Full wwPDB EM Validation Report (i)

Nov 20, 2022 – 11:33 am GMT

PDB ID	:	6QI8
EMDB ID	:	EMD-4552
Title	:	Truncated human R2TP complex, structure 3 (ADP-filled)
Authors	:	Munoz-Hernandez, H.; Rodriguez, C.F.; Llorca, O.
Deposited on	:	2019-01-18
Resolution	:	3.75 Å(reported)
Based on initial model	:	6FO1

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 (i) 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 (1)) were used in the production of this report:

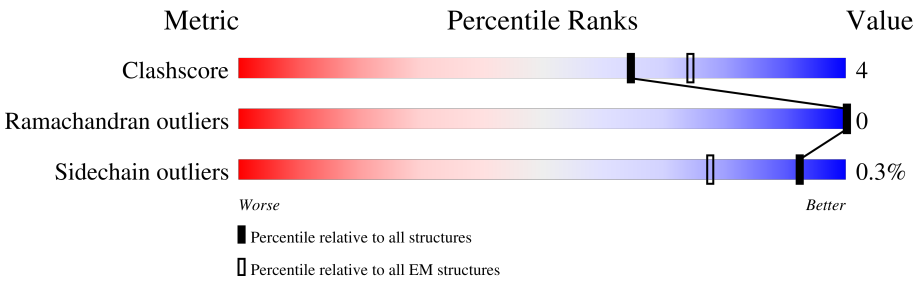
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

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 3.75 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 <=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	456	52% 66% • 30%
1	B	456	51% 62% 6% 32%
1	C	456	53% 61% 9% 31%
2	D	463	49% 59% 5% 36%
2	E	463	56% 64% 9% 28%
2	F	463	56% 62% 10% 28%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 14789 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.

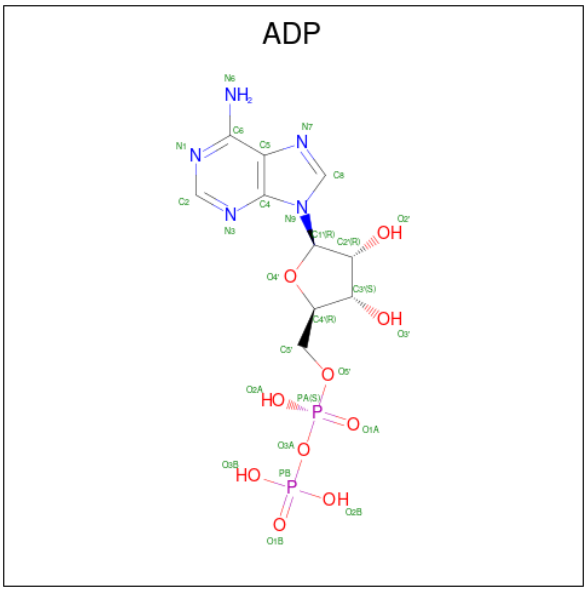
- Molecule 1 is a protein called RuvB-like 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	317	2423	1526	418	468	11	0	0
1	B	310	2369	1493	410	455	11	0	0
1	C	316	2401	1511	413	466	11	0	0

- Molecule 2 is a protein called RuvB-like 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	296	2287	1431	403	441	12	0	0
2	E	335	2585	1619	458	496	12	0	0
2	F	333	2562	1604	452	494	12	0	0

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

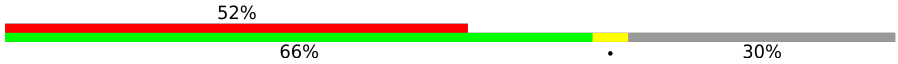


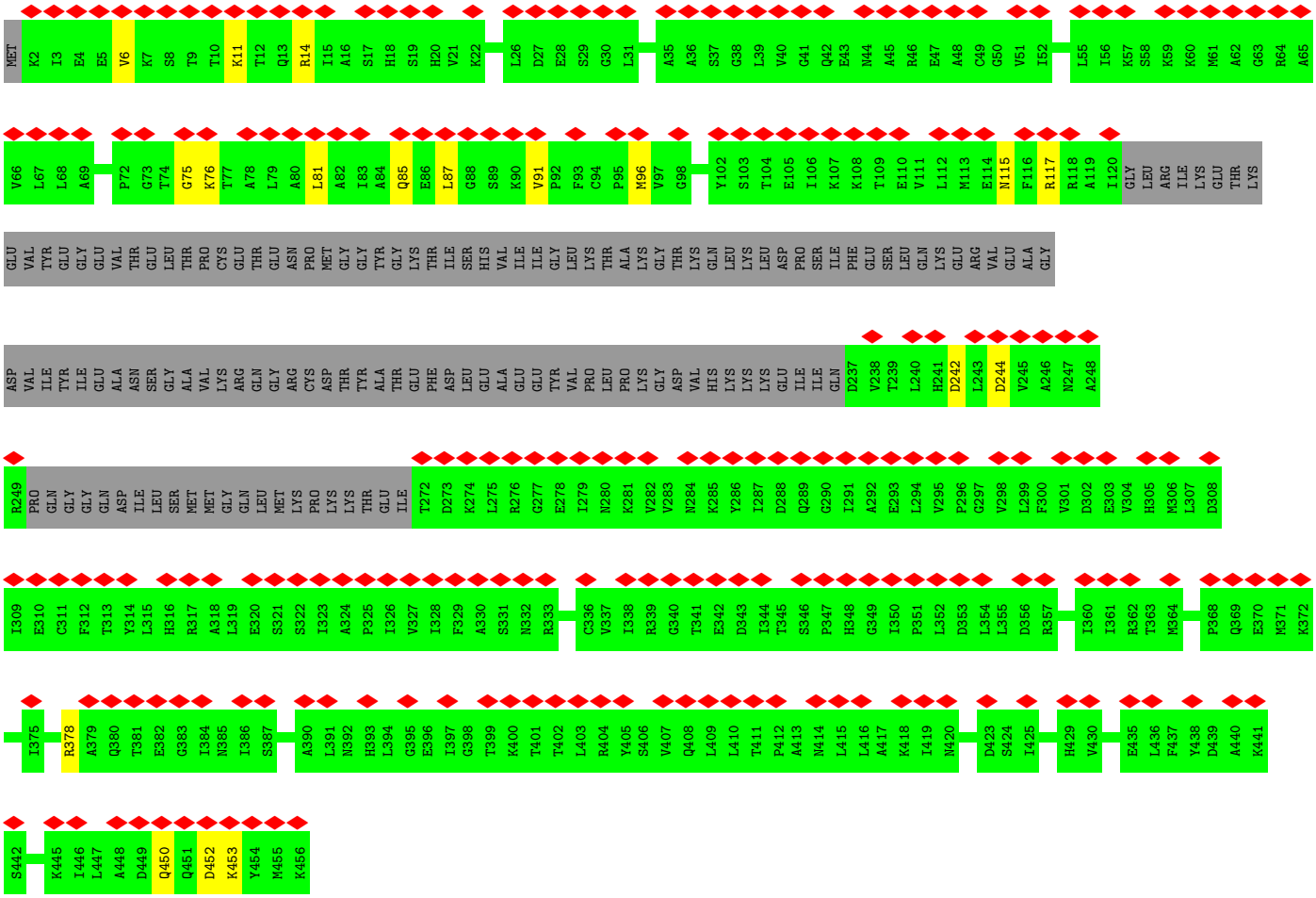
Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	B	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	C	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	D	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	E	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	F	1	Total	C	N	O	P	0
			27	10	5	10	2	

3 Residue-property plots (i)

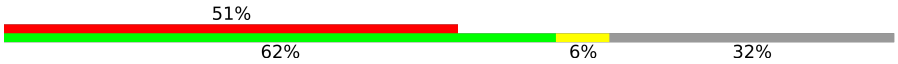
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

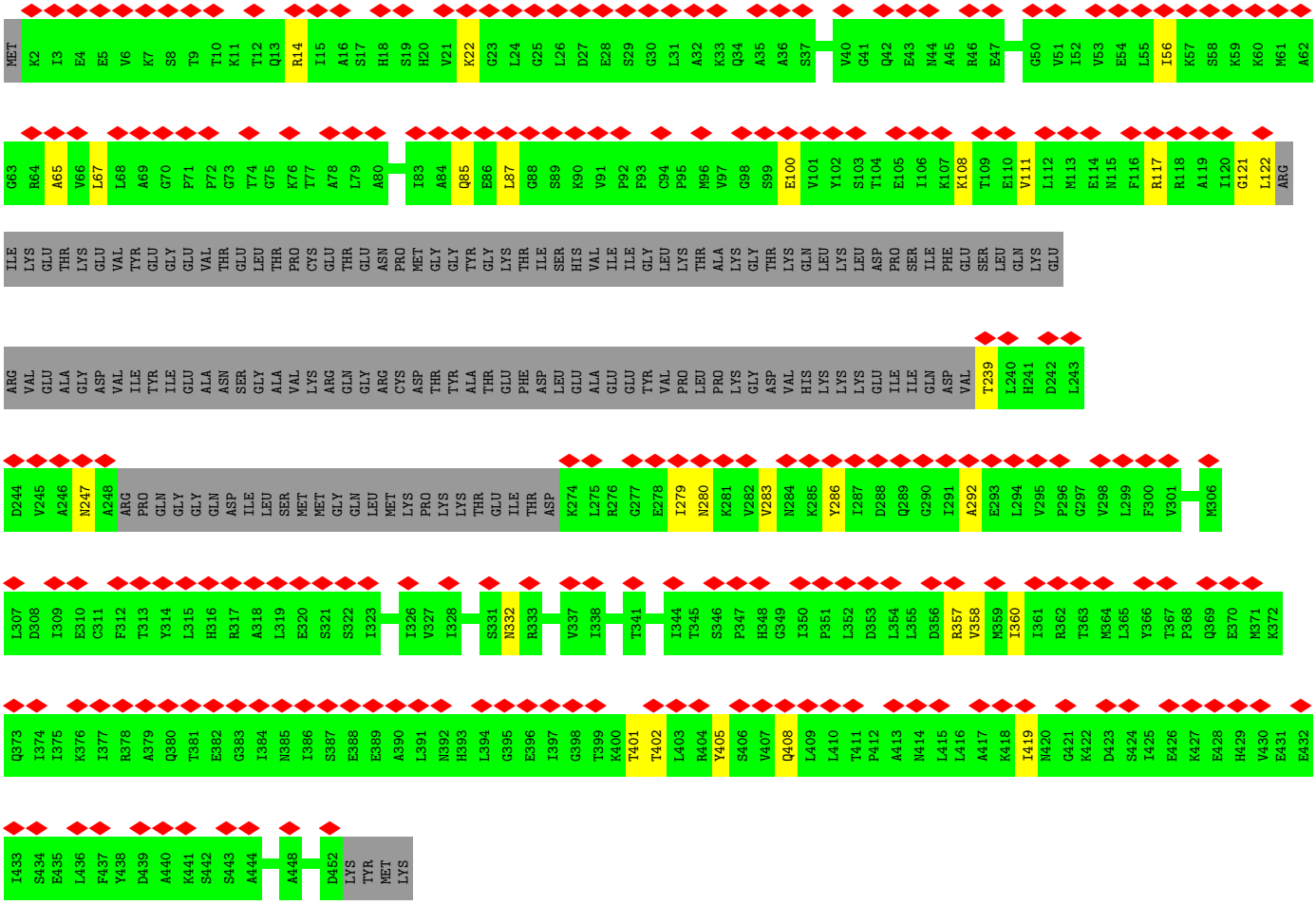
• Molecule 1: RuvB-like 1

Chain A: 



