O	3:C:301:LYS:NZ	2.42	0.43
4:D:65:ILE:HA	4:D:216:HIS:HB2	2.01	0.43
5:E:11:ARG:HD3	5:E:180:PRO:HD2	2.00	0.43
5:E:302:LEU:O	5:E:307:LYS:NZ	2.39	0.43
2:B:320:ARG:H	2:B:320:ARG:HG3	1.44	0.43
3:C:682:ILE:HA	3:C:685:VAL:HG12	1.99	0.43
2:B:545:ILE:HD11	2:B:557:LEU:HD13	2.01	0.42
3:C:558:ASN:O	3:C:562:CYS:HB2	2.19	0.42
5:E:178:TYR:OH	5:E:181:ASP:OD1	2.35	0.42
1:A:786:ARG:HA	1:A:786:ARG:HD2	1.85	0.42
2:B:472:LEU:HD21	2:B:476:SER:HB3	2.01	0.42
3:C:74:ILE:HD13	3:C:128:ASN:HB2	2.00	0.42
3:C:638:LEU:HD12	3:C:638:LEU:HA	1.88	0.42
4:D:52:LYS:O	4:D:56:LEU:HB2	2.19	0.42
4:D:92:GLU:HB3	4:D:94:VAL:HG12	2.01	0.42
2:B:349:LYS:HB3	2:B:349:LYS:HE2	1.90	0.42
4:D:112:LYS:HD3	4:D:112:LYS:HA	1.88	0.42
4:D:156:PHE:HB3	4:D:158:LEU:HD13	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:317:HIS:O	5:E:383:GLN:NE2	2.53	0.42
3:C:265:HIS:HA	3:C:268:SER:HB3	2.01	0.42
3:C:426:LEU:HD22	3:C:463:LEU:HD13	2.02	0.42
5:E:38:HIS:O	5:E:43:LYS:NZ	2.45	0.41
4:D:345:ASN:OD1	4:D:345:ASN:N	2.51	0.41
3:C:408:TYR:OH	3:C:568:LEU:O	2.38	0.41
4:D:304:GLU:HA	4:D:307:GLN:HB2	2.03	0.41
2:B:301:TRP:O	2:B:305:LEU:HB2	2.19	0.41
1:A:797:GLN:O	1:A:800:SER:OG	2.31	0.41
1:A:799:TYR:OH	1:A:814:PRO:O	2.34	0.41
3:C:288:VAL:O	3:C:292:LEU:CB	2.62	0.41
3:C:383:LYS:HB2	3:C:387:LEU:HD12	2.02	0.41
4:D:196:LEU:HD23	4:D:196:LEU:HA	1.89	0.41
5:E:319:ASN:ND2	5:E:431:LEU:O	2.54	0.41
3:C:152:ILE:HD12	3:C:152:ILE:HA	1.93	0.41
5:E:187:LEU:HD23	5:E:212:LEU:HD11	2.03	0.41
2:B:339:ILE:HB	2:B:392:ILE:HG12	2.03	0.41
3:C:355:ILE:HG21	3:C:399:GLN:HG3	2.02	0.41
4:D:198:ILE:HD12	4:D:198:ILE:HA	1.99	0.41
4:D:315:ALA:O	4:D:319:HIS:CB	2.69	0.41
4:D:356:PHE:CZ	4:D:428:TRP:HB2	2.56	0.41
5:E:69:LEU:HD12	5:E:137:LEU:HD22	2.03	0.41
5:E:205:ALA:HA	5:E:208:ILE:HG22	2.02	0.41
1:A:839:ASN:OD1	1:A:839:ASN:N	2.51	0.41
1:A:840:ASP:HB3	4:D:405:LEU:HD12	2.03	0.41
2:B:399:MET:HE3	2:B:399:MET:HB2	1.70	0.41
5:E:431:LEU:HD12	5:E:432:TYR:HB3	2.03	0.41
1:A:820:MET:HA	1:A:823:CYS:HB3	2.03	0.40
2:B:320:ARG:HH12	2:B:455:THR:H	1.69	0.40
2:B:346:ILE:HD13	2:B:346:ILE:HA	1.93	0.40
3:C:426:LEU:HD13	3:C:459:LEU:HD23	2.02	0.40
4:D:418:TYR:HB3	4:D:421:CYS:HB2	2.03	0.40
2:B:428:ASN:HD22	5:E:403:ASP:HA	1.85	0.40
3:C:219:LEU:HB2	3:C:250:PHE:HB3	2.04	0.40
4:D:354:GLN:HA	4:D:357:VAL:HG12	2.03	0.40
5:E:9:LEU:HD13	5:E:190:ILE:HB	2.04	0.40
2:B:305:LEU:HG	2:B:419:TYR:HB3	2.02	0.40
3:C:103:ALA:HB3	3:C:249:ILE:HG22	2.03	0.40
3:C:156:MET:HE1	3:C:202:LYS:HG3	2.02	0.40
3:C:495:GLU:HA	3:C:498:LEU:HB3	2.03	0.40
4:D:75:MET:HE3	4:D:75:MET:HB3	1.84	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:632:ILE:O	3:C:636:LEU:HB2	2.21	0.40
4:D:344:PHE:O	4:D:402:MET:N	2.44	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	100/861 (12%)	97 (97%)	3 (3%)	0	100	100
2	B	296/577 (51%)	283 (96%)	13 (4%)	0	100	100
3	C	576/711 (81%)	534 (93%)	41 (7%)	1 (0%)	43	78
4	D	398/436 (91%)	368 (92%)	30 (8%)	0	100	100
5	E	363/435 (83%)	331 (91%)	32 (9%)	0	100	100
All	All	1733/3020 (57%)	1613 (93%)	119 (7%)	1 (0%)	49	83

