



## Full wwPDB EM Validation Report ⓘ

Nov 12, 2022 – 06:41 AM EST

PDB ID : 6UHC  
EMDB ID : EMD-20770  
Title : CryoEM structure of human Arp2/3 complex with bound NPFs  
Authors : Zimmet, A.; van Eeuwen, T.; Dominguez, R.  
Deposited on : 2019-09-27  
Resolution : 3.90 Å(reported)  
Based on initial model : 4JD2

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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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 : 1.8.5 (274361), 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

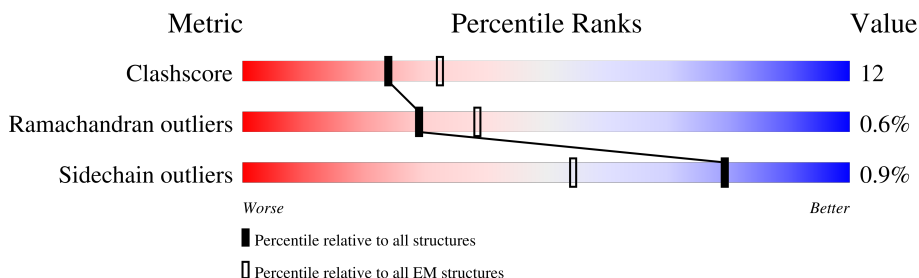
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.90 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.



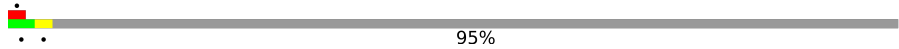
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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	418	
2	B	394	
3	C	372	
4	D	300	
5	E	203	
6	F	168	
7	G	151	
8	H	501	

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Mol	Chain	Length	Quality of chain
8	I	501	 95%

## 2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 14680 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 Actin-related protein 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	404	Total	C	N	O	S	0	0
			3099	1991	518	576	14		

- Molecule 2 is a protein called Actin-related protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	374	Total	C	N	O	S	0	0
			2587	1634	462	483	8		

- Molecule 3 is a protein called Actin-related protein 2/3 complex subunit 1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	354	Total	C	N	O	S	0	0
			2681	1702	471	488	20		

- Molecule 4 is a protein called Actin-related protein 2/3 complex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	283	Total	C	N	O	S	0	0
			2240	1425	387	420	8		

- Molecule 5 is a protein called Actin-related protein 2/3 complex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	173	Total	C	N	O	S	0	0
			1344	864	225	249	6		

There are 25 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	179	GLY	-	expression tag	UNP O15145
E	180	THR	-	expression tag	UNP O15145

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Chain	Residue	Modelled	Actual	Comment	Reference
E	181	SER	-	expression tag	UNP O15145
E	182	GLU	-	expression tag	UNP O15145
E	183	ASN	-	expression tag	UNP O15145
E	184	LEU	-	expression tag	UNP O15145
E	185	TYR	-	expression tag	UNP O15145
E	186	GLN	-	expression tag	UNP O15145
E	187	GLY	-	expression tag	UNP O15145
E	188	GLY	-	expression tag	UNP O15145
E	189	GLY	-	expression tag	UNP O15145
E	190	ASP	-	expression tag	UNP O15145
E	191	TYR	-	expression tag	UNP O15145
E	192	LYS	-	expression tag	UNP O15145
E	193	ASP	-	expression tag	UNP O15145
E	194	ASP	-	expression tag	UNP O15145
E	195	ASP	-	expression tag	UNP O15145
E	196	ASP	-	expression tag	UNP O15145
E	197	LYS	-	expression tag	UNP O15145
E	198	CYS	-	expression tag	UNP O15145
E	199	GLY	-	expression tag	UNP O15145
E	200	ARG	-	expression tag	UNP O15145
E	201	ALA	-	expression tag	UNP O15145
E	202	SER	-	expression tag	UNP O15145
E	203	SER	-	expression tag	UNP O15145

- Molecule 6 is a protein called Actin-related protein 2/3 complex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	166	Total	C	N	O	S	0	0
			1346	860	236	241	9		

- Molecule 7 is a protein called Actin-related protein 2/3 complex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	141	Total	C	N	O	S	0	0
			996	622	178	193	3		

- Molecule 8 is a protein called Neural Wiskott-Aldrich syndrome protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	21	Total	C	N	O	S	0	0
			162	101	28	31	2		

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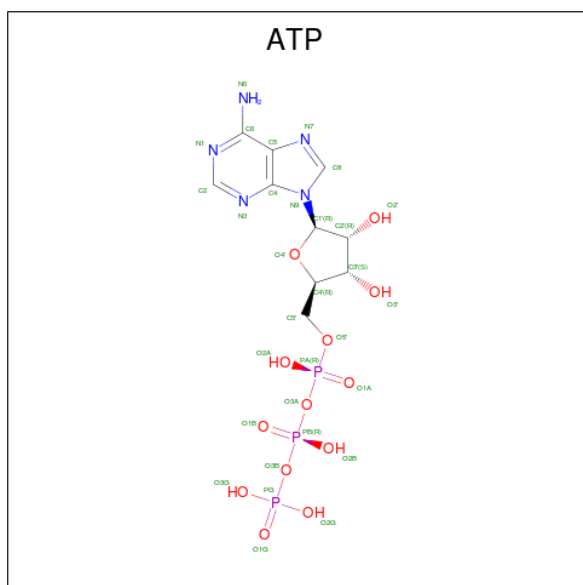
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Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	24	Total	C	N	O	S	0	0
			161	101	25	33	2		

- Molecule 9 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
9	A	1	Total	Mg	0
			1	1	
9	B	1	Total	Mg	0
			1	1	

- Molecule 10 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>5</sub>O<sub>13</sub>P<sub>3</sub>).

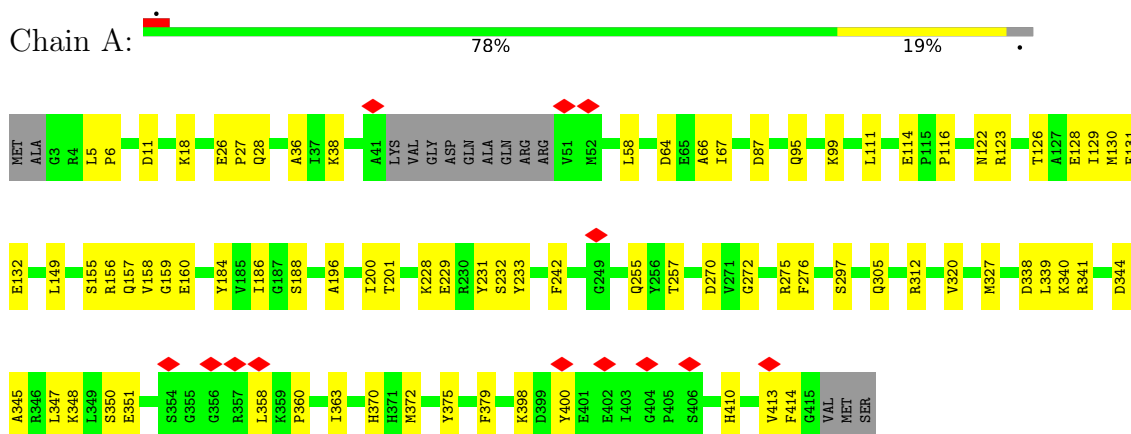


Mol	Chain	Residues	Atoms					AltConf
10	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
10	B	1	Total	C	N	O	P	0
			31	10	5	13	3	

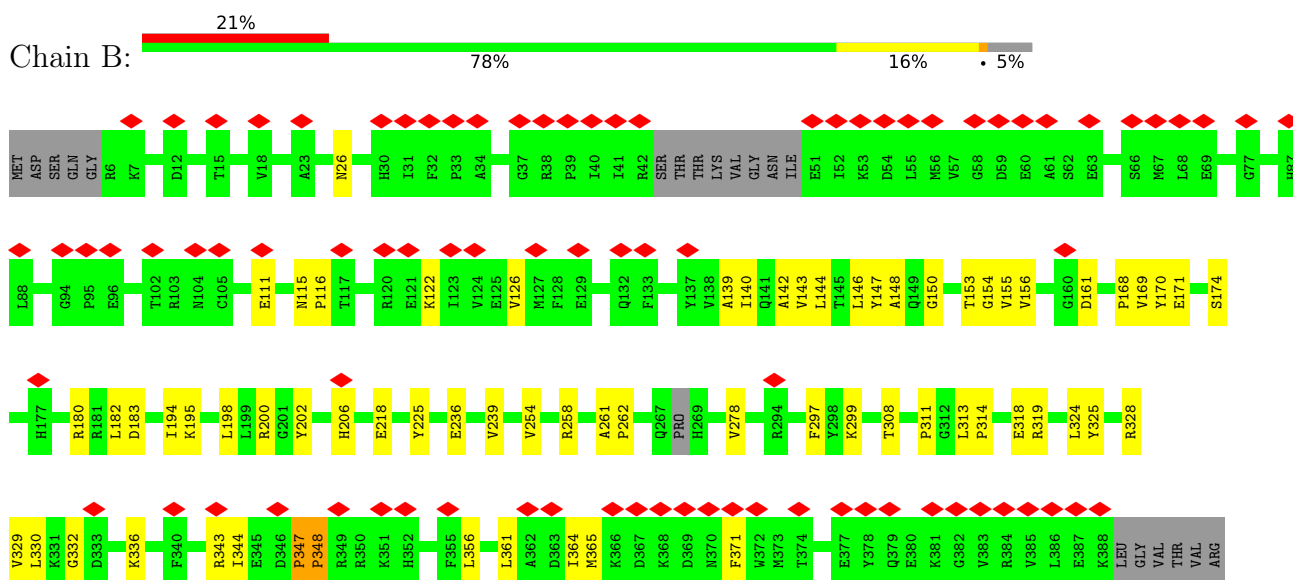
### 3 Residue-property plots

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: Actin-related protein 3

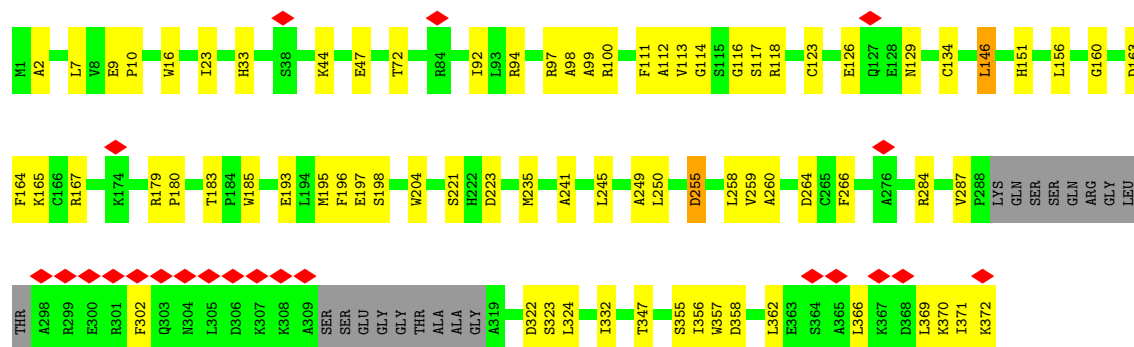


- Molecule 2: Actin-related protein 2



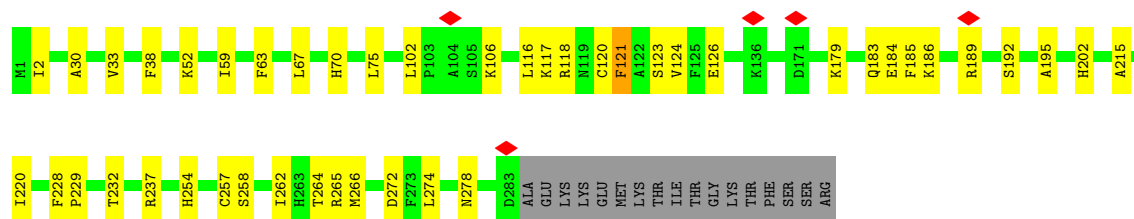
- Molecule 3: Actin-related protein 2/3 complex subunit 1B