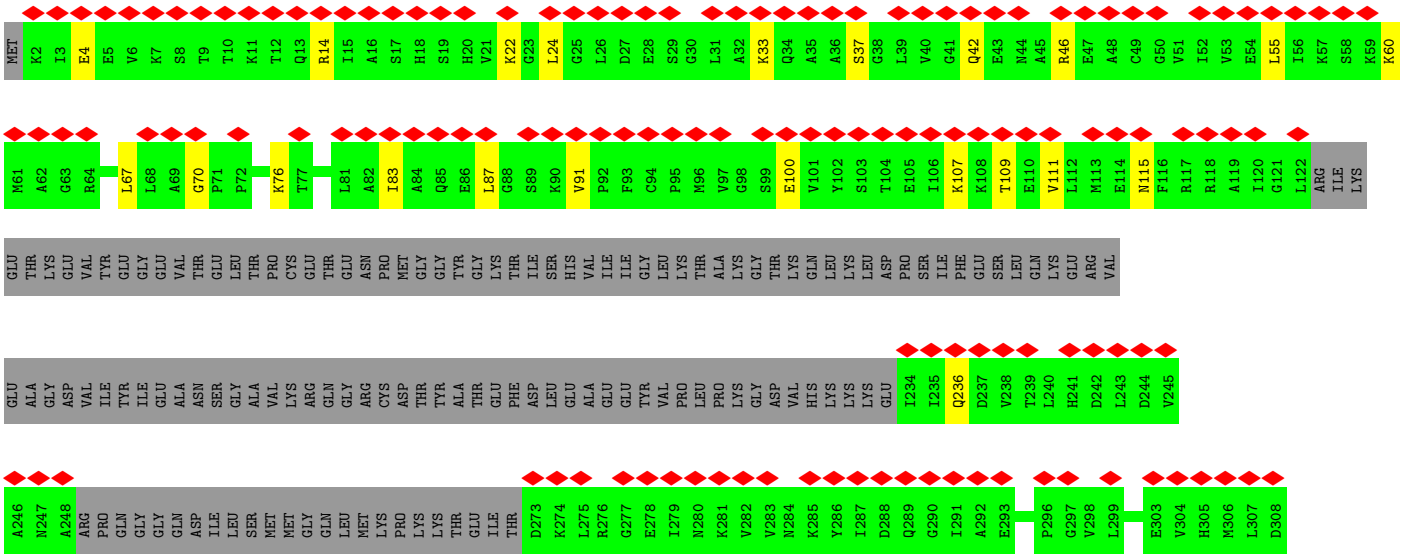
• Molecule 1: RuvB-like 1

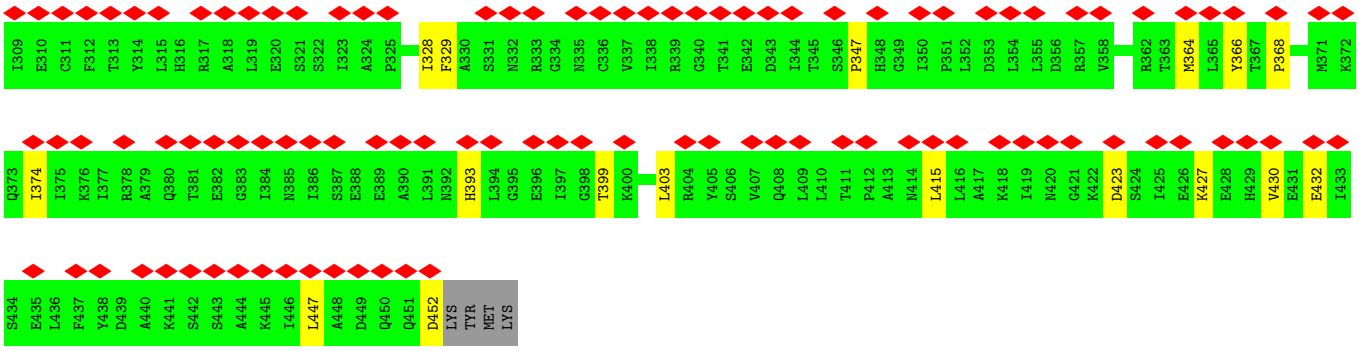
Chain B: 



- Molecule 1: RuvB-like 1

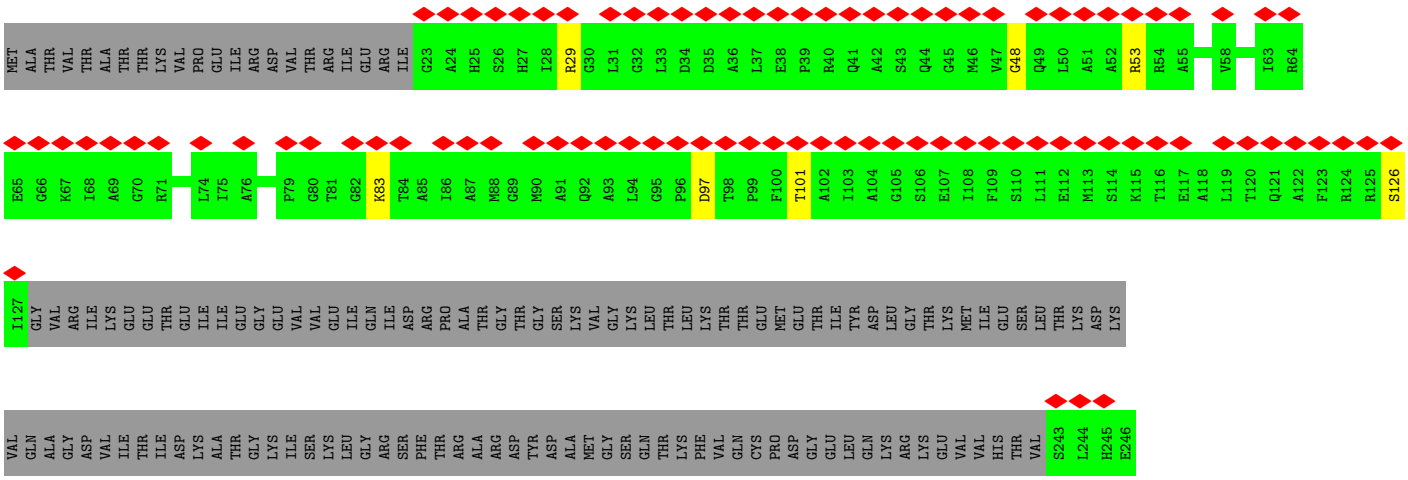
Chain C:





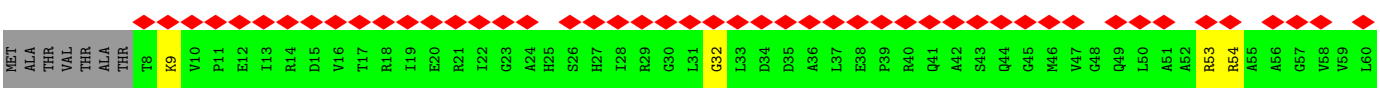
- Molecule 2: RuvB-like 2

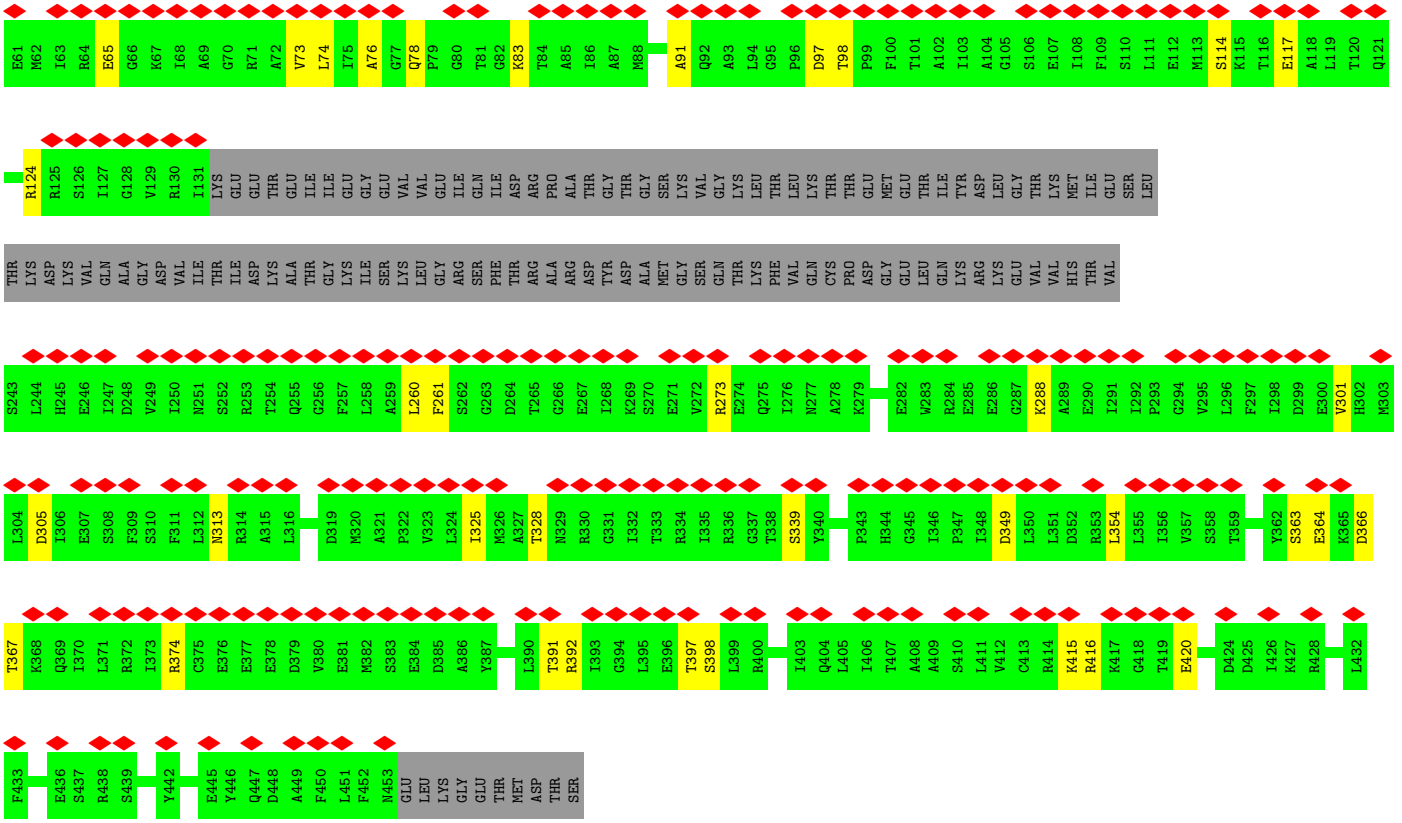
Chain D:



- Molecule 2: RuvB-like 2

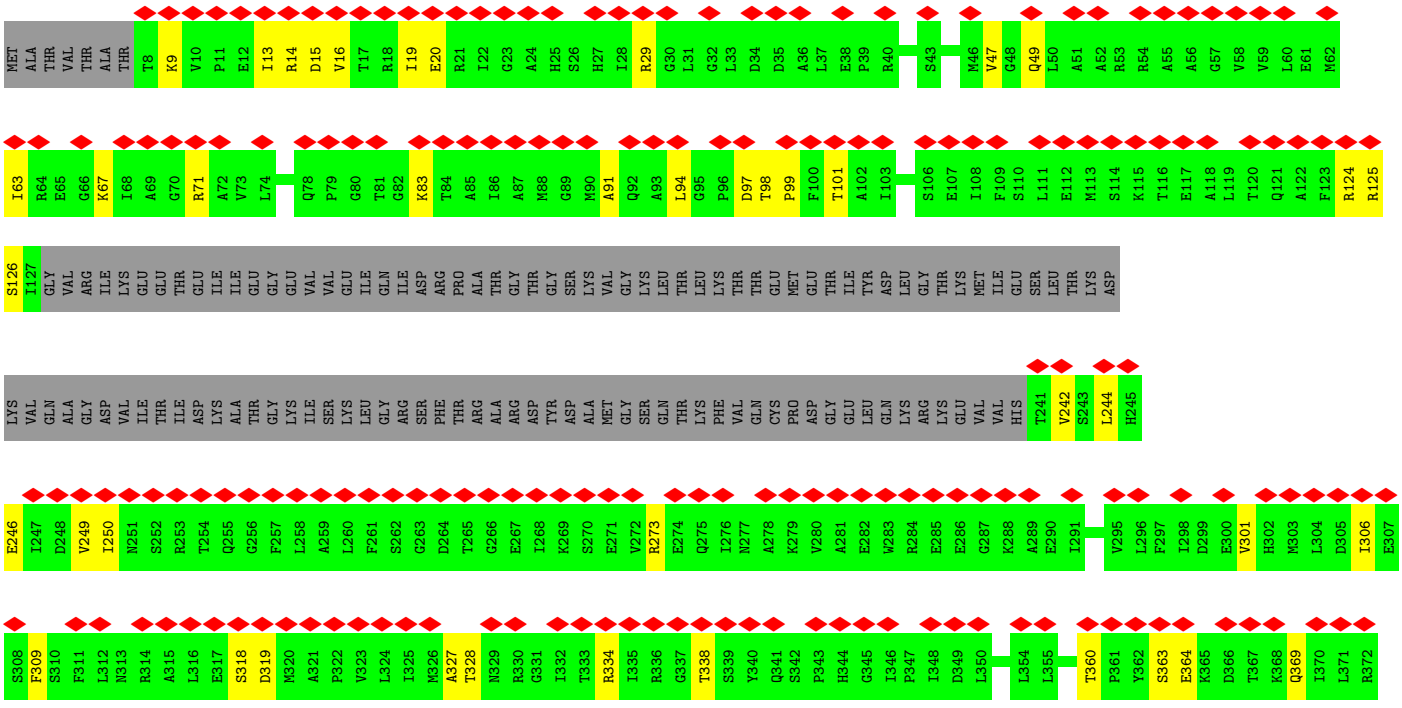
Chain E:

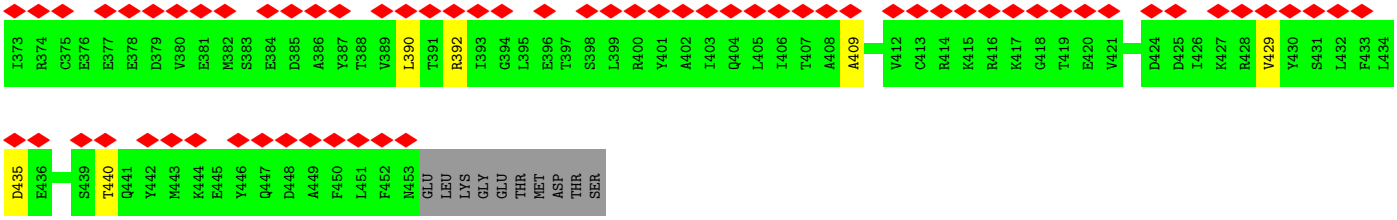




- Molecule 2: RuvB-like 2

Chain F: 56% 62% 10% 28%




I373 R374 C375 E376 E377 E378 D379 V380 E381 M382 S383 E384 D385 A386 Y387 T388 V389 L390 T391 R392 I393 G394 L395 E396 T397 S398 L399 R400 Y401 A402 I403 Q404 L405 I406 T407 A408 A409
V412 C413 R414 K415 R416 K417 G418 T419 E420 V421
D424 D425 I426 K427 R428 V429 Y430 S431 L432 F433 L434

D435 E436 S439 T440 Q441 Y442 M443 K444 E445 Y446 Q447 D448 A449 F450 L451 F452 N453
GLU LEU LYS GLY GLU THR MET ASP THR SER

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	102100	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 ($e^-/Å^2$)	1.18	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	0.143	Depositor
Minimum map value	-0.103	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.02	Depositor
Map size (Å)	283.4, 283.4, 283.4	wwPDB
Map dimensions	260, 260, 260	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.09, 1.09, 1.09	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: ADP

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\|>5$	RMSZ	$\#\|Z\|>5$
1	A	0.26	0/2451	0.49	0/3306
1	B	0.26	0/2396	0.50	0/3230
1	C	0.26	0/2428	0.50	0/3277
2	D	0.26	0/2315	0.48	0/3120
2	E	0.27	0/2618	0.52	0/3531
2	F	0.26	0/2593	0.50	0/3498
All	All	0.26	0/14801	0.50	0/19962