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	694	ILE

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	92/766 (12%)	81 (88%)	11 (12%)	5	18
2	B	276/529 (52%)	251 (91%)	25 (9%)	9	28
3	C	546/659 (83%)	498 (91%)	48 (9%)	9	29
4	D	374/403 (93%)	345 (92%)	29 (8%)	11	32
5	E	341/399 (86%)	312 (92%)	29 (8%)	10	29
All	All	1629/2756 (59%)	1487 (91%)	142 (9%)	12	29

All (142) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	817	SER
1	A	818	GLU
1	A	820	MET
1	A	822	VAL
1	A	823	CYS
1	A	824	SER
1	A	832	LEU
1	A	840	ASP
1	A	841	LEU
1	A	842	LEU
1	A	849	VAL
2	B	276	LEU
2	B	297	LEU
2	B	303	LEU
2	B	320	ARG
2	B	327	ARG
2	B	335	ILE
2	B	350	SER
2	B	354	SER
2	B	369	ILE
2	B	388	LEU
2	B	390	LEU
2	B	399	MET
2	B	420	LEU
2	B	425	ASP
2	B	426	HIS
2	B	434	ASP
2	B	437	LYS
2	B	441	PHE
2	B	449	THR
2	B	465	LEU

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Mol	Chain	Res	Type
2	B	524	PHE
2	B	525	LEU
2	B	526	VAL
2	B	544	LEU
2	B	559	ILE
3	C	43	ARG
3	C	61	LEU
3	C	71	ASP
3	C	80	SER
3	C	102	THR
3	C	111	VAL
3	C	129	VAL
3	C	130	THR
3	C	162	ILE
3	C	194	LYS
3	C	199	MET
3	C	211	GLN
3	C	215	VAL
3	C	227	THR
3	C	228	LYS
3	C	229	VAL
3	C	248	LEU
3	C	249	ILE
3	C	250	PHE
3	C	262	LEU
3	C	271	LEU
3	C	275	LEU
3	C	281	CYS
3	C	293	LEU
3	C	307	LEU
3	C	339	GLN
3	C	342	SER
3	C	354	ARG
3	C	358	LEU
3	C	363	CYS
3	C	369	LEU
3	C	387	LEU
3	C	407	VAL
3	C	414	LEU
3	C	438	LEU
3	C	443	LEU
3	C	480	LYS

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Mol	Chain	Res	Type
3	C	494	ILE
3	C	551	VAL
3	C	569	LEU
3	C	573	THR
3	C	576	LEU
3	C	588	LEU
3	C	631	CYS
3	C	648	ASP
3	C	657	VAL
3	C	671	GLU
3	C	677	ILE
4	D	15	GLU
4	D	17	LEU
4	D	24	LEU
4	D	28	PHE
4	D	32	SER
4	D	42	VAL
4	D	50	LEU
4	D	64	LEU
4	D	74	THR
4	D	81	LEU
4	D	84	LEU
4	D	94	VAL
4	D	97	VAL
4	D	111	LEU
4	D	128	VAL
4	D	163	LEU
4	D	164	PHE
4	D	172	LEU
4	D	185	THR
4	D	201	LEU
4	D	234	LEU
4	D	282	LEU
4	D	287	LEU
4	D	302	LEU
4	D	323	VAL
4	D	335	LEU
4	D	372	VAL
4	D	405	LEU
4	D	417	LYS
5	E	8	VAL
5	E	21	LEU

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Mol	Chain	Res	Type
5	E	27	HIS
5	E	62	ASN
5	E	111	THR
5	E	115	LEU
5	E	152	VAL
5	E	159	GLU
5	E	161	VAL
5	E	179	PHE
5	E	181	ASP
5	E	183	SER
5	E	184	ILE
5	E	211	LEU
5	E	215	PHE
5	E	230	VAL
5	E	237	CYS
5	E	250	THR
5	E	299	HIS
5	E	309	ILE
5	E	310	LEU
5	E	322	ARG
5	E	385	THR
5	E	394	THR
5	E	402	LEU
5	E	410	THR
5	E	413	LEU
5	E	428	ILE
5	E	431	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (42) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	270	GLN
2	B	289	GLN
2	B	336	HIS
2	B	372	GLN
2	B	393	HIS
2	B	411	GLN
2	B	426	HIS
2	B	428	ASN
2	B	563	ASN
3	C	72	ASN
3	C	81	HIS

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Mol	Chain	Res	Type
3	C	211	GLN
3	C	308	GLN
3	C	347	ASN
3	C	411	ASN
3	C	420	HIS
3	C	485	ASN
3	C	577	HIS
3	C	613	ASN
3	C	637	HIS
3	C	674	ASN
4	D	41	GLN
4	D	61	ASN
4	D	98	HIS
4	D	119	ASN
4	D	219	ASN
4	D	271	ASN
4	D	280	HIS
4	D	288	ASN
4	D	358	GLN
4	D	380	GLN
4	D	410	GLN
5	E	38	HIS
5	E	81	ASN
5	E	82	HIS
5	E	145	GLN
5	E	168	ASN
5	E	256	ASN
5	E	297	HIS
5	E	299	HIS
5	E	379	ASN
5	E	383	GLN

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

2 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$
6	ATP	D	901	-	32,33,33	1.29	4 (12%)	48,52,52	1.93	10 (20%)
6	ATP	E	901	-	32,33,33	1.29	4 (12%)	48,52,52	2.02	10 (20%)

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
6	ATP	D	901	-	-	0/22/38/38	0/3/3/3
6	ATP	E	901	-	-	5/22/38/38	0/3/3/3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	E	901	ATP	C5-C4	4.44	1.47	1.39
6	D	901	ATP	C5-C4	4.16	1.46	1.39
6	E	901	ATP	C5-C6	2.74	1.48	1.41
6	D	901	ATP	C5-N7	-2.68	1.34	1.39
6	D	901	ATP	C5-C6	2.36	1.47	1.41
6	E	901	ATP	C5-N7	-2.32	1.34	1.39
6	D	901	ATP	C8-N9	-2.15	1.33	1.37
6	E	901	ATP	C8-N7	2.06	1.35	1.31