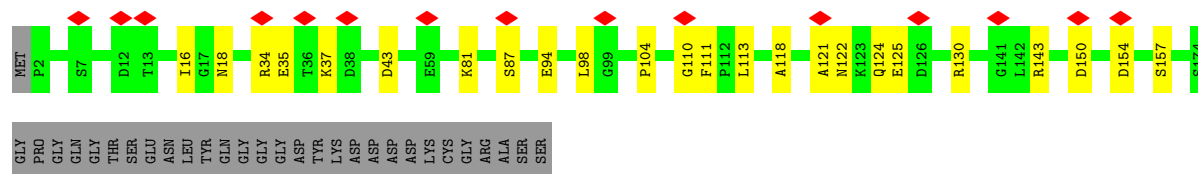
- Molecule 4: Actin-related protein 2/3 complex subunit 2

Chain D: 79% 15% 6%



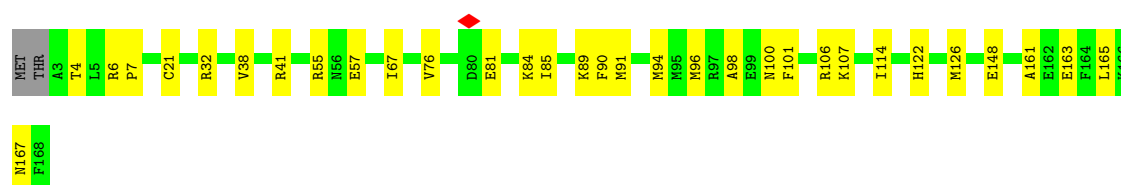
- Molecule 5: Actin-related protein 2/3 complex subunit 3

Chain E: 7% 73% 12% 15%



- Molecule 6: Actin-related protein 2/3 complex subunit 4

Chain F: 80% 19% 1%

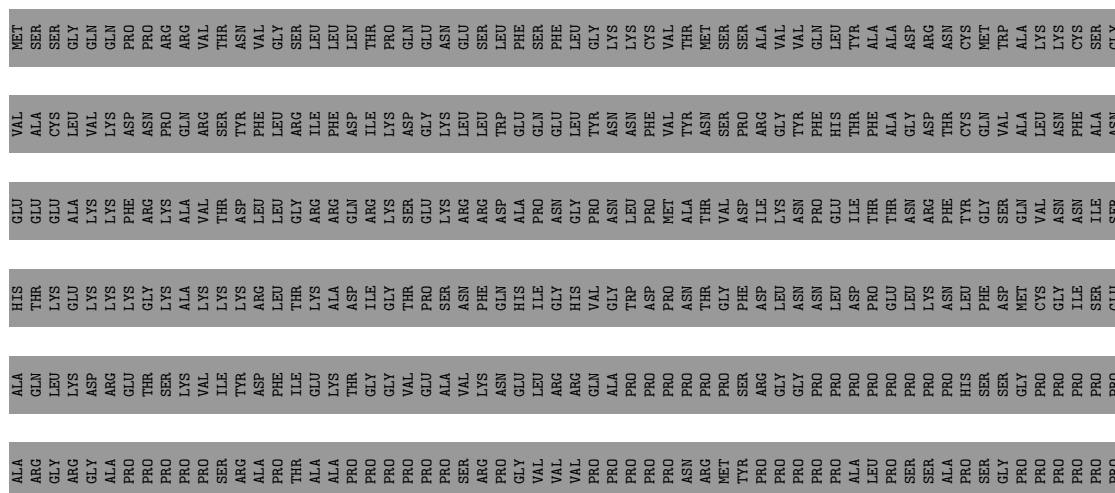


- Molecule 7: Actin-related protein 2/3 complex subunit 5

Chain G: 15% 76% 17% 7%







[illegible]

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	123198	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 ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	-1500	Depositor
Maximum defocus (nm)	-3500	Depositor
Magnification	165000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	3.007	Depositor
Minimum map value	-1.975	Depositor
Average map value	0.006	Depositor
Map value standard deviation	0.088	Depositor
Recommended contour level	0.475	Depositor
Map size (Å)	267.52002, 267.52002, 267.52002	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8360001, 0.8360001, 0.8360001	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, 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	0.57	3/3180 (0.1%)	0.80	8/4331 (0.2%)
2	B	0.41	2/2626 (0.1%)	0.62	2/3573 (0.1%)
3	C	0.43	1/2748 (0.0%)	0.67	5/3734 (0.1%)
4	D	0.40	0/2289	0.63	2/3098 (0.1%)
5	E	0.34	0/1378	0.47	0/1868
6	F	0.43	0/1368	0.65	1/1836 (0.1%)
7	G	0.33	0/1008	0.49	0/1365
8	H	0.19	0/162	0.30	0/213
8	I	0.27	0/162	0.60	0/218
All	All	0.44	6/14921 (0.0%)	0.65	18/20236 (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
1	A	0	1
3	C	0	1
7	G	0	1
All	All	0	3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	347	PRO	N-CD	10.09	1.61	1.47
3	C	180	PRO	N-CD	9.16	1.60	1.47
1	A	196	ALA	C-N	7.99	1.47	1.33
2	B	348	PRO	N-CD	-6.24	1.39	1.47
1	A	6	PRO	C-O	-5.61	1.12	1.23
1	A	116	PRO	C-N	5.46	1.46	1.34

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	148	ALA	N-CA-CB	7.88	121.13	110.10
1	A	410	HIS	N-CA-CB	-7.46	97.16	110.60
6	F	107	LYS	N-CA-CB	-6.52	98.86	110.60
1	A	231	TYR	N-CA-C	6.30	128.02	111.00
4	D	121	PHE	N-CA-C	6.19	127.71	111.00
1	A	196	ALA	O-C-N	-6.16	112.72	123.20
3	C	180	PRO	N-CA-CB	6.00	110.50	103.30
1	A	5	LEU	N-CA-CB	5.96	122.31	110.40
1	A	345	ALA	N-CA-CB	5.94	118.42	110.10
4	D	121	PHE	N-CA-CB	-5.61	100.51	110.60
3	C	146	LEU	N-CA-C	5.52	125.89	111.00
1	A	196	ALA	CA-C-N	5.20	126.60	116.20
2	B	348	PRO	N-CA-CB	-5.19	96.89	102.60
3	C	180	PRO	CA-N-CD	-5.16	104.28	111.50
3	C	255	ASP	CB-CG-OD2	5.16	122.94	118.30
3	C	146	LEU	C-N-CA	5.12	134.50	121.70
1	A	184	TYR	N-CA-C	5.08	124.71	111.00
1	A	410	HIS	N-CA-C	5.04	124.61	111.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	155	SER	Mainchain
3	C	112	ALA	Mainchain
7	G	30	GLY	Mainchain

## 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	3099	0	2912	64	0
2	B	2587	0	2249	63	0
3	C	2681	0	2584	93	0
4	D	2240	0	2158	57	0
5	E	1344	0	1262	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	F	1346	0	1371	35	0
7	G	996	0	944	27	0
8	H	162	0	158	21	0
8	I	161	0	137	8	0
9	A	1	0	0	0	0
9	B	1	0	0	0	0
10	A	31	0	12	2	0
10	B	31	0	12	4	0
All	All	14680	0	13799	343	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 12.