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2423	0	2492	12	0
1	B	2369	0	2453	17	0
1	C	2401	0	2459	24	0
2	D	2287	0	2308	13	0
2	E	2585	0	2608	27	0
2	F	2562	0	2586	40	0
3	A	27	0	12	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	27	0	12	0	0
3	C	27	0	12	1	0
3	D	27	0	12	0	0
3	E	27	0	12	0	0
3	F	27	0	12	0	0
All	All	14789	0	14978	126	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 (126) 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)
2:F:14:ARG:HB2	2:F:242:VAL:CG1	1.47	1.44
2:F:14:ARG:CB	2:F:242:VAL:CG1	2.00	1.38
2:F:14:ARG:CB	2:F:242:VAL:HG11	1.59	1.33
2:F:14:ARG:CD	2:F:242:VAL:HG13	1.76	1.14
2:F:14:ARG:HD2	2:F:242:VAL:HG13	1.25	1.12
2:F:14:ARG:HB3	2:F:242:VAL:HG11	1.10	1.09
2:F:14:ARG:CB	2:F:242:VAL:HG12	1.77	1.00
2:F:14:ARG:CD	2:F:242:VAL:CG1	2.43	0.94
2:F:14:ARG:HD2	2:F:242:VAL:CG1	1.98	0.94
2:F:14:ARG:HB2	2:F:242:VAL:HG12	0.91	0.91
2:F:16:VAL:HB	2:F:246:GLU:OE1	1.75	0.87
1:A:6:VAL:O	1:A:242:ASP:OD1	2.04	0.76
2:F:14:ARG:CG	2:F:242:VAL:CG1	2.66	0.72
2:F:14:ARG:HD3	2:F:242:VAL:HG13	1.71	0.70
2:F:14:ARG:O	2:F:14:ARG:HG3	2.01	0.60
2:E:124:ARG:HH12	2:E:273:ARG:HH11	1.48	0.60
1:C:42:GLN:HE22	1:C:364:MET:H	1.50	0.60
2:F:124:ARG:HD2	2:F:244:LEU:HD22	1.83	0.59
2:F:101:THR:HG21	2:F:125:ARG:HB3	1.84	0.59
1:C:4:GLU:O	1:C:236:GLN:NE2	2.37	0.58
2:F:306:ILE:HA	2:F:309:PHE:HB2	1.85	0.58
1:C:33:LYS:O	1:C:46:ARG:NH2	2.37	0.58
1:A:96:MET:SD	1:A:115:ASN:ND2	2.77	0.58
1:B:14:ARG:NH2	1:B:100:GLU:OE2	2.38	0.57
1:C:432:GLU:OE2	2:E:54:ARG:NH1	2.37	0.56
1:B:121:GLY:HA2	1:B:239:THR:HA	1.86	0.55
2:F:124:ARG:HH12	2:F:273:ARG:HB3	1.73	0.54
2:F:49:GLN:NE2	2:F:360:THR:O	2.40	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:11:LYS:HD3	1:A:14:ARG:HG3	1.90	0.54
2:E:301:VAL:HG12	2:E:328:THR:HB	1.90	0.54
2:E:416:ARG:NH2	2:E:420:GLU:O	2.41	0.54
1:C:22:LYS:HB2	1:C:37:SER:HB3	1.89	0.53
2:F:334:ARG:NH1	2:F:338:THR:O	2.41	0.53
2:F:63:ILE:HG21	2:F:94:LEU:HD11	1.91	0.53
1:B:408:GLN:NE2	2:D:352:ASP:O	2.43	0.52
1:C:70:GLY:O	1:C:76:LYS:NZ	2.41	0.52
2:F:16:VAL:HG12	2:F:16:VAL:O	2.09	0.52
2:D:48:GLY:O	2:D:53:ARG:NH1	2.42	0.52
2:E:397:THR:OG1	2:E:398:SER:N	2.43	0.52
1:C:366:TYR:OH	3:C:501:ADP:N7	2.37	0.51
1:C:14:ARG:NH2	1:C:100:GLU:OE2	2.44	0.51
2:D:435:ASP:OD1	2:D:435:ASP:N	2.44	0.50
1:B:65:ALA:HB3	1:B:358:VAL:HG22	1.94	0.50
2:F:364:GLU:OE2	2:F:392:ARG:NH2	2.45	0.50
1:B:401:THR:OG1	1:B:402:THR:N	2.44	0.49
2:D:83:LYS:HD3	2:D:327:ALA:HB1	1.94	0.49
2:F:13:ILE:HG21	2:F:250:ILE:HD11	1.94	0.49
1:C:55:LEU:HD22	1:C:60:LYS:HB2	1.93	0.49
1:A:75:GLY:N	3:A:501:ADP:O2B	2.44	0.49
1:C:452:ASP:OD1	1:C:452:ASP:N	2.45	0.49
1:C:423:ASP:OD2	1:C:423:ASP:N	2.46	0.49
2:F:409:ALA:HA	2:F:429:VAL:HG21	1.94	0.49
1:C:415:LEU:HD11	2:E:65:GLU:HG3	1.93	0.49
1:C:447:LEU:HD11	2:E:76:ALA:HB1	1.95	0.48
2:D:305:ASP:OD1	2:D:305:ASP:N	2.47	0.48
1:C:393:HIS:HB2	1:C:427:LYS:HE3	1.95	0.48
2:F:83:LYS:HD2	2:F:327:ALA:HB1	1.96	0.48
2:E:114:SER:OG	2:E:117:GLU:OE1	2.31	0.48
2:F:19:ILE:HG13	2:F:20:GLU:HG3	1.96	0.48
2:F:249:VAL:HG13	2:F:250:ILE:HG12	1.96	0.48
2:E:313:ASN:ND2	2:E:349:ASP:OD2	2.47	0.48
1:C:67:LEU:HD12	1:C:329:PHE:HB2	1.96	0.47
1:C:107:LYS:HG2	1:C:109:THR:HG22	1.97	0.47
2:E:74:LEU:HB2	2:E:354:LEU:HD13	1.95	0.47
2:D:97:ASP:N	2:D:97:ASP:OD1	2.48	0.47
2:F:318:SER:OG	2:F:319:ASP:N	2.48	0.47
1:A:117:ARG:NH1	1:A:244:ASP:OD2	2.48	0.47
2:D:371:LEU:HD12	2:D:391:THR:HG22	1.97	0.47
2:E:78:GLN:O	2:E:83:LYS:NZ	2.45	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:393:HIS:HD2	1:C:430:VAL:HG23	1.80	0.46
2:D:306:ILE:HA	2:D:309:PHE:HB2	1.97	0.46
2:D:280:VAL:HA	2:D:283:TRP:HB2	1.97	0.46
1:A:81:LEU:HD23	1:A:85:GLN:HE22	1.80	0.46
1:A:452:ASP:OD1	1:A:452:ASP:N	2.48	0.46
1:B:117:ARG:NH1	2:E:260:LEU:O	2.48	0.46
1:B:108:LYS:HA	1:B:111:VAL:HG12	1.98	0.45
1:C:87:LEU:HB2	1:C:91:VAL:HG21	1.98	0.45
2:E:288:LYS:HE3	2:E:288:LYS:HB3	1.85	0.45
2:F:97:ASP:N	2:F:97:ASP:OD1	2.50	0.45
2:E:32:GLY:O	2:E:53:ARG:NH2	2.44	0.45
1:A:87:LEU:HB3	1:A:91:VAL:HG21	1.98	0.44
1:B:280:ASN:HB2	2:E:260:LEU:HD22	1.98	0.44
2:E:9:LYS:HD3	2:E:9:LYS:HA	1.83	0.44
2:E:91:ALA:O	2:E:98:THR:OG1	2.35	0.44
2:D:247:ILE:HG22	2:D:276:ILE:HD13	1.99	0.44
2:D:397:THR:OG1	2:D:398:SER:N	2.50	0.44
1:C:24:LEU:HD11	1:C:83:ILE:HG22	2.00	0.43
2:E:374:ARG:HA	2:E:374:ARG:HD2	1.78	0.43
2:F:363:SER:OG	2:F:364:GLU:N	2.51	0.43
1:B:22:LYS:HA	1:B:85:GLN:HE21	1.84	0.43
1:B:122:LEU:HD11	1:B:283:VAL:HG23	2.01	0.43
2:E:363:SER:OG	2:E:366:ASP:OD1	2.35	0.43
2:F:47:VAL:HG11	2:F:369:GLN:HB3	2.00	0.43
2:F:99:PRO:HB2	2:F:126:SER:HA	2.00	0.43
2:E:363:SER:O	2:E:367:THR:OG1	2.30	0.43
2:E:367:THR:HB	2:E:391:THR:HG23	2.00	0.43
2:F:9:LYS:HD3	2:F:9:LYS:HA	1.83	0.43
1:B:286:TYR:HB3	1:B:292:ALA:HB3	2.00	0.43
1:B:247:ASN:HD21	1:B:279:ILE:HD11	1.83	0.42
2:E:364:GLU:OE1	2:E:392:ARG:NH2	2.50	0.42
1:B:332:ASN:N	1:B:332:ASN:OD1	2.51	0.42
1:B:56:ILE:HG21	1:B:87:LEU:HD21	2.02	0.42
1:B:67:LEU:HD23	1:B:360:ILE:HG12	2.01	0.42
1:B:402:THR:HG23	1:B:405:TYR:H	1.85	0.41
2:D:101:THR:HG1	2:D:126:SER:HG	1.65	0.41
1:C:368:PRO:HG3	1:C:399:THR:HG21	2.03	0.41
2:E:73:VAL:HB	2:E:325:ILE:HG12	2.03	0.41
2:E:339:SER:O	2:E:339:SER:OG	2.32	0.41
2:F:390:LEU:HD12	2:F:390:LEU:HA	1.92	0.41
2:F:435:ASP:N	2:F:435:ASP:OD1	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:83:ILE:HD11	1:C:328:ILE:HD11	2.03	0.41
2:F:91:ALA:O	2:F:98:THR:OG1	2.35	0.41
1:C:347:PRO:HB3	2:F:440:THR:HG21	2.02	0.41
2:F:301:VAL:HG12	2:F:328:THR:HB	2.02	0.41
2:E:415:LYS:HE2	2:E:415:LYS:HB2	1.89	0.41
2:F:67:LYS:O	2:F:71:ARG:NH1	2.53	0.41
1:A:76:LYS:HE3	1:A:76:LYS:HB2	1.96	0.41
1:C:111:VAL:O	1:C:115:ASN:ND2	2.44	0.41
2:E:97:ASP:N	2:E:97:ASP:OD1	2.51	0.41
1:C:374:ILE:HG21	1:C:403:LEU:HD21	2.04	0.40
1:A:450:GLN:HA	1:A:453:LYS:HG2	2.03	0.40
1:B:419:ILE:HD13	1:B:419:ILE:HA	1.97	0.40
2:D:83:LYS:HE3	2:D:83:LYS:HB2	1.79	0.40
1:A:6:VAL:HB	1:A:242:ASP:OD1	2.21	0.40
1:A:378:ARG:HD2	1:A:378:ARG:HA	1.90	0.40
2:E:305:ASP:OD1	2:E:305:ASP:N	2.50	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	311/456 (68%)	299 (96%)	12 (4%)	0	100	100
1	B	304/456 (67%)	289 (95%)	15 (5%)	0	100	100
1	C	310/456 (68%)	292 (94%)	18 (6%)	0	100	100
2	D	290/463 (63%)	275 (95%)	15 (5%)	0	100	100
2	E	331/463 (72%)	312 (94%)	19 (6%)	0	100	100
2	F	329/463 (71%)	304 (92%)	25 (8%)	0	100	100
All	All	1875/2757 (68%)	1771 (94%)	104 (6%)	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	265/387 (68%)	265 (100%)	0	100	100
1	B	260/387 (67%)	259 (100%)	1 (0%)	91	95
1	C	262/387 (68%)	262 (100%)	0	100	100
2	D	243/390 (62%)	242 (100%)	1 (0%)	91	95
2	E	274/390 (70%)	273 (100%)	1 (0%)	91	95
2	F	272/390 (70%)	270 (99%)	2 (1%)	84	91
All	All	1576/2331 (68%)	1571 (100%)	5 (0%)	92	96

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	357	ARG
2	D	29	ARG
2	E	261	PHE
2	F	15	ASP
2	F	29	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	18	HIS
1	A	85	GLN
1	A	420	ASN
1	A	429	HIS
1	B	18	HIS
1	B	85	GLN
1	B	115	ASN
1	C	42	GLN
1	C	380	GLN

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Mol	Chain	Res	Type
1	C	393	HIS
1	C	429	HIS
2	D	369	GLN
2	E	44	GLN
2	E	251	ASN
2	F	49	GLN
2	F	447	GLN

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)

6 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	$\#\|Z\| > 2$
3	ADP	C	501	-	24,29,29	0.94	1 (4%)	29,45,45	1.47	5 (17%)
3	ADP	F	501	-	24,29,29	0.94	1 (4%)	29,45,45	1.45	4 (13%)
3	ADP	A	501	-	24,29,29	0.94	1 (4%)	29,45,45	1.48	4 (13%)
3	ADP	B	501	-	24,29,29	0.94	1 (4%)	29,45,45	1.40	4 (13%)
3	ADP	E	501	-	24,29,29	0.96	1 (4%)	29,45,45	1.40	4 (13%)
3	ADP	D	501	-	24,29,29	0.96	1 (4%)	29,45,45	1.41	4 (13%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	C	501	-	-	2/12/32/32	0/3/3/3
3	ADP	F	501	-	-	4/12/32/32	0/3/3/3
3	ADP	A	501	-	-	2/12/32/32	0/3/3/3
3	ADP	B	501	-	-	2/12/32/32	0/3/3/3
3	ADP	E	501	-	-	6/12/32/32	0/3/3/3
3	ADP	D	501	-	-	6/12/32/32	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	501	ADP	C5-C4	2.53	1.47	1.40
3	E	501	ADP	C5-C4	2.51	1.47	1.40
3	F	501	ADP	C5-C4	2.40	1.47	1.40
3	C	501	ADP	C5-C4	2.40	1.47	1.40
3	A	501	ADP	C5-C4	2.37	1.47	1.40
3	B	501	ADP	C5-C4	2.31	1.47	1.40

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	501	ADP	PA-O3A-PB	-3.85	119.60	132.83
3	F	501	ADP	PA-O3A-PB	-3.80	119.78	132.83
3	E	501	ADP	N3-C2-N1	-3.39	123.38	128.68
3	B	501	ADP	PA-O3A-PB	-3.38	121.22	132.83
3	D	501	ADP	N3-C2-N1	-3.34	123.45	128.68
3	C	501	ADP	N3-C2-N1	-3.33	123.47	128.68
3	F	501	ADP	N3-C2-N1	-3.26	123.59	128.68
3	D	501	ADP	C4-C5-N7	-3.15	106.11	109.40
3	C	501	ADP	C3'-C2'-C1'	3.13	105.69	100.98
3	A	501	ADP	N3-C2-N1	-3.10	123.84	128.68
3	E	501	ADP	PA-O3A-PB	-3.09	122.21	132.83
3	B	501	ADP	N3-C2-N1	-3.09	123.86	128.68
3	A	501	ADP	C3'-C2'-C1'	3.07	105.60	100.98
3	E	501	ADP	C3'-C2'-C1'	3.06	105.58	100.98
3	B	501	ADP	C3'-C2'-C1'	2.93	105.38	100.98
3	C	501	ADP	PA-O3A-PB	-2.90	122.89	132.83
3	D	501	ADP	PA-O3A-PB	-2.89	122.90	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	F	501	ADP	C3'-C2'-C1'	2.77	105.14	100.98
3	C	501	ADP	C4-C5-N7	-2.57	106.72	109.40
3	D	501	ADP	C3'-C2'-C1'	2.38	104.56	100.98
3	F	501	ADP	C4-C5-N7	-2.31	106.99	109.40
3	B	501	ADP	C4-C5-N7	-2.29	107.02	109.40
3	A	501	ADP	C4-C5-N7	-2.27	107.03	109.40
3	E	501	ADP	C4-C5-N7	-2.02	107.30	109.40
3	C	501	ADP	C2-N1-C6	2.00	122.18	118.75