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	E	901	ATP	C5-C4-N3	-6.85	117.28	126.72
6	D	901	ATP	C5-C4-N3	-6.41	117.89	126.72
6	E	901	ATP	N3-C4-N9	5.85	137.12	127.17
6	D	901	ATP	N3-C4-N9	5.66	136.79	127.17
6	E	901	ATP	C2-N3-C4	4.51	122.85	111.83
6	D	901	ATP	C2-N3-C4	3.99	121.57	111.83
6	E	901	ATP	N3-C2-N1	-3.82	122.79	128.58
6	D	901	ATP	N3-C2-N1	-3.48	123.31	128.58
6	D	901	ATP	C4-N9-C8	3.35	109.25	105.74
6	D	901	ATP	C4-C5-N7	-2.98	107.18	110.58
6	E	901	ATP	C4-C5-N7	-2.79	107.39	110.58
6	E	901	ATP	C4-N9-C8	2.63	108.50	105.74
6	D	901	ATP	C5-N7-C8	2.54	107.44	103.45
6	E	901	ATP	C3'-C2'-C1'	2.52	106.24	101.46
6	D	901	ATP	C1'-N9-C8	-2.46	121.63	127.09
6	E	901	ATP	O2A-PA-O1A	2.44	123.80	112.44
6	E	901	ATP	C1'-N9-C8	-2.44	121.69	127.09
6	D	901	ATP	N9-C8-N7	-2.20	110.82	113.94
6	D	901	ATP	O3G-PG-O2G	2.20	116.04	107.80
6	E	901	ATP	C5-N7-C8	2.15	106.83	103.45

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	E	901	ATP	C5'-O5'-PA-O1A
6	E	901	ATP	C5'-O5'-PA-O2A
6	E	901	ATP	C5'-O5'-PA-O3A
6	E	901	ATP	PA-O3A-PB-O2B
6	E	901	ATP	PA-O3A-PB-O1B

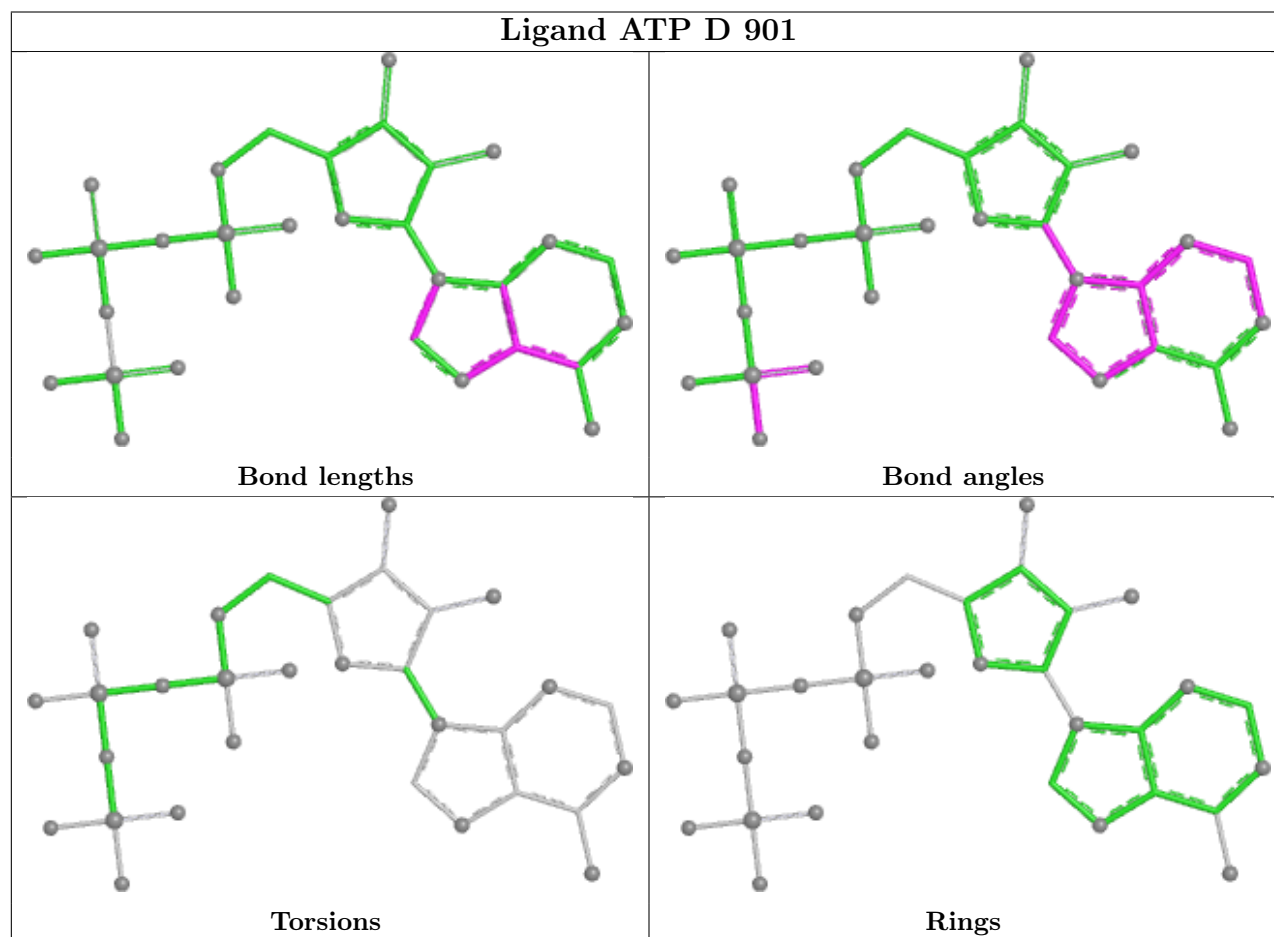
There are no ring outliers.