All (343) 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)
8:H:475:SER:O	8:H:477:ALA:N	1.96	0.99
8:I:500:GLU:HG3	8:I:501:ASP:H	1.31	0.95
3:C:369:LEU:C	3:C:370:LYS:HD3	1.91	0.90
7:G:91:ILE:HD11	7:G:128:TRP:CD2	2.10	0.86
4:D:67:LEU:HD13	4:D:120:CYS:SG	2.14	0.86
4:D:102:LEU:HB2	4:D:106:LYS:NZ	1.91	0.86
4:D:102:LEU:CB	4:D:106:LYS:NZ	2.40	0.85
2:B:153:THR:HA	2:B:169:VAL:O	1.76	0.84
5:E:18:ASN:HB2	5:E:118:ALA:CB	2.06	0.84
2:B:171:GLU:O	2:B:171:GLU:CD	2.17	0.84
1:A:327:MET:O	1:A:327:MET:HG3	1.75	0.83
4:D:67:LEU:CD1	4:D:120:CYS:SG	2.66	0.83
1:A:297:SER:CB	1:A:338:ASP:CB	2.57	0.82
4:D:126:GLU:OE2	4:D:237:ARG:NE	2.12	0.82
2:B:171:GLU:O	2:B:171:GLU:OE1	1.97	0.82
4:D:102:LEU:CB	4:D:106:LYS:HZ2	1.92	0.82
7:G:88:ALA:O	7:G:91:ILE:HG22	1.80	0.81
4:D:117:LYS:O	4:D:120:CYS:HB3	1.79	0.81
4:D:102:LEU:HB3	4:D:106:LYS:HZ2	1.43	0.81
4:D:185:PHE:CD1	6:F:165:LEU:HD11	2.16	0.80
2:B:182:LEU:HD11	2:B:278:VAL:HA	1.63	0.80
1:A:123:ARG:O	1:A:126:THR:HG22	1.82	0.80
3:C:165:LYS:HD3	3:C:198:SER:O	1.81	0.79
1:A:201:THR:OG1	1:A:228:LYS:HE2	1.83	0.78
2:B:168:PRO:HB2	2:B:297:PHE:CE1	2.19	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:204:TRP:HZ3	6:F:67:ILE:HG13	1.47	0.78
3:C:358:ASP:O	3:C:362:LEU:HG	1.82	0.78
4:D:30:ALA:HB2	4:D:52:LYS:HE2	1.66	0.77
5:E:121:ALA:O	5:E:125:GLU:HB2	1.85	0.77
3:C:117:SER:O	3:C:118:ARG:HG2	1.85	0.76
3:C:223:ASP:HB3	7:G:146:THR:HG21	1.67	0.76
1:A:347:LEU:HD11	1:A:363:ILE:HD12	1.68	0.76
4:D:185:PHE:CE1	6:F:165:LEU:HD11	2.21	0.76
5:E:18:ASN:HB2	5:E:118:ALA:HB3	1.68	0.75
1:A:149:LEU:HD23	1:A:320:VAL:HG21	1.70	0.74
3:C:250:LEU:HD11	3:C:258:LEU:HB3	1.69	0.74
8:H:467:LEU:HD12	8:H:467:LEU:O	1.87	0.74
1:A:58:LEU:HD21	4:D:257:CYS:SG	2.27	0.74
4:D:189:ARG:HG2	4:D:195:ALA:HB3	1.69	0.73
3:C:204:TRP:CZ3	6:F:67:ILE:HG13	2.23	0.73
7:G:91:ILE:CD1	7:G:128:TRP:CD2	2.71	0.73
8:I:500:GLU:HG3	8:I:501:ASP:N	2.03	0.73
3:C:97:ARG:HG3	3:C:116:GLY:O	1.90	0.72
8:H:475:SER:C	8:H:477:ALA:H	1.93	0.72
3:C:204:TRP:CZ3	6:F:67:ILE:CG1	2.72	0.72
4:D:265:ARG:HH22	6:F:148:GLU:HB3	1.55	0.71
4:D:102:LEU:HB3	4:D:106:LYS:NZ	2.06	0.70
2:B:318:GLU:HG3	2:B:344:ILE:HD12	1.72	0.70
3:C:204:TRP:CZ3	6:F:67:ILE:HD12	2.26	0.70
2:B:299:LYS:HG3	2:B:343:ARG:CG	2.22	0.70
4:D:229:PRO:HA	4:D:232:THR:OG1	1.92	0.70
5:E:104:PRO:HG2	5:E:111:PHE:H	1.57	0.70
7:G:91:ILE:HD11	7:G:128:TRP:CE3	2.26	0.69
2:B:325:TYR:O	2:B:329:VAL:CB	2.40	0.69
3:C:163:ASP:OD2	3:C:167:ARG:NH2	2.25	0.69
5:E:35:GLU:OE1	5:E:37:LYS:HB2	1.93	0.69
3:C:179:ARG:HD3	8:H:499:TRP:CZ3	2.27	0.69
2:B:236:GLU:O	6:F:106:ARG:HB3	1.92	0.69
2:B:365:MET:SD	8:H:463:ILE:HD11	2.33	0.69
1:A:58:LEU:CD2	4:D:257:CYS:SG	2.81	0.68
2:B:347:PRO:HB2	2:B:348:PRO:HD2	1.76	0.68
2:B:330:LEU:HD22	2:B:336:LYS:CB	2.23	0.67
4:D:59:ILE:CG2	4:D:116:LEU:HD21	2.24	0.67
5:E:104:PRO:HG2	5:E:111:PHE:N	2.10	0.67
3:C:287:VAL:HG11	3:C:366:LEU:HD21	1.75	0.67
6:F:6:ARG:HB3	6:F:7:PRO:HD3	1.76	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:126:GLU:OE2	8:H:473:LYS:NZ	2.28	0.67
2:B:299:LYS:HG3	2:B:343:ARG:HG3	1.77	0.66
6:F:81:GLU:HA	6:F:84:LYS:HB3	1.78	0.66
3:C:193:GLU:HG2	3:C:195:MET:HE1	1.78	0.66
1:A:327:MET:O	1:A:327:MET:CG	2.44	0.66
2:B:140:ILE:HG22	2:B:142:ALA:H	1.60	0.66
2:B:115:ASN:ND2	2:B:116:PRO:HD2	2.10	0.65
3:C:163:ASP:OD2	3:C:167:ARG:NH1	2.30	0.65
1:A:233:TYR:HE1	1:A:275:ARG:CZ	2.09	0.65
5:E:18:ASN:HB2	5:E:118:ALA:HB2	1.79	0.65
8:I:498:GLU:HG3	8:I:498:GLU:O	1.96	0.65
4:D:185:PHE:CE1	6:F:165:LEU:CD1	2.79	0.65
3:C:97:ARG:CB	3:C:116:GLY:O	2.45	0.64
2:B:194:ILE:O	2:B:198:LEU:HG	1.97	0.64
6:F:90:PHE:CE2	6:F:94:MET:CE	2.81	0.64
1:A:242:PHE:CZ	1:A:276:PHE:HE1	2.16	0.64
3:C:322:ASP:O	3:C:323:SER:OG	2.13	0.64
1:A:87:ASP:OD1	4:D:264:THR:CG2	2.47	0.63
8:H:475:SER:C	8:H:477:ALA:N	2.47	0.63
3:C:97:ARG:HB2	3:C:116:GLY:C	2.19	0.63
3:C:204:TRP:CE3	6:F:67:ILE:HD12	2.34	0.63
4:D:59:ILE:HG22	4:D:116:LEU:HD21	1.78	0.63
1:A:114:GLU:OE1	1:A:123:ARG:CZ	2.47	0.63
8:H:476:LYS:O	8:H:476:LYS:HG3	1.99	0.63
1:A:305:GLN:OE1	1:A:312:ARG:NH1	2.32	0.62
2:B:140:ILE:CG2	2:B:143:VAL:HG23	2.30	0.62
8:I:500:GLU:CG	8:I:501:ASP:H	2.09	0.62
3:C:100:ARG:HG2	3:C:146:LEU:HD23	1.82	0.62
1:A:340:LYS:O	1:A:340:LYS:HG2	1.99	0.62
6:F:122:HIS:HB3	6:F:126:MET:CE	2.29	0.62
7:G:118:SER:O	7:G:119:ASP:HB2	2.00	0.61
2:B:154:GLY:O	2:B:168:PRO:HA	1.99	0.61
2:B:261:ALA:HB3	2:B:262:PRO:HD3	1.81	0.61
7:G:55:LEU:HD21	7:G:98:LEU:HD11	1.82	0.61
3:C:370:LYS:HD3	3:C:370:LYS:N	2.13	0.61
3:C:117:SER:O	3:C:118:ARG:CG	2.49	0.61
4:D:126:GLU:OE2	4:D:237:ARG:CD	2.48	0.61
1:A:129:ILE:HD12	1:A:129:ILE:O	2.01	0.61
2:B:150:GLY:HA3	8:H:471:MET:HB2	1.83	0.61
2:B:168:PRO:HB2	2:B:297:PHE:CZ	2.36	0.61
3:C:2:ALA:HB3	3:C:356:ILE:HB	1.82	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:G:37:PRO:HB2	7:G:78:ILE:HG21	1.81	0.61
3:C:111:PHE:CE1	3:C:113:VAL:CG2	2.84	0.61
4:D:126:GLU:OE2	4:D:237:ARG:CZ	2.49	0.60
3:C:204:TRP:CZ3	6:F:67:ILE:CD1	2.85	0.60
2:B:325:TYR:HA	2:B:329:VAL:CB	2.30	0.60
1:A:95:GLN:OE1	1:A:99:LYS:HB2	2.01	0.60
4:D:179:LYS:O	4:D:183:GLN:HG2	2.01	0.60
1:A:350:SER:O	1:A:358:LEU:HA	2.01	0.60
7:G:37:PRO:HB3	7:G:58:ALA:HA	1.84	0.60
3:C:347:THR:OG1	3:C:355:SER:OG	2.21	0.59
4:D:2:ILE:HD13	6:F:163:GLU:HG2	1.84	0.59
3:C:204:TRP:CH2	6:F:67:ILE:HB	2.36	0.59
4:D:126:GLU:OE2	4:D:237:ARG:HD2	2.02	0.59
6:F:90:PHE:CE2	6:F:94:MET:HE1	2.36	0.59
7:G:110:ILE:HG23	7:G:125:LEU:HD22	1.84	0.59
3:C:44:LYS:HE2	3:C:47:GLU:HG3	1.85	0.59
3:C:250:LEU:HD13	3:C:260:ALA:HB2	1.85	0.59
8:H:464:VAL:O	8:H:468:MET:HG3	2.02	0.59
3:C:111:PHE:HE1	3:C:113:VAL:CG2	2.16	0.59
4:D:118:ARG:HD3	4:D:118:ARG:C	2.24	0.58
1:A:128:GLU:OE2	6:F:96:MET:SD	2.62	0.58
6:F:91:MET:SD	6:F:114:ILE:HB	2.42	0.58
1:A:242:PHE:CZ	1:A:276:PHE:CE1	2.91	0.58
3:C:163:ASP:OD2	3:C:167:ARG:CZ	2.52	0.58
1:A:11:ASP:OD2	1:A:18:LYS:NZ	2.26	0.58
3:C:33:HIS:CD2	3:C:44:LYS:HZ1	2.22	0.57
1:A:233:TYR:N	1:A:233:TYR:CD1	2.73	0.57
3:C:204:TRP:O	3:C:221:SER:HA	2.04	0.57
7:G:77:SER:O	7:G:81:LYS:HG3	2.03	0.57
3:C:111:PHE:CD1	3:C:113:VAL:HG23	2.39	0.57
2:B:161:ASP:HA	10:B:502:ATP:O3'	2.05	0.57
3:C:97:ARG:HB2	3:C:116:GLY:O	2.04	0.57
3:C:371:ILE:O	3:C:372:LYS:HB2	2.05	0.57
2:B:144:LEU:HA	2:B:147:TYR:HD2	1.70	0.56
1:A:87:ASP:OD1	4:D:264:THR:HG21	2.06	0.56
7:G:91:ILE:HD11	7:G:128:TRP:HA	1.85	0.56
3:C:97:ARG:CG	3:C:116:GLY:O	2.53	0.56
3:C:126:GLU:CD	8:H:473:LYS:HZ1	2.08	0.56
1:A:229:GLU:HG3	10:A:502:ATP:N6	2.21	0.56
3:C:111:PHE:CE1	3:C:113:VAL:HG23	2.41	0.56
1:A:255:GLN:OE1	1:A:270:ASP:OD1	2.24	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:264:ASP:HB3	3:C:266:PHE:CE2	2.41	0.56
2:B:239:VAL:HG12	2:B:239:VAL:O	2.04	0.56
5:E:81:LYS:CB	5:E:98:LEU:HD11	2.36	0.56
2:B:299:LYS:HG3	2:B:343:ARG:HG2	1.87	0.55
1:A:229:GLU:HG3	10:A:502:ATP:C6	2.41	0.55
1:A:233:TYR:CE1	1:A:275:ARG:NH2	2.74	0.55
2:B:308:THR:HA	2:B:313:LEU:HD22	1.87	0.55
1:A:375:TYR:O	1:A:379:PHE:CB	2.55	0.55
1:A:232:SER:CB	1:A:275:ARG:O	2.55	0.55
4:D:184:GLU:HA	4:D:184:GLU:OE1	2.07	0.55
8:I:470:VAL:O	8:I:474:ARG:N	2.26	0.55
1:A:87:ASP:OD1	4:D:264:THR:HG22	2.07	0.54
2:B:324:LEU:O	2:B:328:ARG:N	2.39	0.54
3:C:123:CYS:SG	3:C:134:CYS:CB	2.96	0.54
4:D:183:GLN:O	4:D:186:LYS:HB3	2.07	0.54
5:E:94:GLU:O	5:E:98:LEU:HG	2.08	0.54
6:F:4:THR:HG23	6:F:55:ARG:HE	1.73	0.53
3:C:357:TRP:N	3:C:357:TRP:CD1	2.76	0.53
5:E:110:GLY:CA	5:E:111:PHE:C	2.78	0.52
2:B:343:ARG:NH2	8:H:477:ALA:HB3	2.24	0.52
8:I:500:GLU:HA	8:I:500:GLU:OE1	2.09	0.52
1:A:201:THR:OG1	1:A:228:LYS:CE	2.56	0.52
7:G:91:ILE:CD1	7:G:128:TRP:HA	2.40	0.52
4:D:272:ASP:OD1	4:D:272:ASP:O	2.28	0.52
3:C:94:ARG:HG2	3:C:94:ARG:O	2.09	0.51
3:C:249:ALA:HB1	3:C:332:ILE:HG22	1.91	0.51
2:B:153:THR:HG21	2:B:170:TYR:HD1	1.75	0.51
4:D:63:PHE:CE2	4:D:121:PHE:CE1	2.98	0.51
1:A:26:GLU:HB2	1:A:375:TYR:CE2	2.46	0.51