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	501	ADP	C5'-O5'-PA-O1A
3	D	501	ADP	C5'-O5'-PA-O2A
3	D	501	ADP	C5'-O5'-PA-O3A
3	D	501	ADP	O4'-C4'-C5'-O5'
3	E	501	ADP	C5'-O5'-PA-O3A
3	E	501	ADP	O4'-C4'-C5'-O5'
3	F	501	ADP	C5'-O5'-PA-O3A
3	C	501	ADP	O4'-C4'-C5'-O5'
3	C	501	ADP	C3'-C4'-C5'-O5'
3	F	501	ADP	O4'-C4'-C5'-O5'
3	D	501	ADP	C3'-C4'-C5'-O5'
3	E	501	ADP	C3'-C4'-C5'-O5'
3	F	501	ADP	C3'-C4'-C5'-O5'
3	A	501	ADP	C5'-O5'-PA-O3A
3	B	501	ADP	PB-O3A-PA-O2A
3	E	501	ADP	PB-O3A-PA-O2A
3	E	501	ADP	C5'-O5'-PA-O1A
3	D	501	ADP	PA-O3A-PB-O3B
3	B	501	ADP	PB-O3A-PA-O1A
3	E	501	ADP	PB-O3A-PA-O1A
3	F	501	ADP	C5'-O5'-PA-O1A
3	A	501	ADP	O4'-C4'-C5'-O5'

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	501	ADP	1	0

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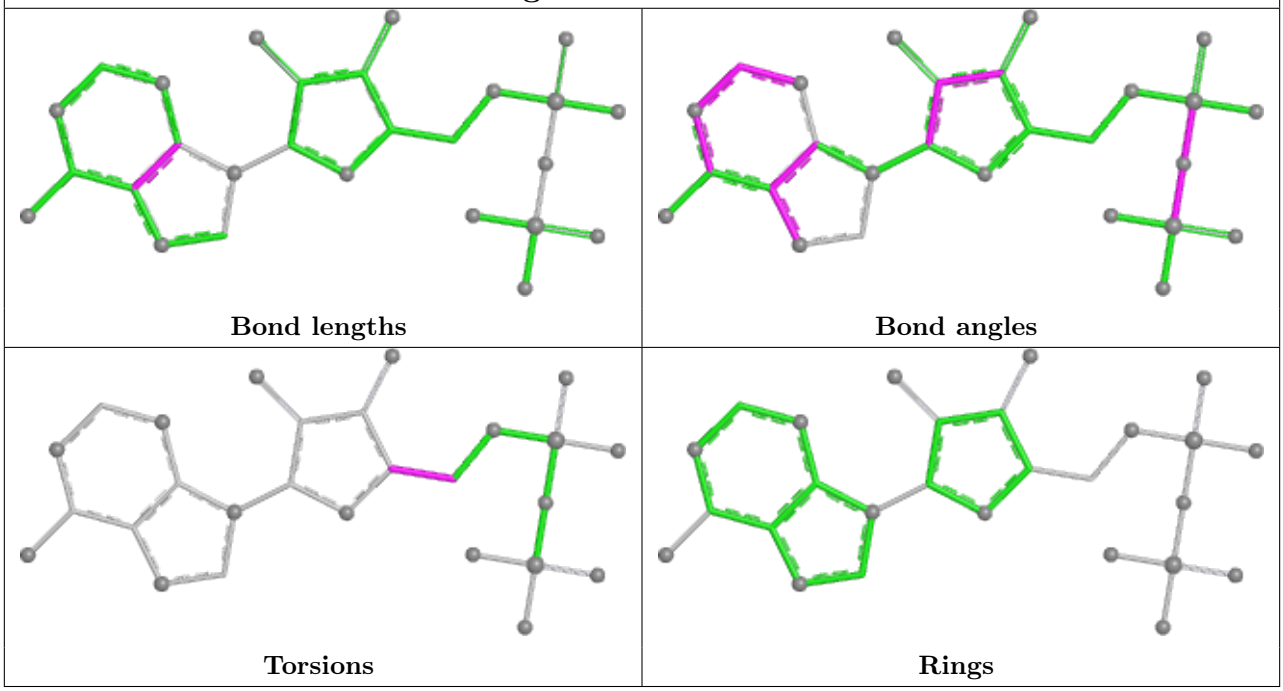
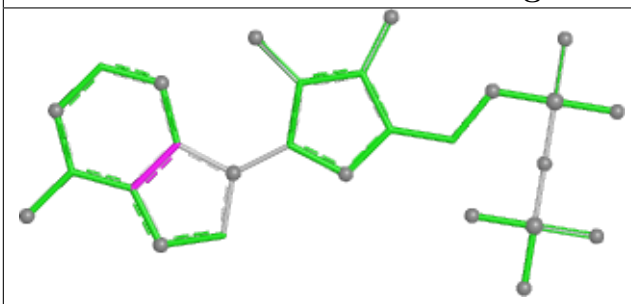
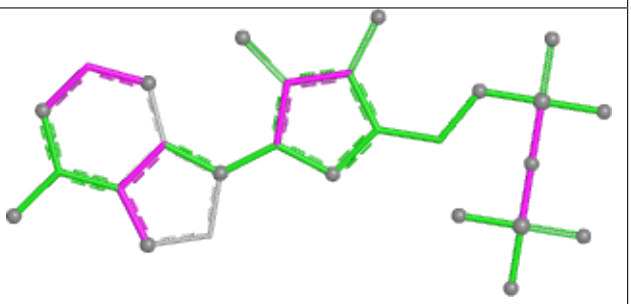
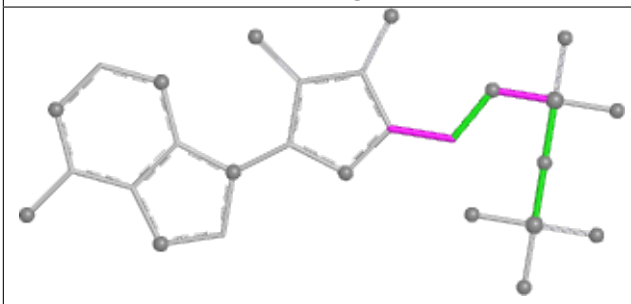
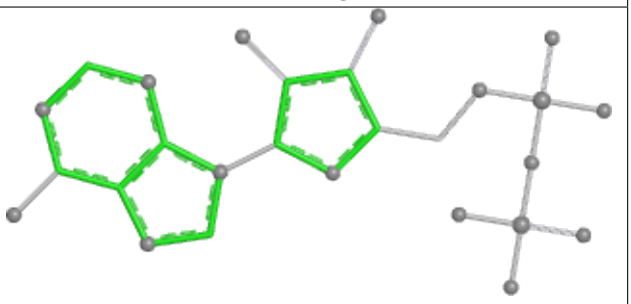
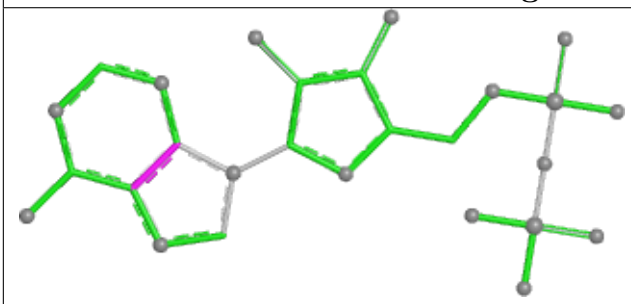
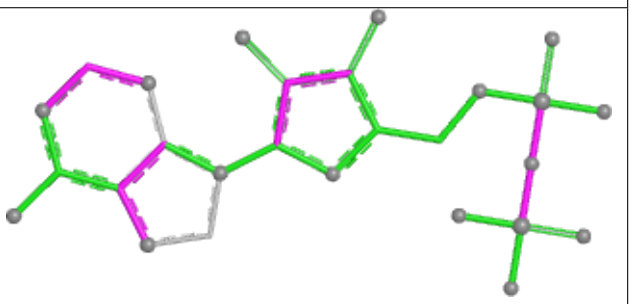
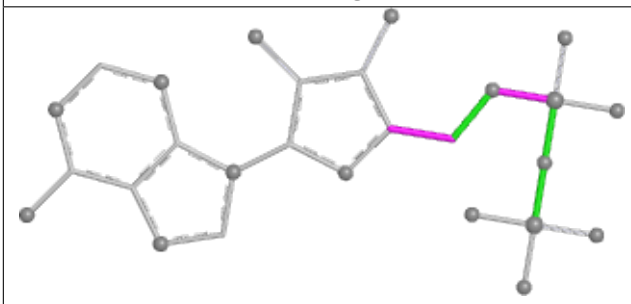
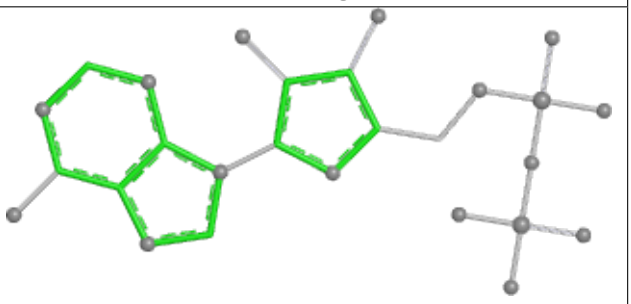
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	501	ADP	1	0