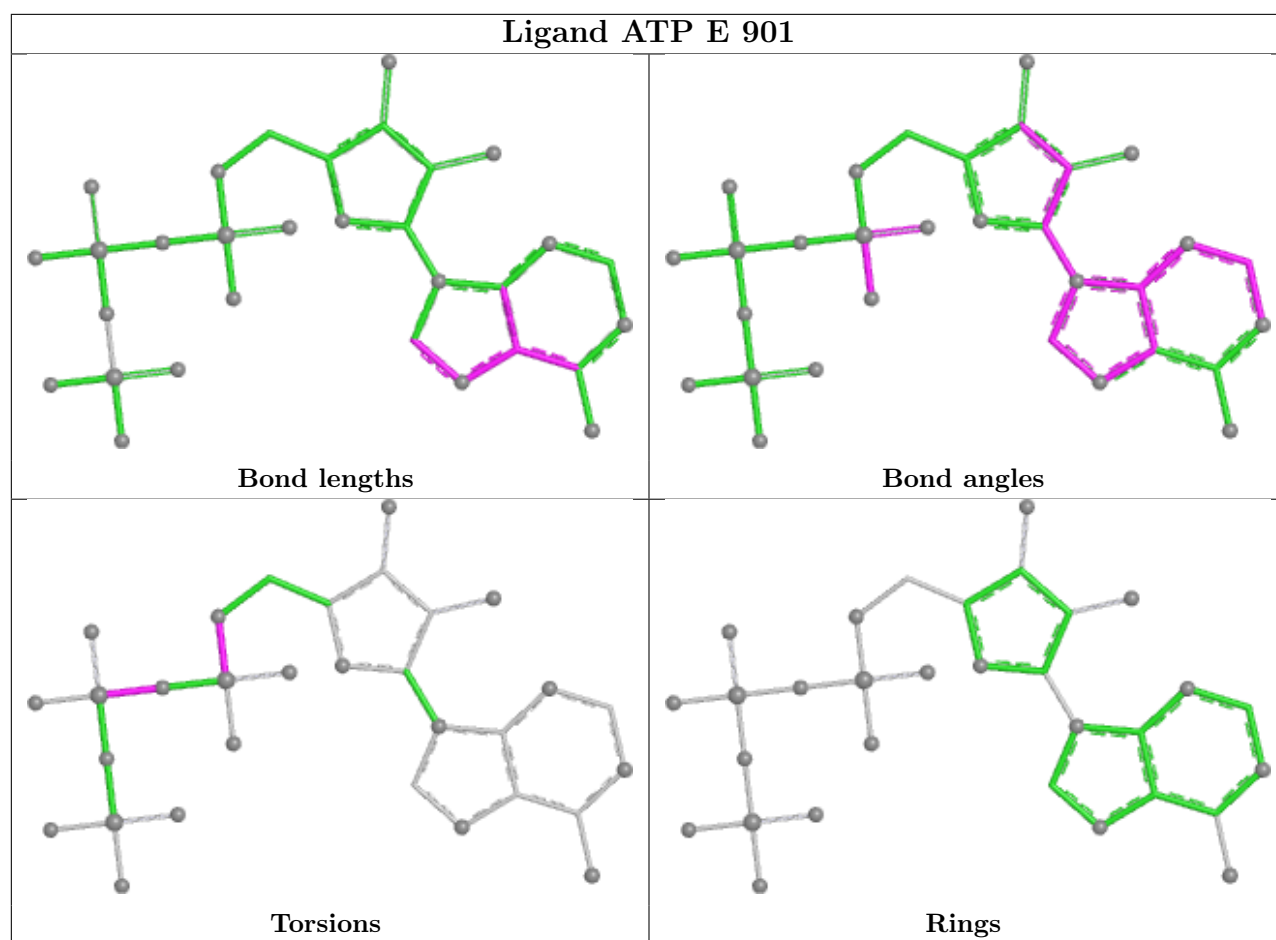
2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	901	ATP	1	0
6	E	901	ATP	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.

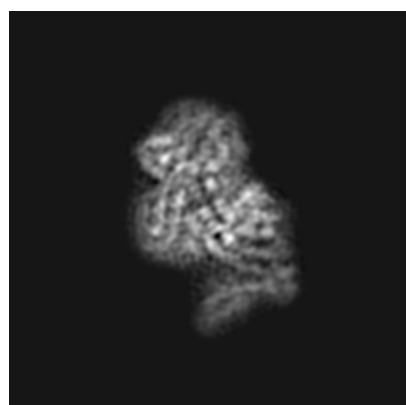
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-30463. These allow visual inspection of the internal detail of the map and identification of artifacts.

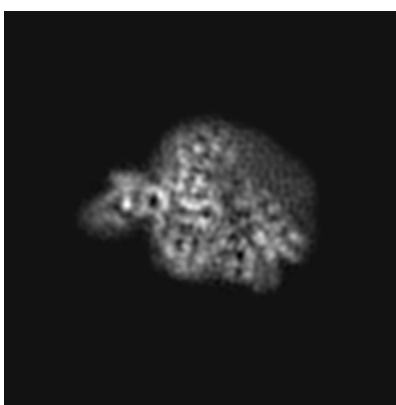
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

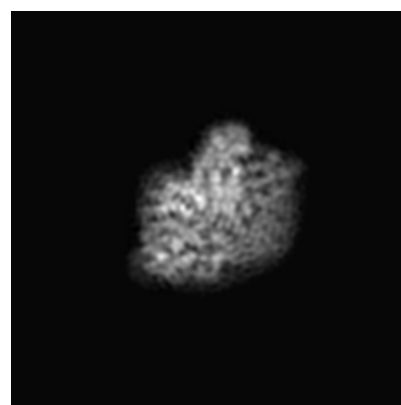
6.1.1 Primary map



X



Y

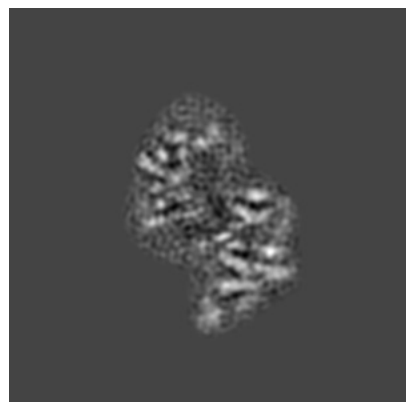


Z

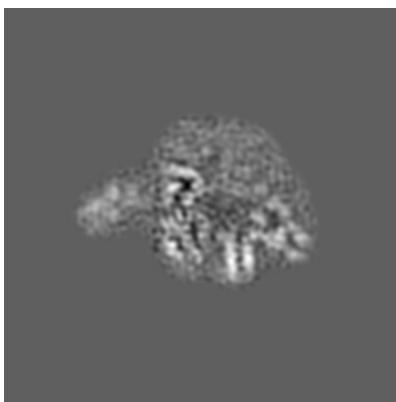
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