2:B:155:VAL:HG22	2:B:168:PRO:HB3	1.91	0.51
8:H:475:SER:O	8:H:476:LYS:C	2.49	0.51
1:A:114:GLU:OE2	1:A:123:ARG:NE	2.44	0.51
2:B:299:LYS:O	2:B:299:LYS:HG2	2.10	0.51
3:C:165:LYS:CD	3:C:198:SER:O	2.54	0.51
1:A:200:ILE:HG22	1:A:228:LYS:CD	2.41	0.50
8:H:466:ALA:O	8:H:470:VAL:HG23	2.11	0.50
2:B:198:LEU:HD23	2:B:202:TYR:O	2.11	0.50
7:G:37:PRO:O	7:G:78:ILE:HD13	2.11	0.50
2:B:161:ASP:CB	10:B:502:ATP:O3'	2.59	0.50
4:D:63:PHE:CE2	4:D:121:PHE:HE1	2.28	0.50
4:D:274:LEU:HD21	6:F:100:ASN:HB3	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:375:TYR:O	1:A:379:PHE:HB2	2.11	0.50
2:B:140:ILE:HG21	2:B:143:VAL:HG23	1.94	0.50
4:D:67:LEU:HD12	4:D:120:CYS:SG	2.49	0.50
3:C:193:GLU:CG	3:C:195:MET:HE1	2.42	0.50
5:E:150:ASP:OD1	5:E:157:SER:HB2	2.11	0.50
4:D:215:ALA:O	4:D:220:ILE:HD13	2.13	0.49
3:C:118:ARG:NE	7:G:22:ASN:CB	2.75	0.49
3:C:123:CYS:SG	3:C:134:CYS:HB2	2.52	0.49
3:C:250:LEU:HD12	3:C:259:VAL:O	2.12	0.49
5:E:81:LYS:HB3	5:E:98:LEU:HD11	1.95	0.49
1:A:64:ASP:O	1:A:67:ILE:HG22	2.11	0.49
5:E:16:ILE:HG23	5:E:16:ILE:O	2.12	0.49
4:D:202:HIS:O	4:D:220:ILE:O	2.30	0.49
3:C:129:ASN:HD22	8:H:473:LYS:HE3	1.77	0.49
5:E:87:SER:HA	5:E:154:ASP:HB3	1.93	0.49
6:F:81:GLU:O	6:F:85:ILE:N	2.41	0.49
2:B:140:ILE:HG22	2:B:142:ALA:N	2.28	0.49
7:G:95:VAL:HG12	7:G:95:VAL:O	2.12	0.48
3:C:196:PHE:HD1	3:C:235:MET:SD	2.37	0.48
1:A:370:HIS:NE2	1:A:372:MET:O	2.47	0.48
3:C:99:ALA:HA	3:C:114:GLY:O	2.14	0.48
4:D:63:PHE:HE2	4:D:121:PHE:CE1	2.31	0.48
2:B:26:ASN:O	2:B:356:LEU:HD11	2.14	0.47
3:C:117:SER:C	3:C:118:ARG:HG2	2.33	0.47
1:A:233:TYR:CE1	1:A:275:ARG:CZ	2.95	0.47
2:B:218:GLU:HG2	10:B:502:ATP:C5	2.49	0.47
3:C:72:THR:HA	3:C:98:ALA:HB1	1.94	0.47
3:C:287:VAL:CG1	3:C:366:LEU:HD21	2.43	0.47
2:B:194:ILE:HD13	2:B:206:HIS:HA	1.97	0.47
3:C:16:TRP:CZ2	3:C:23:ILE:HD12	2.49	0.47
4:D:192:SER:HB2	4:D:195:ALA:HB2	1.96	0.47
3:C:123:CYS:SG	3:C:134:CYS:HB3	2.55	0.47
2:B:324:LEU:O	2:B:328:ARG:CB	2.63	0.47
1:A:186:ILE:HG22	1:A:188:SER:H	1.80	0.47
1:A:200:ILE:HG22	1:A:228:LYS:HD3	1.95	0.47
3:C:111:PHE:HE1	3:C:113:VAL:HG21	1.79	0.47
6:F:163:GLU:O	6:F:167:ASN:ND2	2.47	0.47
2:B:143:VAL:O	2:B:146:LEU:N	2.42	0.46
2:B:147:TYR:HD1	8:H:467:LEU:CD2	2.28	0.46
4:D:229:PRO:HA	4:D:232:THR:HG1	1.81	0.46
7:G:91:ILE:HD11	7:G:128:TRP:CG	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:313:LEU:HB3	2:B:314:PRO:HD3	1.96	0.46
3:C:204:TRP:O	3:C:221:SER:HB3	2.16	0.46
2:B:142:ALA:O	2:B:156:VAL:HG21	2.16	0.46
3:C:9:GLU:HB3	3:C:10:PRO:HD2	1.96	0.46
3:C:204:TRP:CH2	6:F:67:ILE:CB	2.99	0.46
5:E:35:GLU:OE1	5:E:37:LYS:HD2	2.15	0.46
2:B:153:THR:OG1	2:B:171:GLU:N	2.43	0.46
2:B:311:PRO:HA	6:F:32:ARG:NH2	2.30	0.46
3:C:44:LYS:NZ	3:C:47:GLU:HG2	2.31	0.46
3:C:255:ASP:OD1	3:C:255:ASP:O	2.33	0.46
5:E:43:ASP:OD1	5:E:143:ARG:NH1	2.49	0.46
1:A:38:LYS:HE2	1:A:38:LYS:HA	1.98	0.46
1:A:95:GLN:OE1	1:A:99:LYS:HD2	2.16	0.46
1:A:233:TYR:O	1:A:233:TYR:CD2	2.69	0.46
7:G:12:ARG:NH1	7:G:12:ARG:HG3	2.31	0.46
3:C:164:PHE:O	3:C:165:LYS:HG3	2.16	0.46
7:G:106:LEU:O	7:G:110:ILE:HG13	2.16	0.46
6:F:161:ALA:O	6:F:165:LEU:HD13	2.16	0.45
1:A:131:PHE:CD2	1:A:400:TYR:CD1	3.04	0.45
1:A:351:GLU:HA	1:A:358:LEU:CB	2.46	0.45
2:B:347:PRO:CB	2:B:348:PRO:HD2	2.40	0.45
4:D:102:LEU:HB2	4:D:106:LYS:HZ1	1.77	0.45
6:F:38:VAL:O	6:F:41:ARG:NH1	2.48	0.45
1:A:375:TYR:O	1:A:379:PHE:HB3	2.16	0.45
3:C:100:ARG:CG	3:C:146:LEU:HD23	2.47	0.45
3:C:100:ARG:NE	3:C:146:LEU:HD21	2.32	0.45
2:B:299:LYS:HE3	2:B:343:ARG:HH11	1.82	0.45
7:G:12:ARG:HG3	7:G:12:ARG:HH11	1.81	0.45
4:D:38:PHE:HB2	4:D:117:LYS:HZ3	1.82	0.45
1:A:344:ASP:O	1:A:348:LYS:N	2.44	0.44
3:C:167:ARG:HG2	3:C:197:GLU:HG3	1.98	0.44
6:F:122:HIS:HB3	6:F:126:MET:HE2	1.99	0.44
5:E:122:ASN:ND2	5:E:124:GLN:NE2	2.66	0.44
1:A:233:TYR:O	1:A:233:TYR:CG	2.71	0.44
2:B:254:VAL:HG12	2:B:258:ARG:HG3	1.99	0.44
4:D:118:ARG:C	4:D:118:ARG:CD	2.85	0.44
1:A:200:ILE:CG2	1:A:228:LYS:HD2	2.48	0.44
2:B:155:VAL:HG12	2:B:156:VAL:N	2.33	0.44
3:C:165:LYS:HG2	3:C:198:SER:OG	2.17	0.44
4:D:262:ILE:O	4:D:266:MET:HG3	2.18	0.44
2:B:122:LYS:O	2:B:126:VAL:HG23	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:143:VAL:HG12	2:B:147:TYR:CE2	2.52	0.44
2:B:195:LYS:HA	2:B:198:LEU:HD12	2.00	0.44
3:C:241:ALA:HB1	7:G:143:ARG:NH1	2.32	0.44
7:G:37:PRO:HG3	7:G:58:ALA:O	2.18	0.44
3:C:266:PHE:CD2	3:C:284:ARG:NH1	2.84	0.44
1:A:414:PHE:O	1:A:414:PHE:CD1	2.70	0.44
5:E:34:ARG:HD3	5:E:34:ARG:HA	1.81	0.43
2:B:218:GLU:HG2	10:B:502:ATP:C6	2.53	0.43
3:C:146:LEU:N	3:C:160:GLY:O	2.49	0.43
1:A:87:ASP:CG	4:D:264:THR:HG22	2.39	0.43
1:A:156:ARG:O	1:A:158:VAL:N	2.50	0.43
3:C:266:PHE:CE2	3:C:284:ARG:NH1	2.87	0.43
1:A:257:THR:HG23	1:A:257:THR:O	2.18	0.43
3:C:204:TRP:CD1	3:C:204:TRP:N	2.83	0.43
1:A:339:LEU:HD23	1:A:339:LEU:HA	1.72	0.43
4:D:254:HIS:O	4:D:258:SER:HB2	2.19	0.43
2:B:153:THR:OG1	2:B:170:TYR:HA	2.18	0.43
4:D:228:PHE:HB3	4:D:229:PRO:HD2	1.99	0.43
1:A:114:GLU:OE1	1:A:123:ARG:NH2	2.52	0.43
4:D:278:ASN:OD1	4:D:278:ASN:O	2.36	0.43
6:F:57:GLU:HG2	7:G:117:PRO:O	2.19	0.43
2:B:169:VAL:CB	2:B:174:SER:HB3	2.49	0.42
2:B:365:MET:HG2	2:B:371:PHE:CG	2.53	0.42
3:C:44:LYS:HE2	3:C:47:GLU:CG	2.48	0.42
3:C:324:LEU:CB	3:C:357:TRP:CH2	3.01	0.42
8:I:470:VAL:HG12	8:I:474:ARG:CB	2.49	0.42
3:C:92:ILE:O	3:C:92:ILE:HG22	2.19	0.42
3:C:204:TRP:O	3:C:221:SER:CA	2.67	0.42
6:F:98:ALA:O	6:F:101:PHE:O	2.38	0.42
3:C:126:GLU:OE2	8:H:473:LYS:CE	2.67	0.42
3:C:287:VAL:CG2	3:C:366:LEU:HD11	2.50	0.42
4:D:121:PHE:N	4:D:121:PHE:CD1	2.82	0.42
3:C:126:GLU:OE2	8:H:473:LYS:HE3	2.19	0.42
3:C:245:LEU:HD22	6:F:21:CYS:SG	2.60	0.42
4:D:59:ILE:CG2	4:D:116:LEU:CD2	2.95	0.42
1:A:36:ALA:HB2	1:A:66:ALA:HB1	2.01	0.42
3:C:183:THR:OG1	3:C:185:TRP:HB2	2.20	0.42
4:D:59:ILE:HB	4:D:116:LEU:HD23	2.01	0.42
7:G:28:GLU:CB	7:G:149:LYS:NZ	2.83	0.42
3:C:97:ARG:HB2	3:C:116:GLY:CA	2.50	0.41
3:C:100:ARG:HG2	3:C:146:LEU:CD2	2.49	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:196:PHE:CD1	3:C:235:MET:SD	3.12	0.41
7:G:91:ILE:HD12	7:G:128:TRP:CD2	2.53	0.41
6:F:76:VAL:HG21	6:F:91:MET:CE	2.51	0.41
7:G:91:ILE:HD12	7:G:128:TRP:CE2	2.54	0.41
1:A:341:ARG:HD3	1:A:341:ARG:HA	1.77	0.41
3:C:204:TRP:CZ3	6:F:67:ILE:CB	3.04	0.41
7:G:91:ILE:CD1	7:G:128:TRP:CG	3.04	0.41
1:A:28:GLN:HE22	4:D:33:VAL:CG1	2.33	0.41
2:B:144:LEU:HA	2:B:147:TYR:CD2	2.54	0.41
3:C:44:LYS:HZ1	3:C:47:GLU:HG2	1.86	0.41
3:C:151:HIS:CB	3:C:156:LEU:HB2	2.51	0.41
3:C:151:HIS:HB2	3:C:156:LEU:HB2	2.02	0.41
2:B:325:TYR:CA	2:B:329:VAL:CB	2.98	0.41
2:B:364:ILE:HD12	8:H:463:ILE:HG12	2.03	0.41
8:H:470:VAL:HG12	8:H:470:VAL:O	2.20	0.41
1:A:87:ASP:CG	4:D:264:THR:CG2	2.89	0.41
1:A:242:PHE:CE1	1:A:276:PHE:HZ	2.39	0.41
1:A:414:PHE:O	1:A:414:PHE:CG	2.74	0.41
2:B:111:GLU:N	2:B:139:ALA:O	2.54	0.41
3:C:44:LYS:CE	3:C:47:GLU:CG	2.99	0.41
4:D:70:HIS:O	4:D:123:SER:HB2	2.20	0.41
8:I:471:MET:HE3	8:I:475:SER:HB2	2.02	0.41
1:A:132:GLU:OE1	6:F:89:LYS:HE3	2.21	0.40
1:A:111:LEU:C	1:A:111:LEU:HD23	2.42	0.40
4:D:75:LEU:HD23	4:D:75:LEU:C	2.41	0.40
1:A:26:GLU:HB2	1:A:27:PRO:HD2	2.03	0.40
2:B:150:GLY:HA2	8:H:467:LEU:HD11	2.03	0.40
3:C:7:LEU:HD23	3:C:7:LEU:N	2.37	0.40
2:B:225:TYR:CZ	2:B:319:ARG:HD2	2.56	0.40
4:D:70:HIS:CG	4:D:124:VAL:HG22	2.57	0.40
5:E:111:PHE:O	5:E:113:LEU:N	2.47	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	400/418 (96%)	358 (90%)	35 (9%)	7 (2%)	8	42
2	B	368/394 (93%)	333 (90%)	34 (9%)	1 (0%)	41	75
3	C	348/372 (94%)	319 (92%)	28 (8%)	1 (0%)	41	75
4	D	281/300 (94%)	266 (95%)	15 (5%)	0	100	100
5	E	171/203 (84%)	157 (92%)	14 (8%)	0	100	100
6	F	164/168 (98%)	158 (96%)	6 (4%)	0	100	100
7	G	139/151 (92%)	130 (94%)	9 (6%)	0	100	100
8	H	17/501 (3%)	12 (71%)	4 (24%)	1 (6%)	1	20
8	I	20/501 (4%)	15 (75%)	4 (20%)	1 (5%)	2	23
All	All	1908/3008 (63%)	1748 (92%)	149 (8%)	11 (1%)	29	63