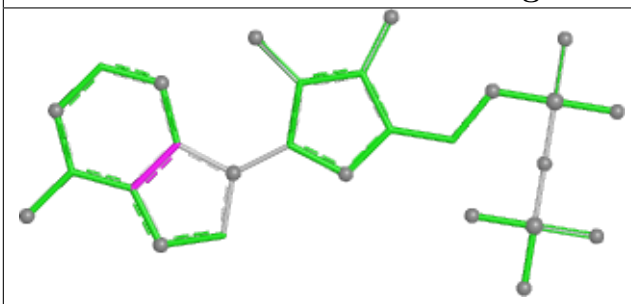
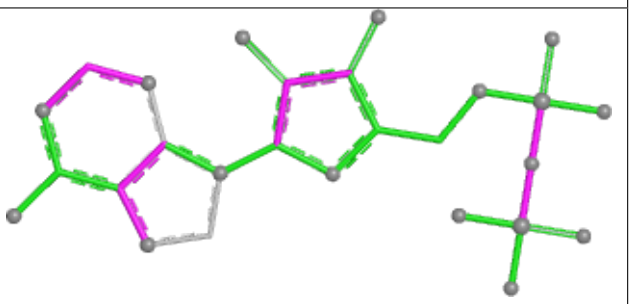
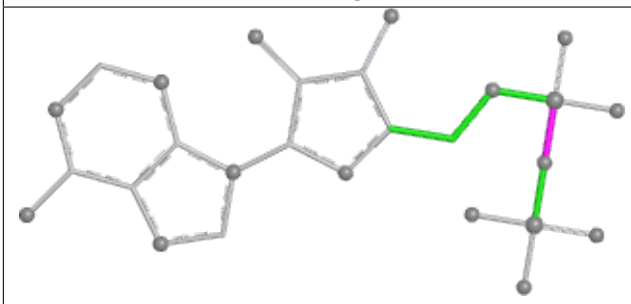
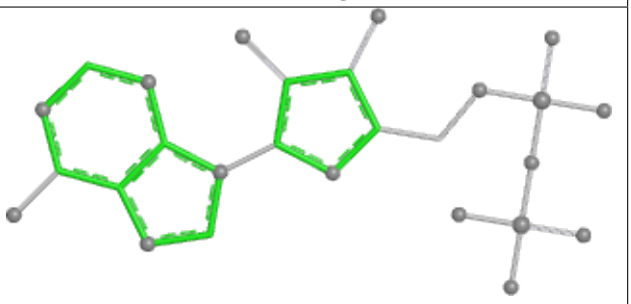
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

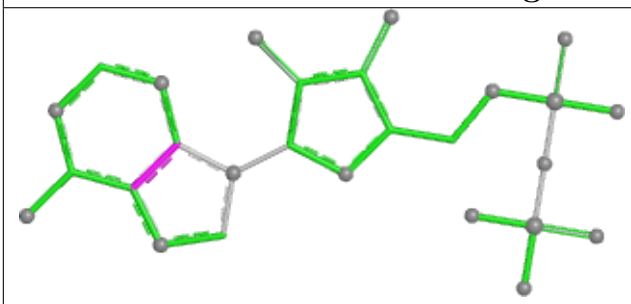
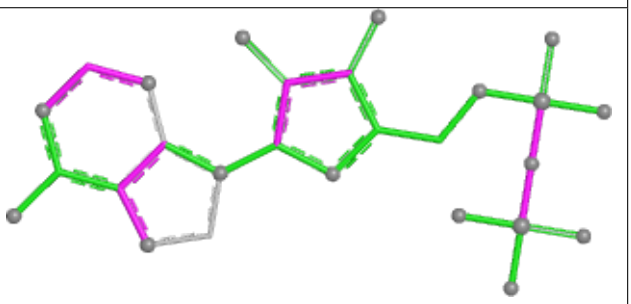
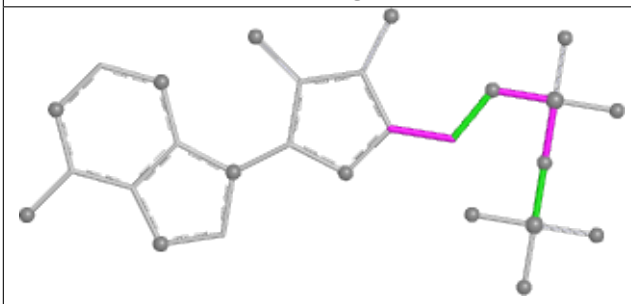
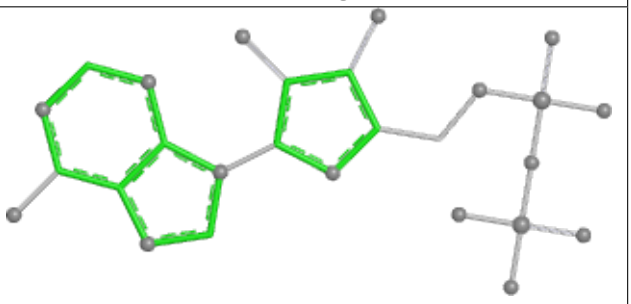
Ligand ADP C 501

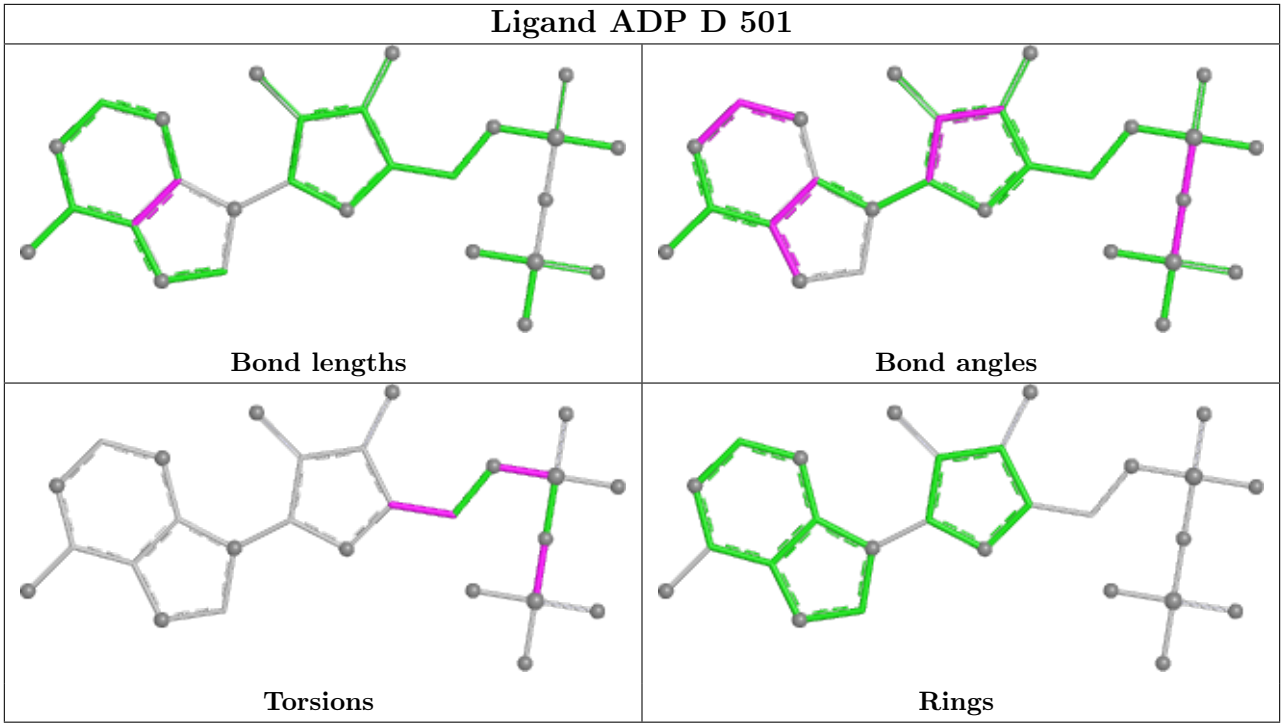


Ligand ADP F 501	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand ADP A 501	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand ADP B 501	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand ADP E 501	
 Bond lengths	 Bond angles
 Torsions	 Rings



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)

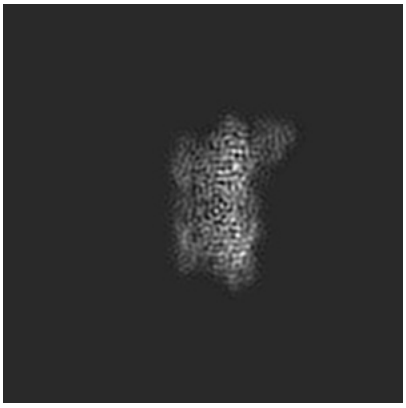
This section contains visualisations of the EMDB entry EMD-4552. These allow visual inspection of the internal detail of the map and identification of artifacts.

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.

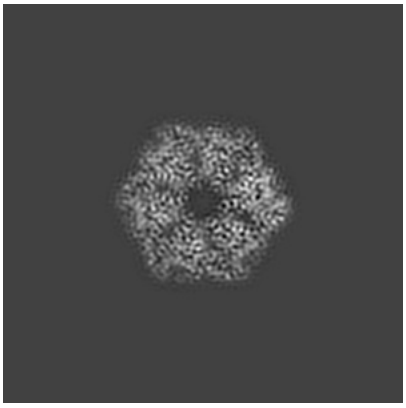
6.1 Orthogonal projections (i)

6.1.1 Primary map

X



Y



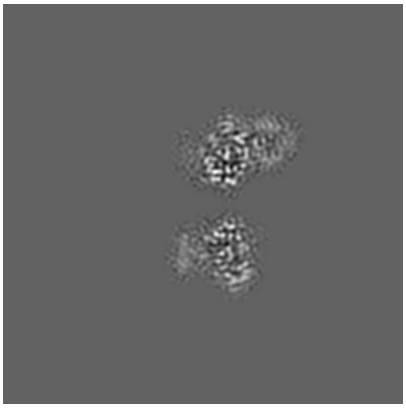
Z

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

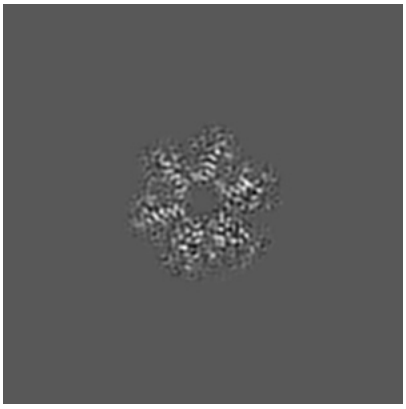
6.2 Central slices (i)

6.2.1 Primary map

X Index: 130



Y Index: 130



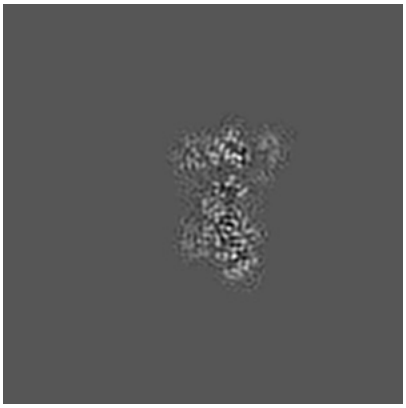
Z Index: 130

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

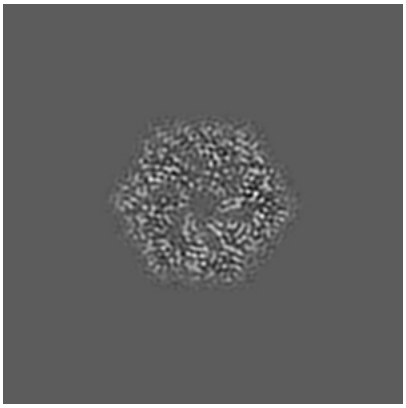
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 150