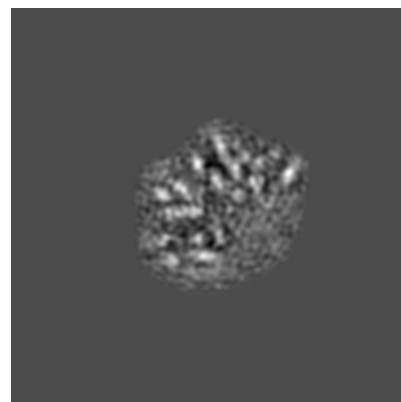
6.2.1 Primary map



X Index: 75



Y Index: 75



Z Index: 75

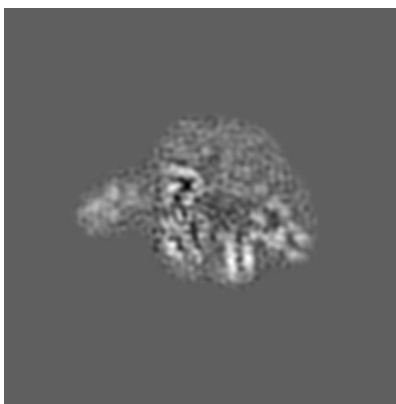
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

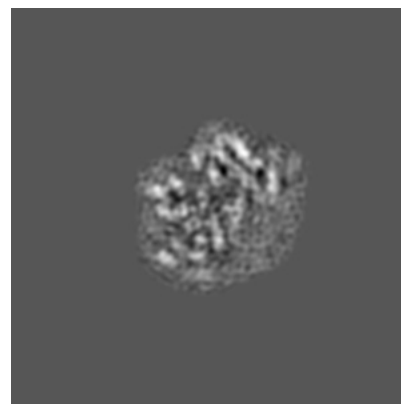
6.3.1 Primary map



X Index: 77



Y Index: 75



Z Index: 73

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

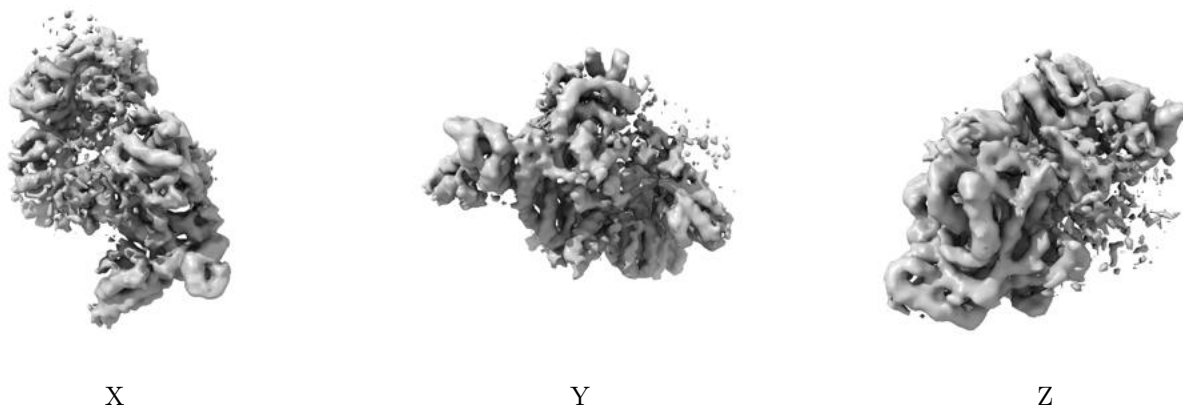


Z

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 0.06. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