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	157	GLN
1	A	360	PRO
1	A	413	VAL
8	H	476	LYS
1	A	130	MET
1	A	122	ASN
1	A	272	GLY
3	C	302	PHE
8	I	499	TRP
1	A	159	GLY
2	B	332	GLY

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	313/363 (86%)	311 (99%)	2 (1%)	86	91

*Continued on next page...*

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	210/345 (61%)	206 (98%)	4 (2%)	57	75
3	C	278/311 (89%)	278 (100%)	0	100	100
4	D	236/264 (89%)	236 (100%)	0	100	100
5	E	134/178 (75%)	133 (99%)	1 (1%)	84	90
6	F	148/155 (96%)	148 (100%)	0	100	100
7	G	93/124 (75%)	91 (98%)	2 (2%)	52	71
8	H	16/431 (4%)	13 (81%)	3 (19%)	1	11
8	I	14/431 (3%)	13 (93%)	1 (7%)	14	44
All	All	1442/2602 (55%)	1429 (99%)	13 (1%)	79	87

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	160	GLU
1	A	398	LYS
2	B	180	ARG
2	B	183	ASP
2	B	200	ARG
2	B	361	LEU
5	E	130	ARG
7	G	26	ASP
7	G	120	ASN
8	H	471	MET
8	H	499	TRP
8	H	500	GLU
8	I	468	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
5	E	18	ASN

### 5.3.3 RNA ⓘ

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 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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$
10	ATP	A	502	9	26,33,33	0.98	1 (3%)	31,52,52	1.37	5 (16%)
10	ATP	B	502	9	26,33,33	0.97	2 (7%)	31,52,52	1.47	5 (16%)

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
10	ATP	A	502	9	-	2/18/38/38	0/3/3/3
10	ATP	B	502	9	-	0/18/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	A	502	ATP	C5-C4	2.34	1.47	1.40
10	B	502	ATP	O4'-C1'	2.22	1.44	1.41
10	B	502	ATP	C5-C4	2.12	1.46	1.40

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	B	502	ATP	PA-O3A-PB	-3.36	121.29	132.83
10	A	502	ATP	C4-C5-N7	-3.18	106.09	109.40
10	B	502	ATP	PB-O3B-PG	-3.17	121.93	132.83
10	A	502	ATP	N3-C2-N1	-2.84	124.25	128.68
10	B	502	ATP	N3-C2-N1	-2.80	124.31	128.68
10	A	502	ATP	PB-O3B-PG	-2.72	123.50	132.83
10	A	502	ATP	PA-O3A-PB	-2.51	124.22	132.83
10	B	502	ATP	C4-C5-N7	-2.36	106.94	109.40
10	A	502	ATP	O4'-C1'-C2'	-2.25	103.64	106.93
10	B	502	ATP	O2A-PA-O1A	2.14	122.80	112.24

There are no chirality outliers.

All (2) torsion outliers are listed below:

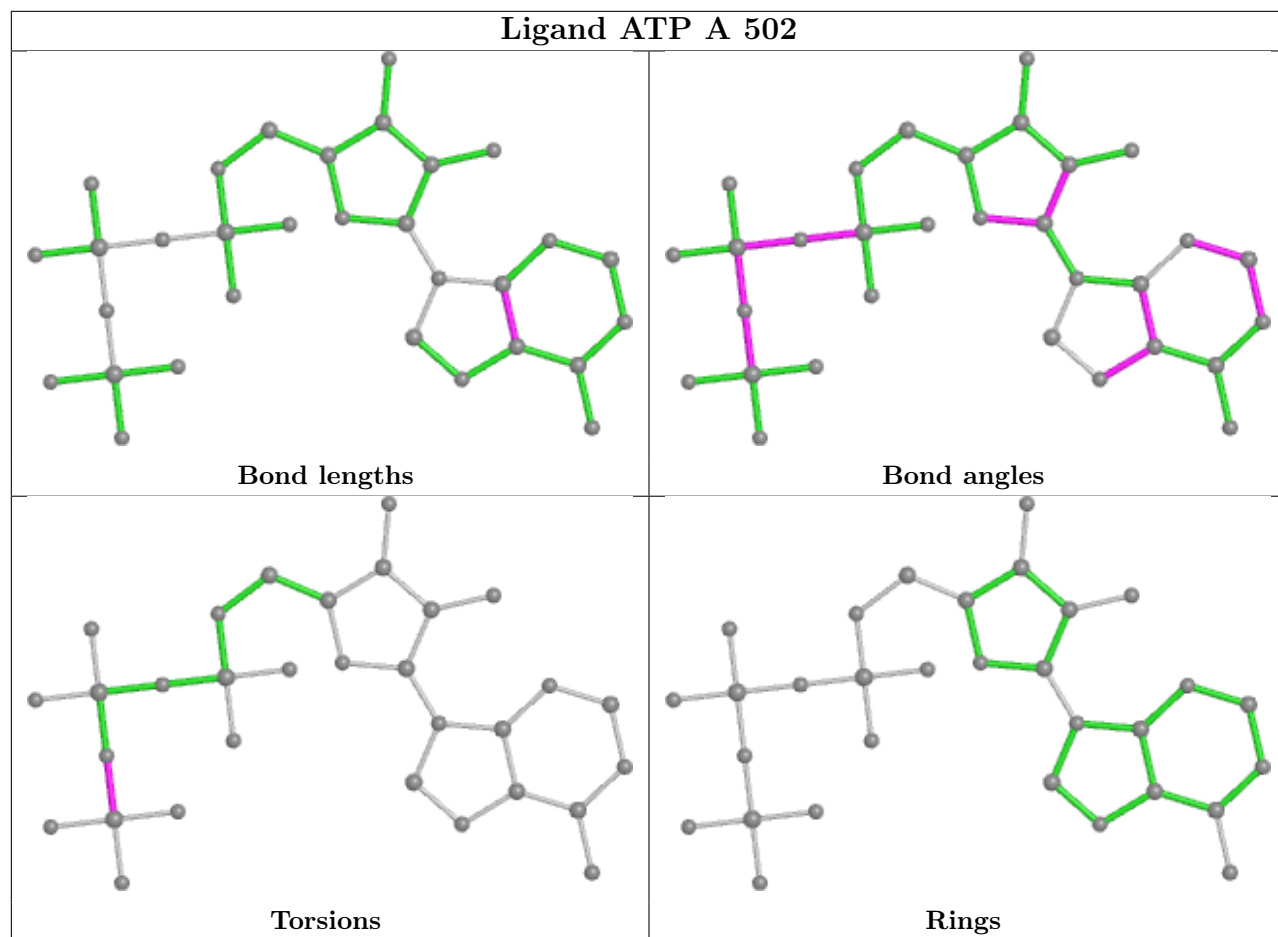
Mol	Chain	Res	Type	Atoms
10	A	502	ATP	PB-O3B-PG-O2G
10	A	502	ATP	PB-O3B-PG-O1G