Y Index: 146



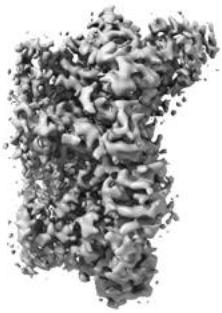
Z Index: 150

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

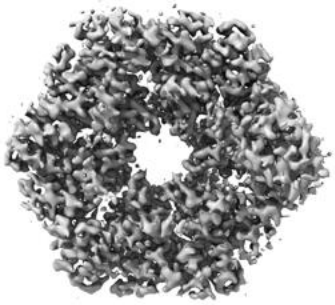
6.4 Orthogonal surface views (i)

6.4.1 Primary map

X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.02. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

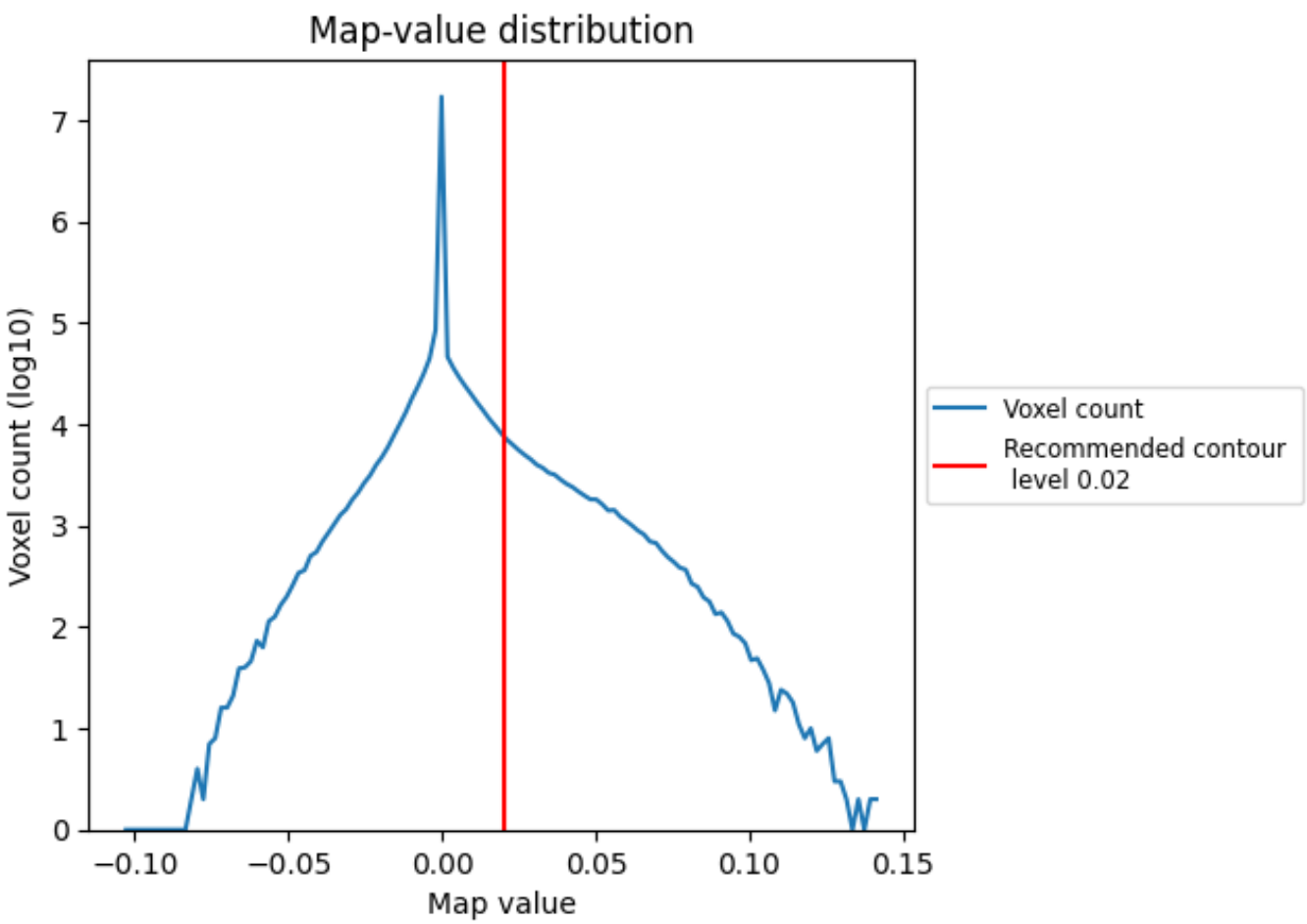
6.5 Mask visualisation (i)

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

7 Map analysis (i)

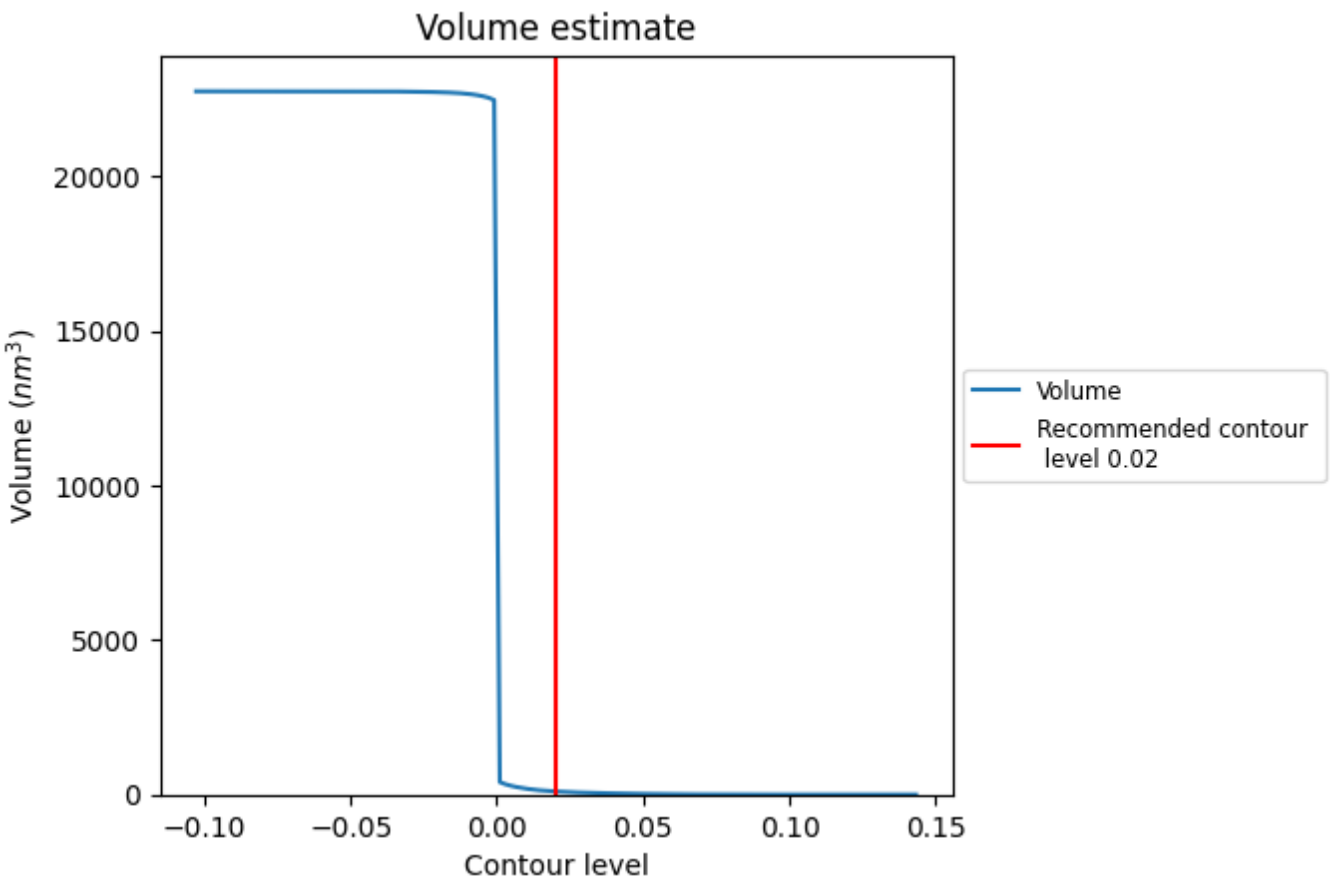
This section contains the results of statistical analysis of the map.

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.

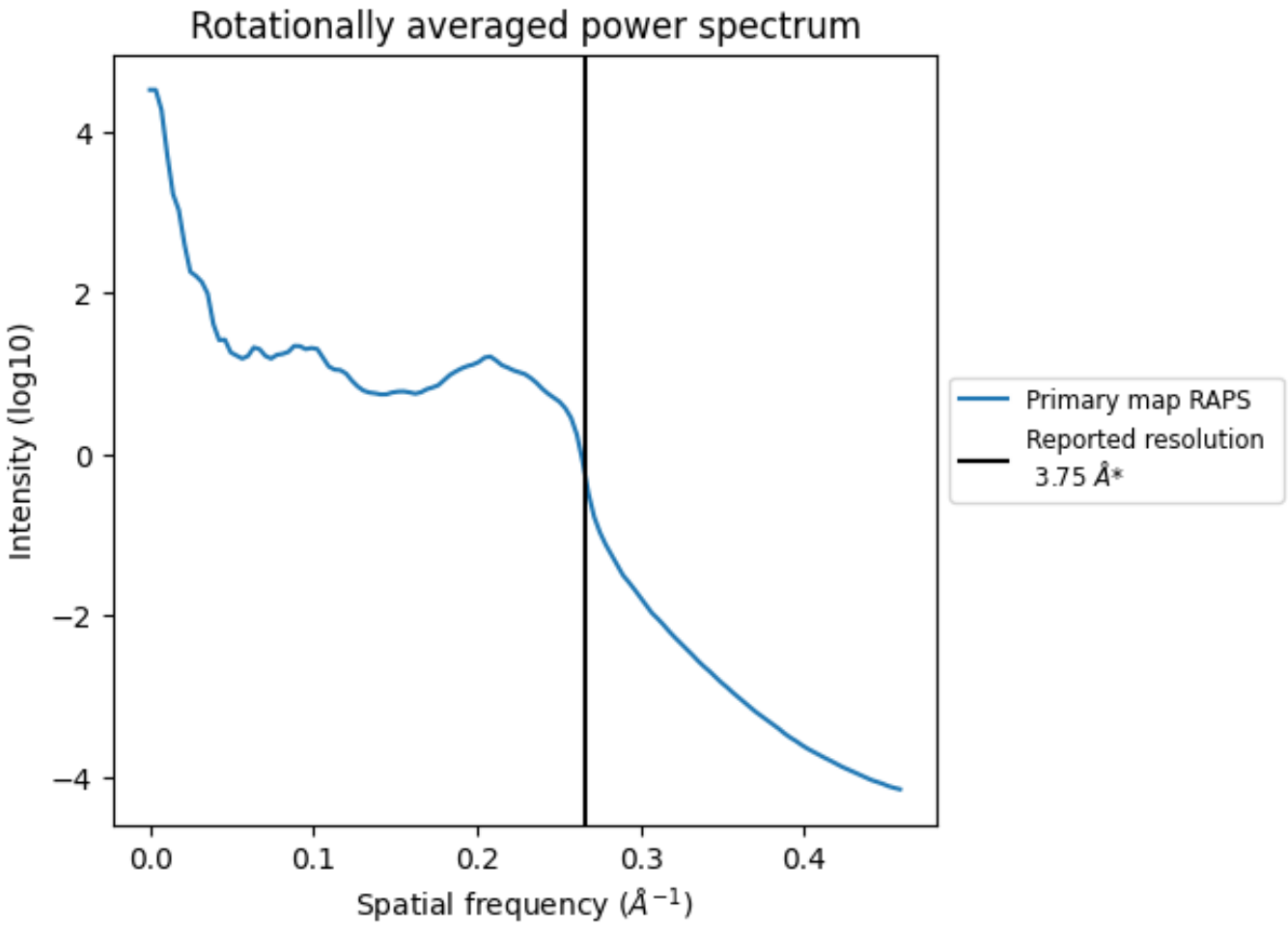
7.2 Volume estimate (i)