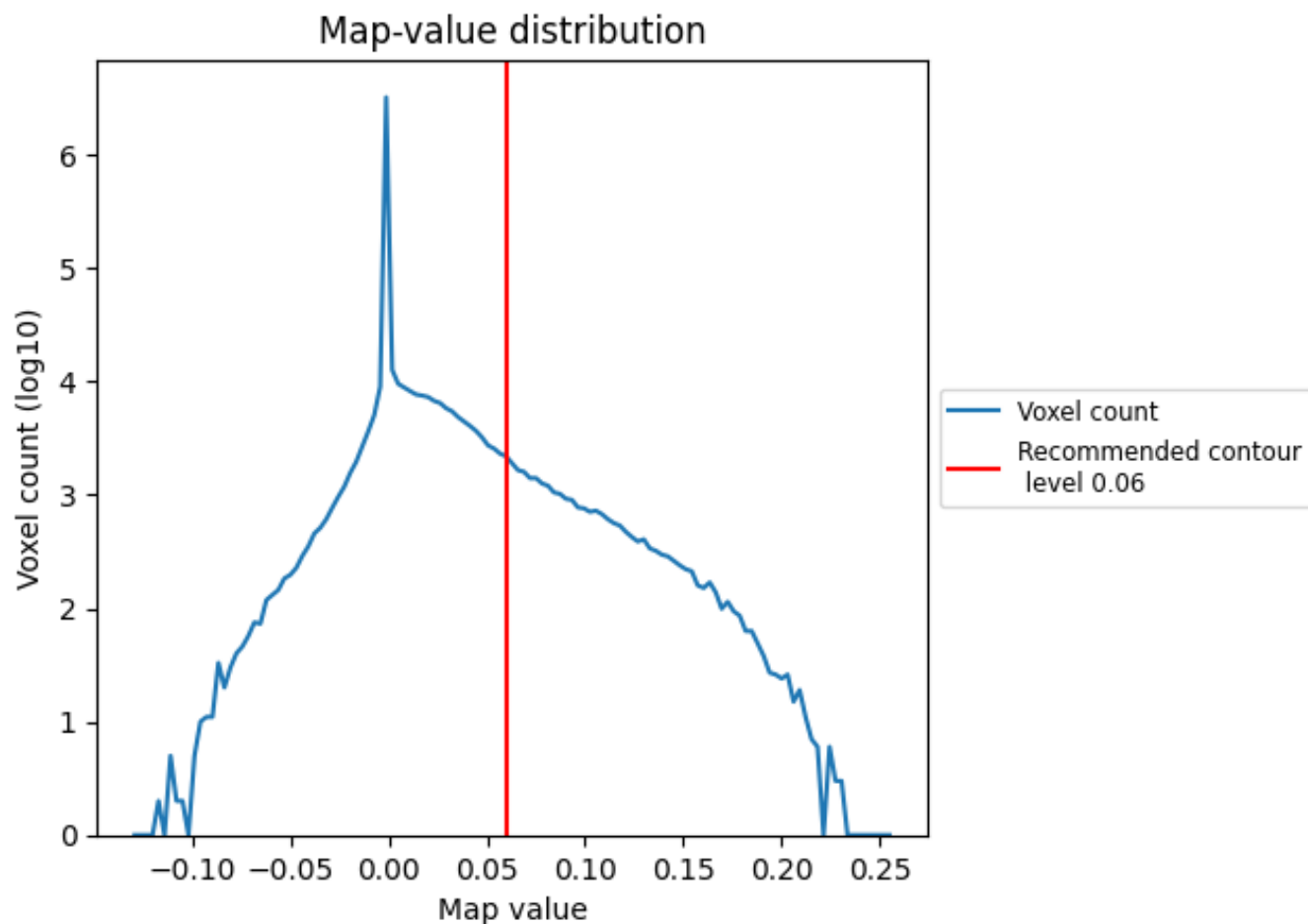
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

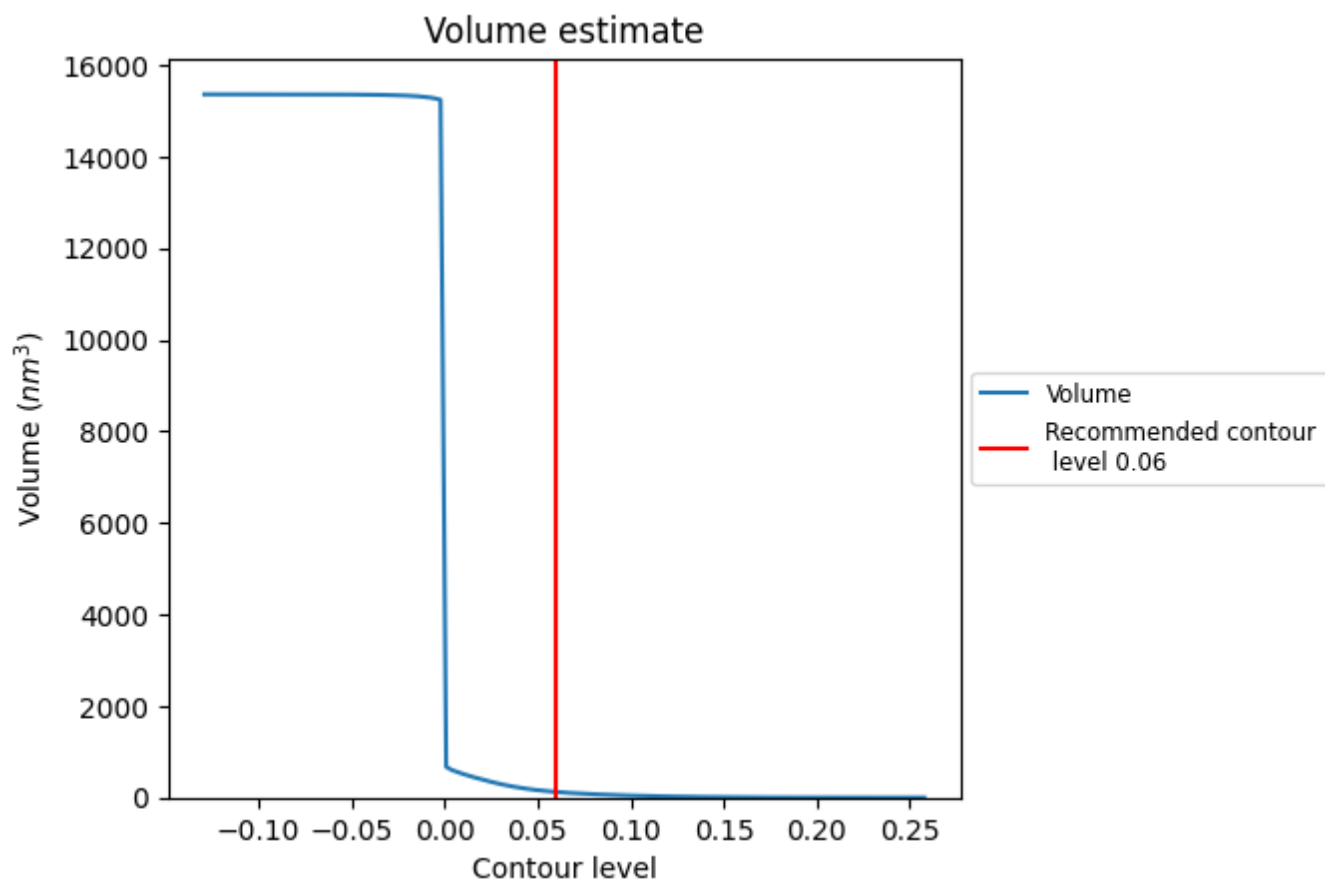
This section contains the results of statistical analysis of the map.