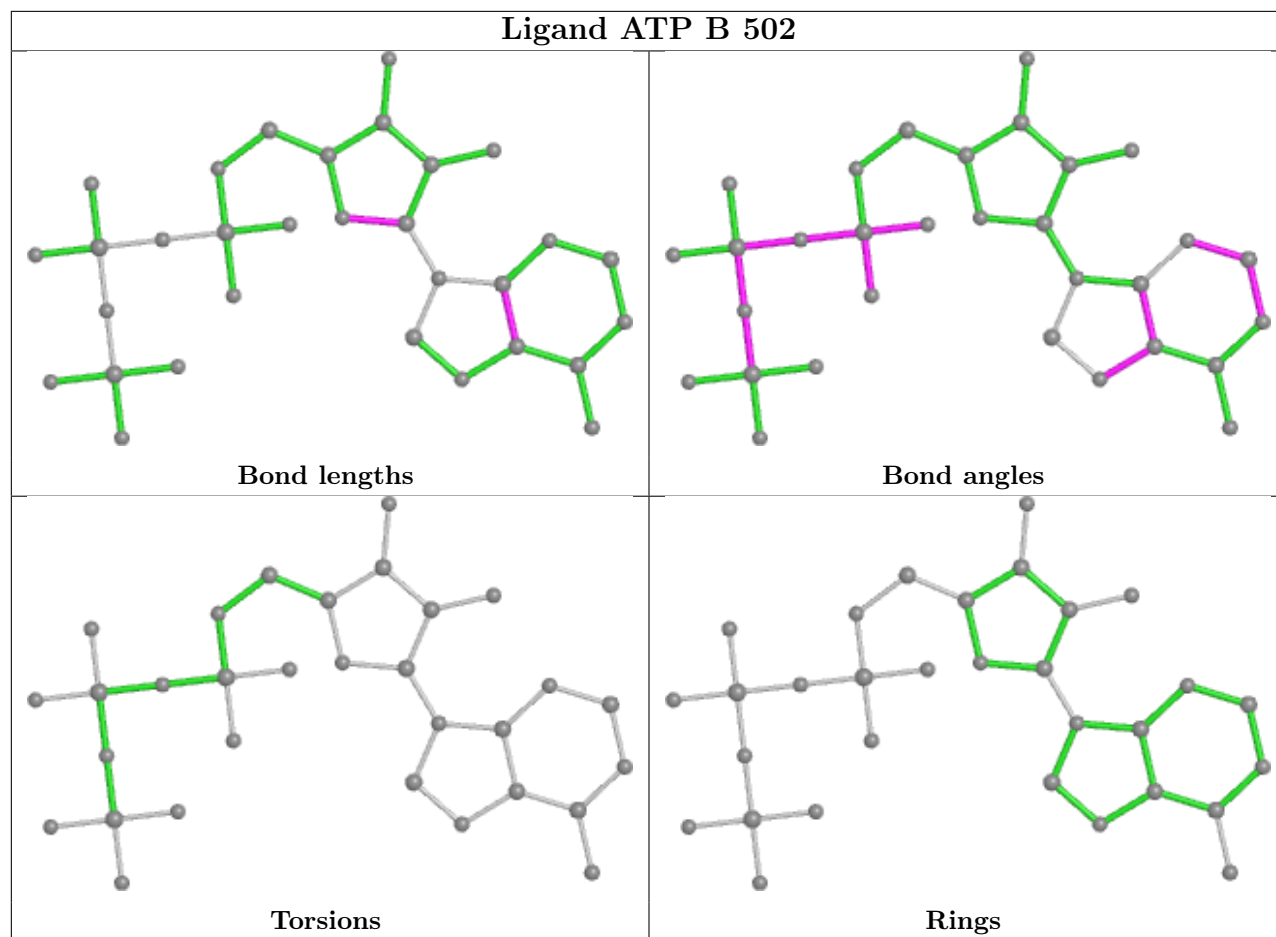
There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	A	502	ATP	2	0
10	B	502	ATP	4	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.

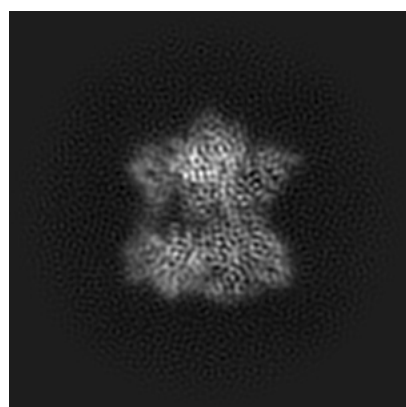
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20770. These allow visual inspection of the internal detail of the map and identification of artifacts.

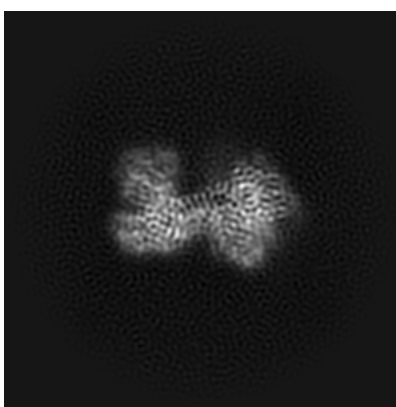
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

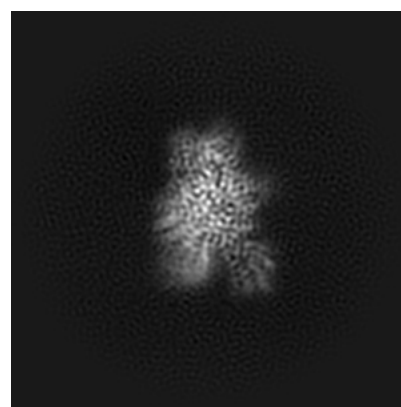
#### 6.1.1 Primary map



X



Y

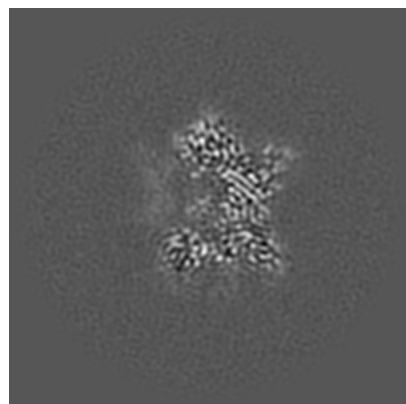


Z

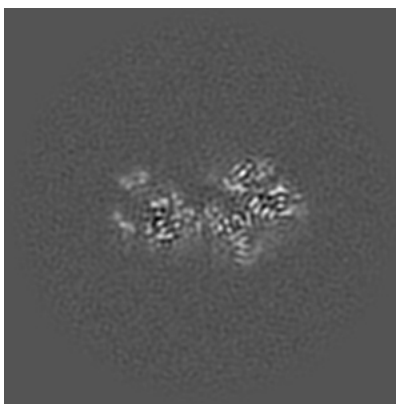
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

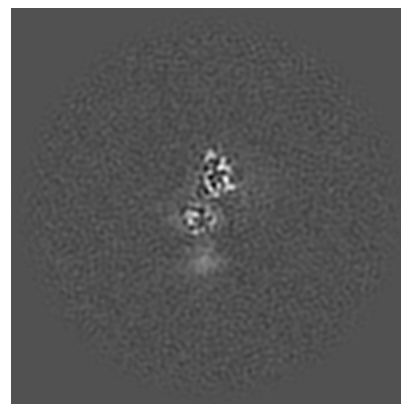
#### 6.2.1 Primary map



X Index: 160



Y Index: 160

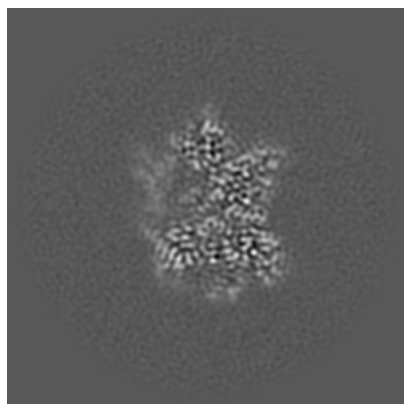


Z Index: 160

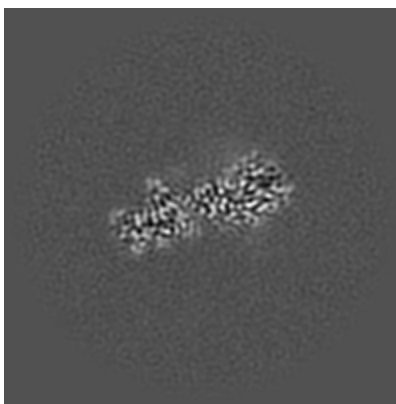
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

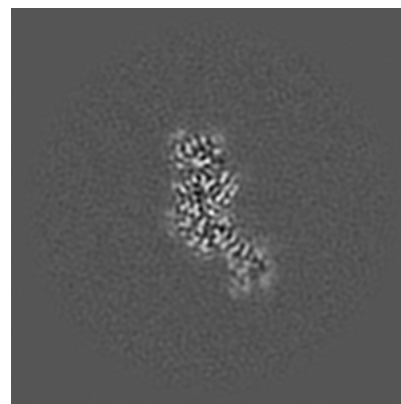
### 6.3.1 Primary map



X Index: 156



Y Index: 178

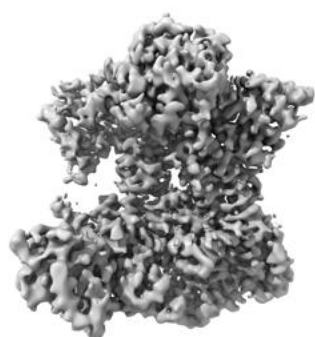


Z Index: 125

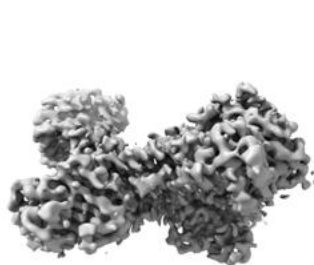
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