The volume at the recommended contour level is 101 nm^3; this corresponds to an approximate mass of 91 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 0.267 Å^{-1}

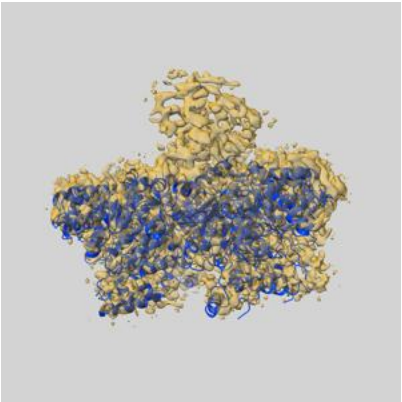
8 Fourier-Shell correlation (i)

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

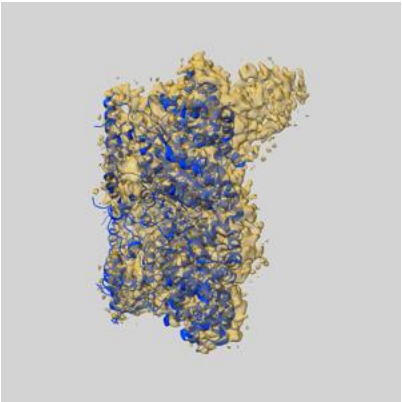
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-4552 and PDB model 6QI8. Per-residue inclusion information can be found in section 3 on page 5.

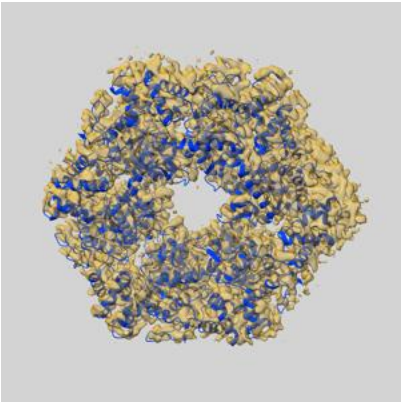
9.1 Map-model overlay (i)



X



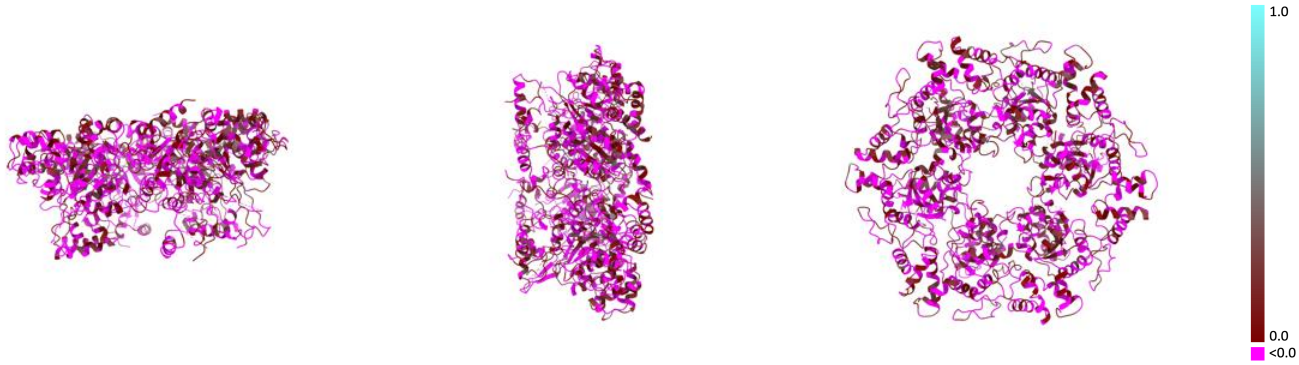
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.02 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

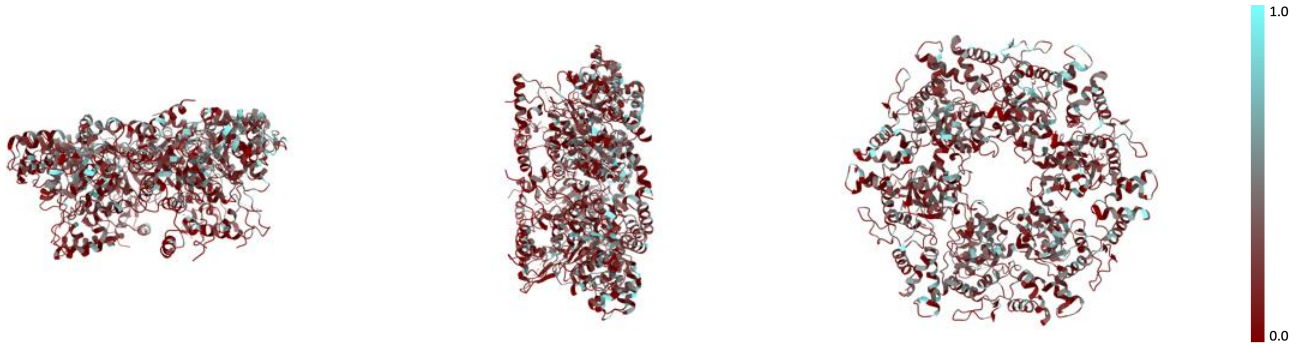
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

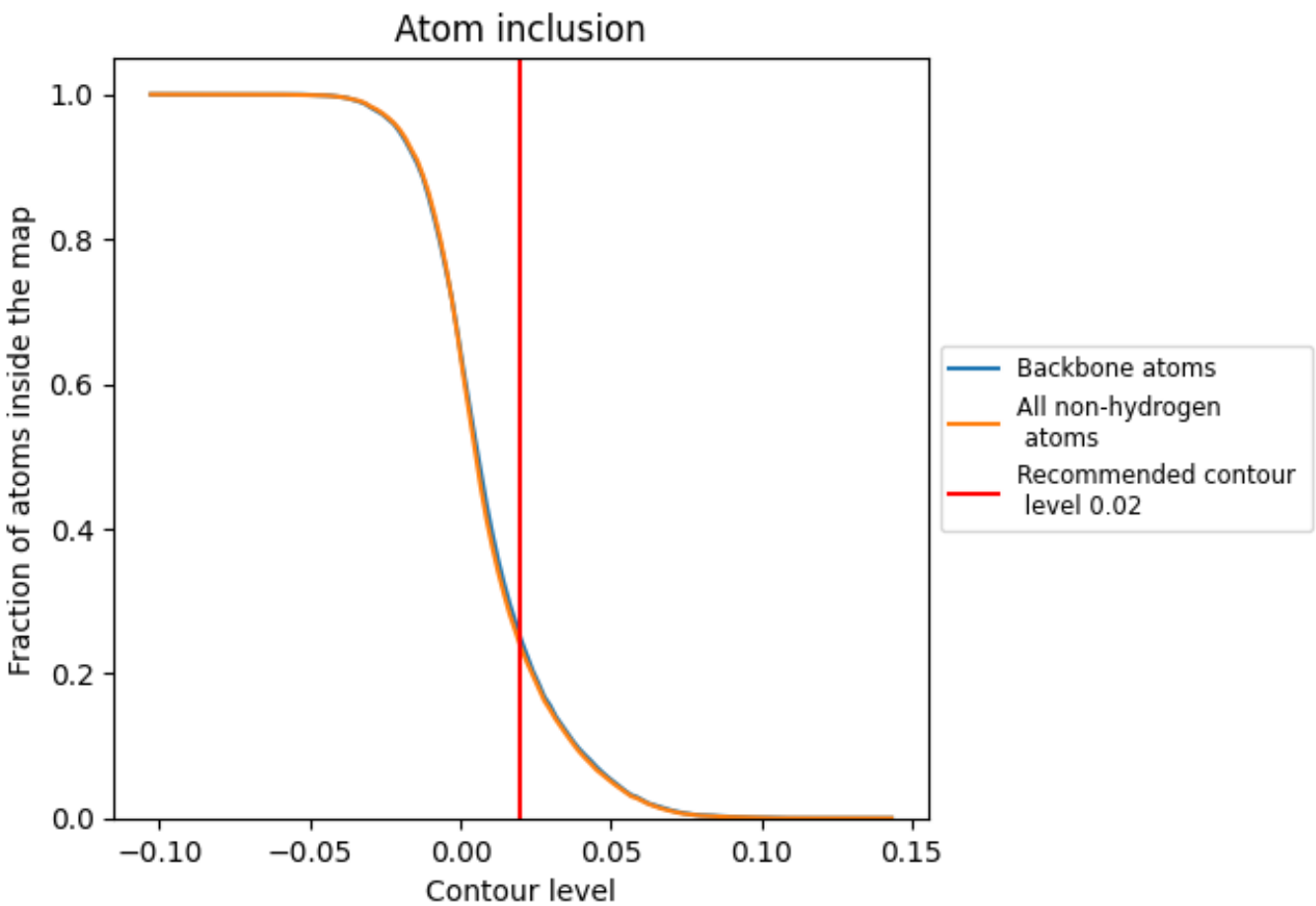
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.02).

9.4 Atom inclusion (i)



At the recommended contour level, 25% of all backbone atoms, 24% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.2364	-0.0080
A	0.2346	-0.0010
B	0.2415	-0.0360
C	0.2352	0.0100
D	0.2372	-0.0130
E	0.2298	-0.0290
F	0.2403	0.0170