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.

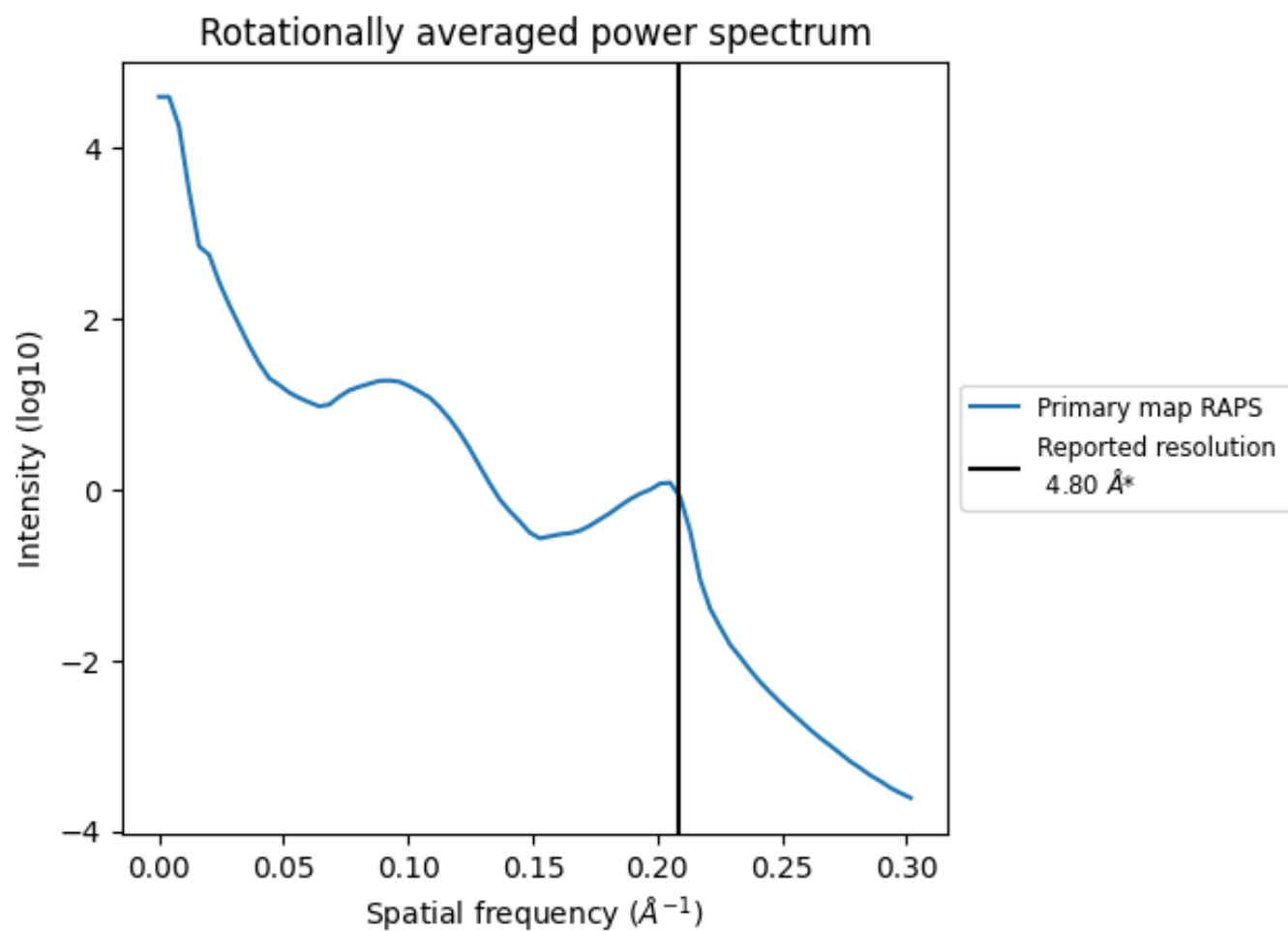
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 123 nm³; this corresponds to an approximate mass of 111 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 0.208 Å⁻¹

8 Fourier-Shell correlation ⓘ

This section was not generated. No FSC curve or half-maps provided.

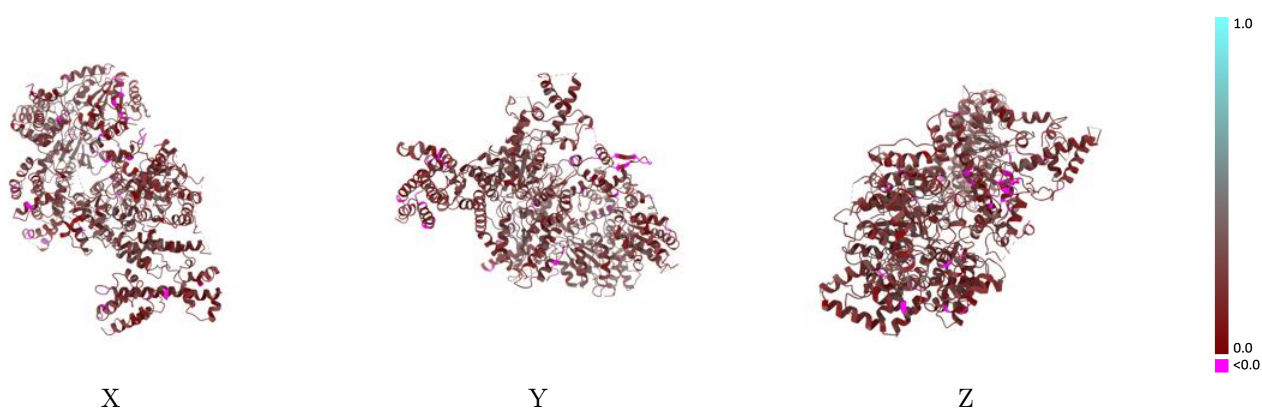
9 Map-model fit [i](#)