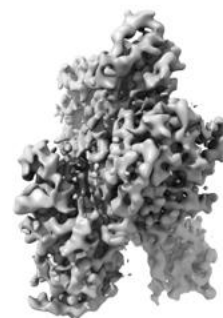
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.475. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

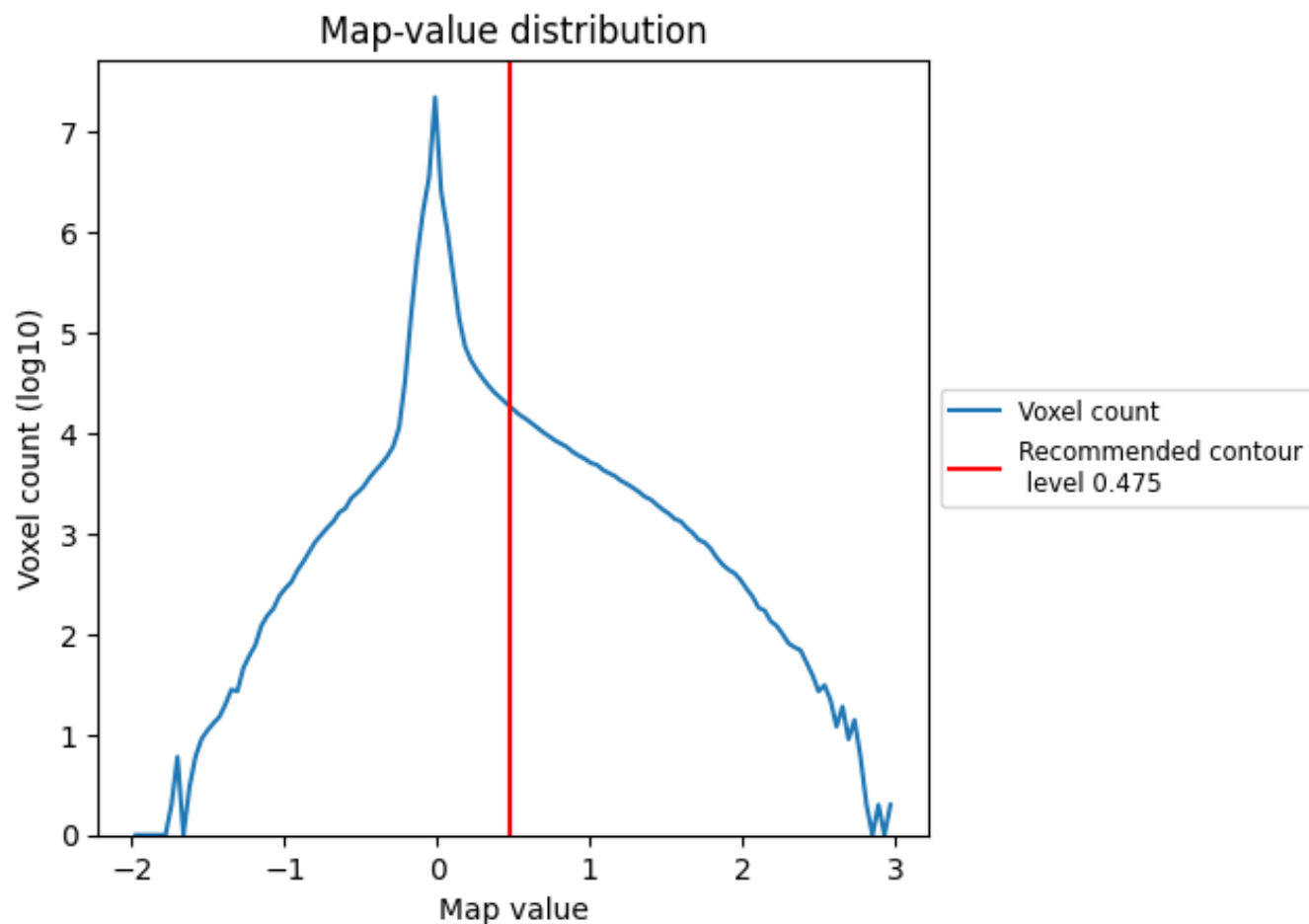
## 6.5 Mask visualisation

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.

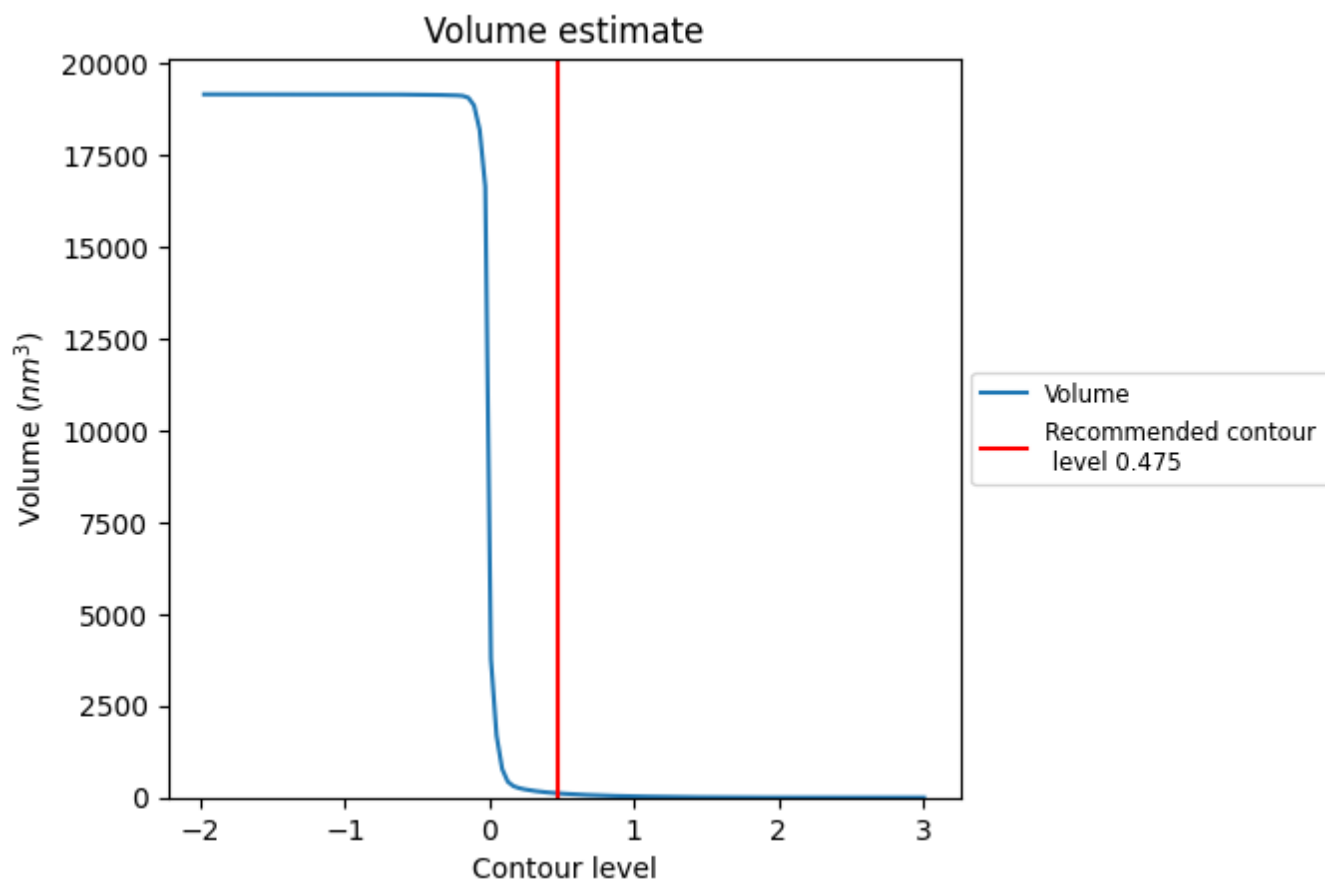
### 7.1 Map-value distribution [i](#)



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.



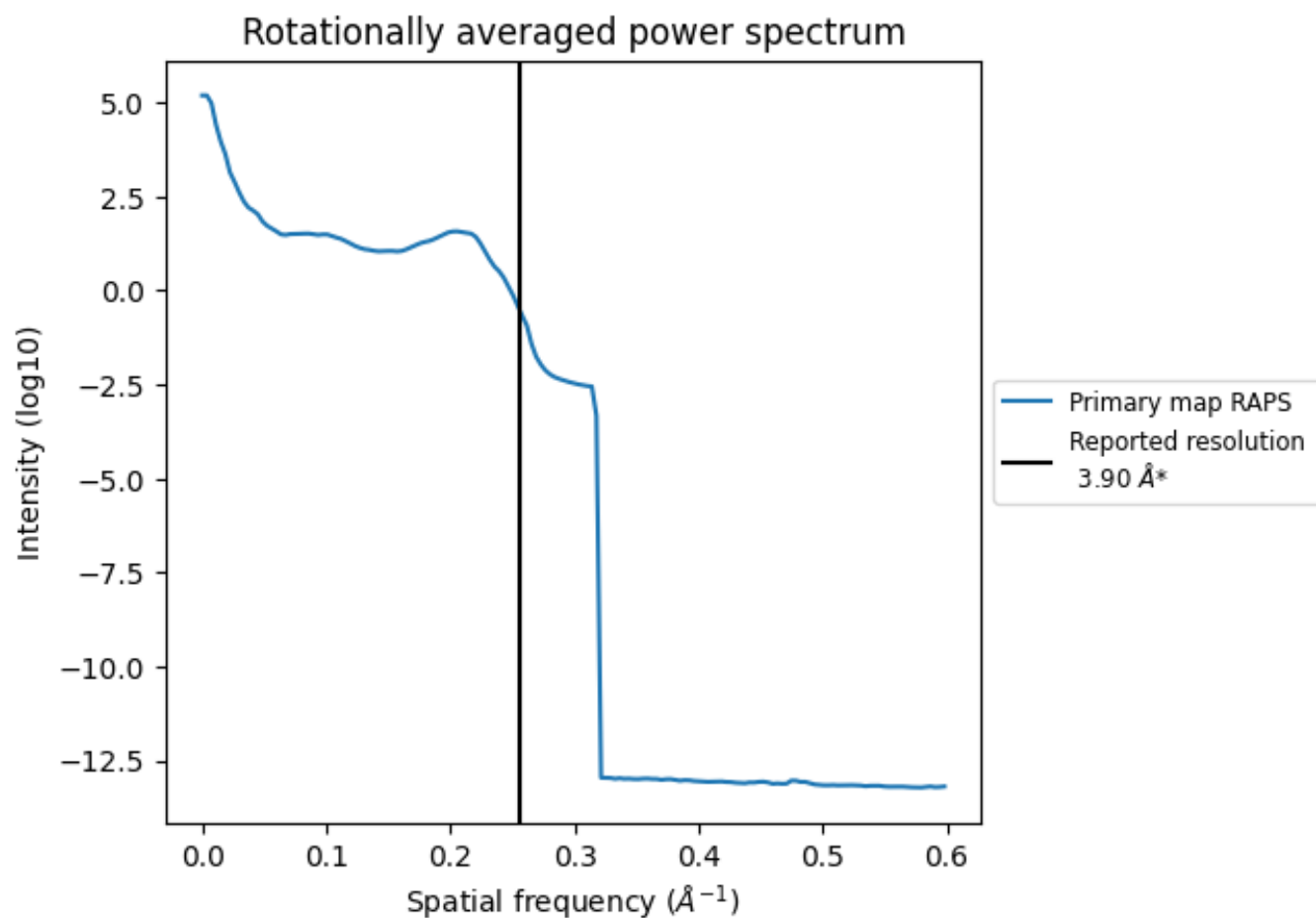
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 115 nm<sup>3</sup>; this corresponds to an approximate mass of 104 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 ⓘ