This section contains information regarding the fit between EMD map EMD-30463 and PDB model 7CTF. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlay [i](#)

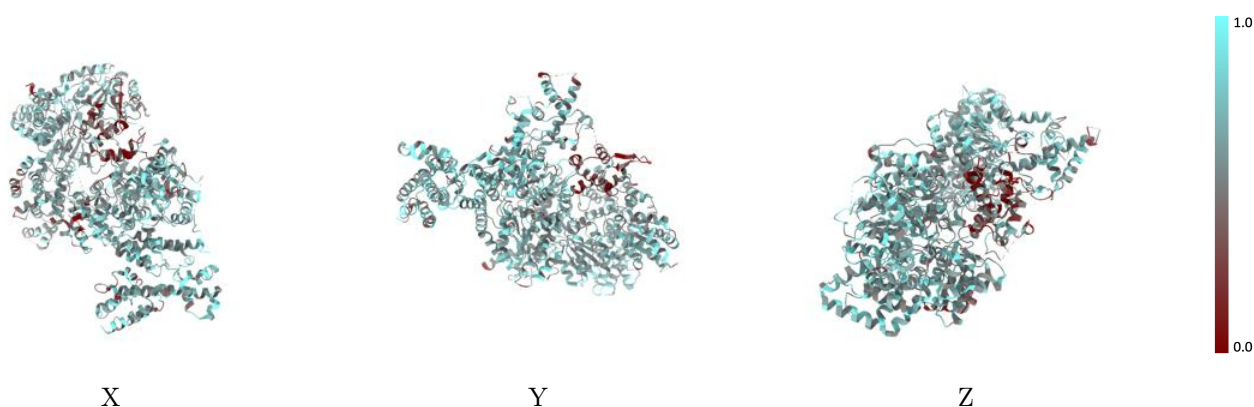
This section was not generated.

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



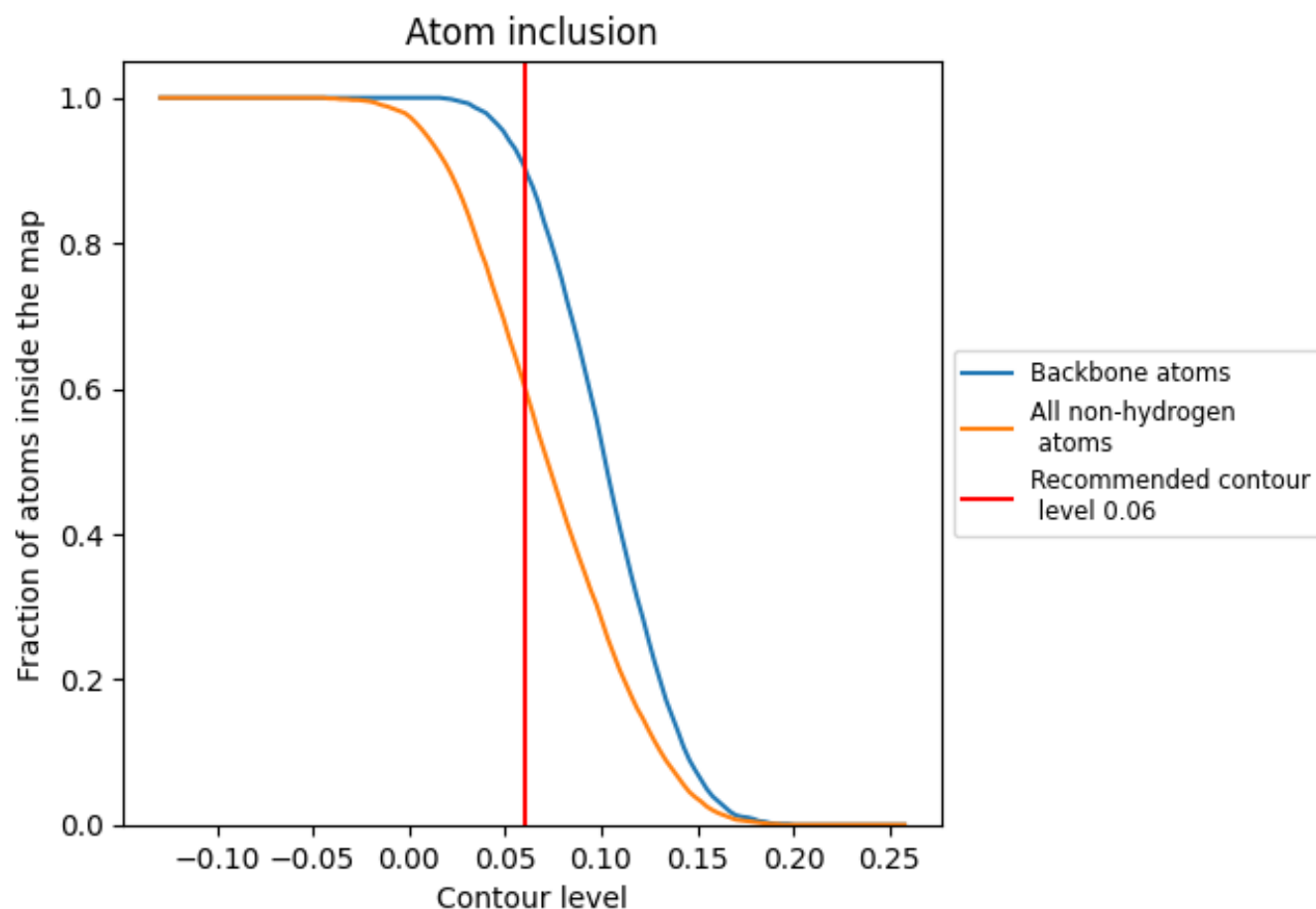
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.06).

9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 60% 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 (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6050	0.2170
A	0.5990	0.2180
B	0.5340	0.2040
C	0.6390	0.2140
D	0.6150	0.2130
E	0.6000	0.2350