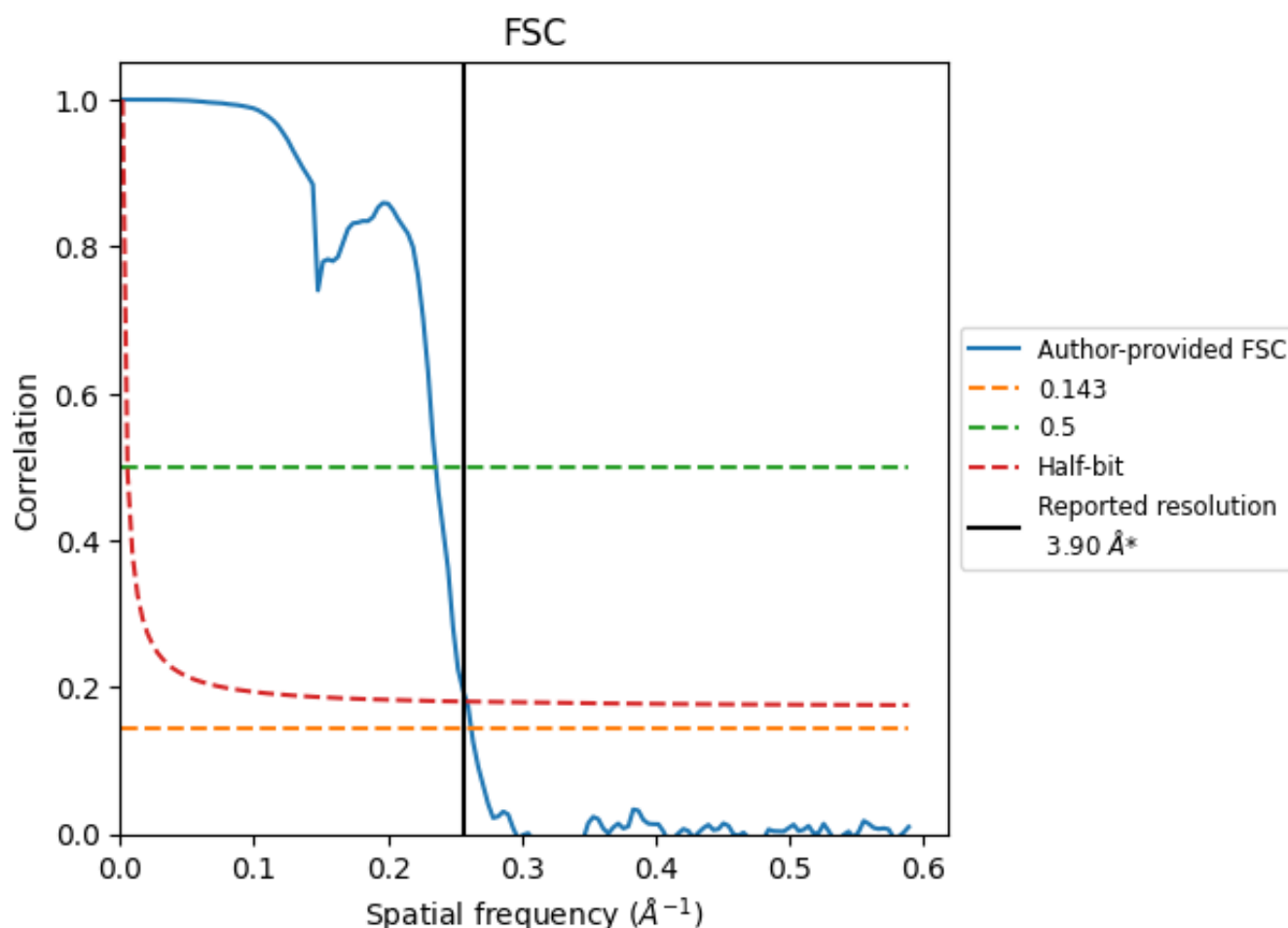


\*Reported resolution corresponds to spatial frequency of 0.256 Å<sup>-1</sup>

## 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 0.256  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

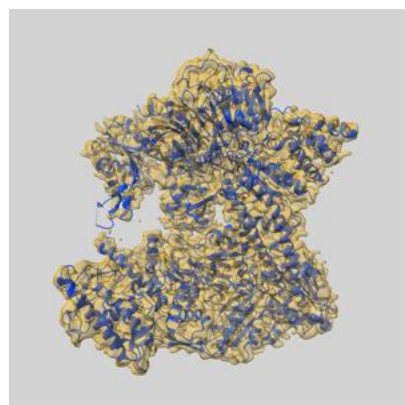
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	3.81	4.24	3.87
Unmasked-calculated*	-	-	-

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

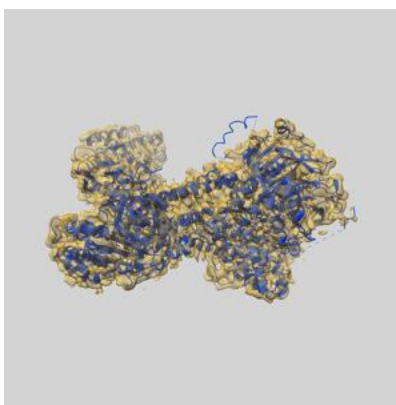
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-20770 and PDB model 6UHC. Per-residue inclusion information can be found in [section 3](#) on [page 7](#).

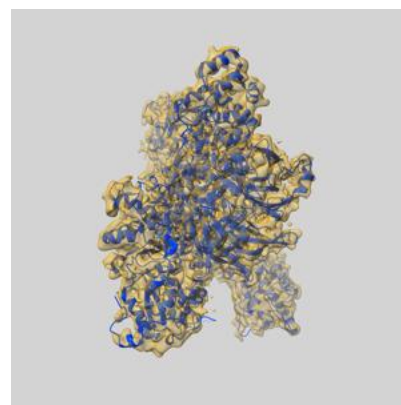
### 9.1 Map-model overlay [i](#)



X



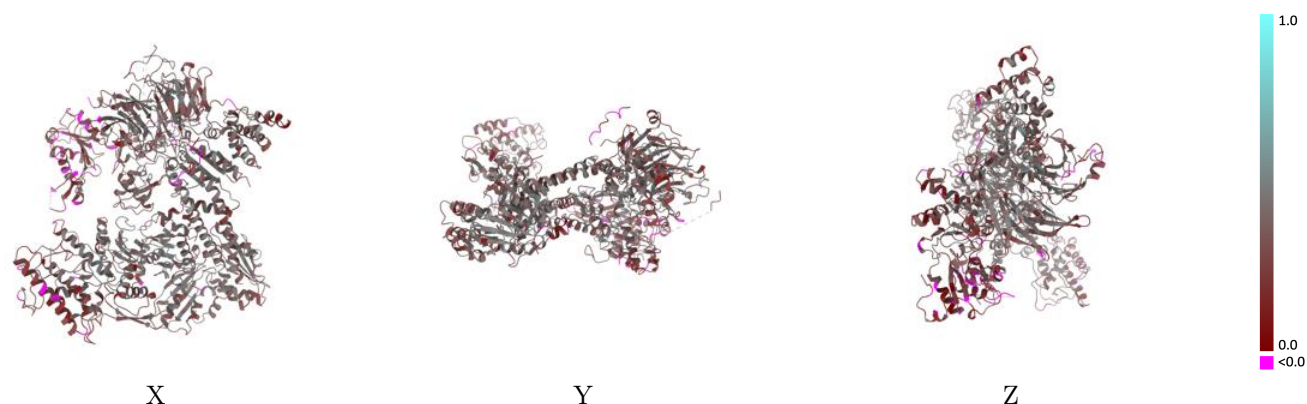
Y



Z

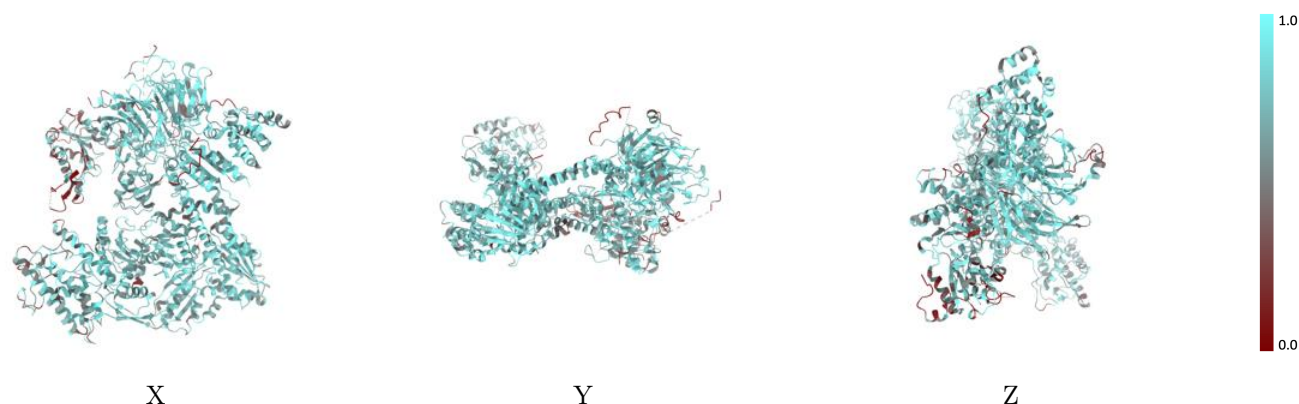
The images above show the 3D surface view of the map at the recommended contour level 0.475 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



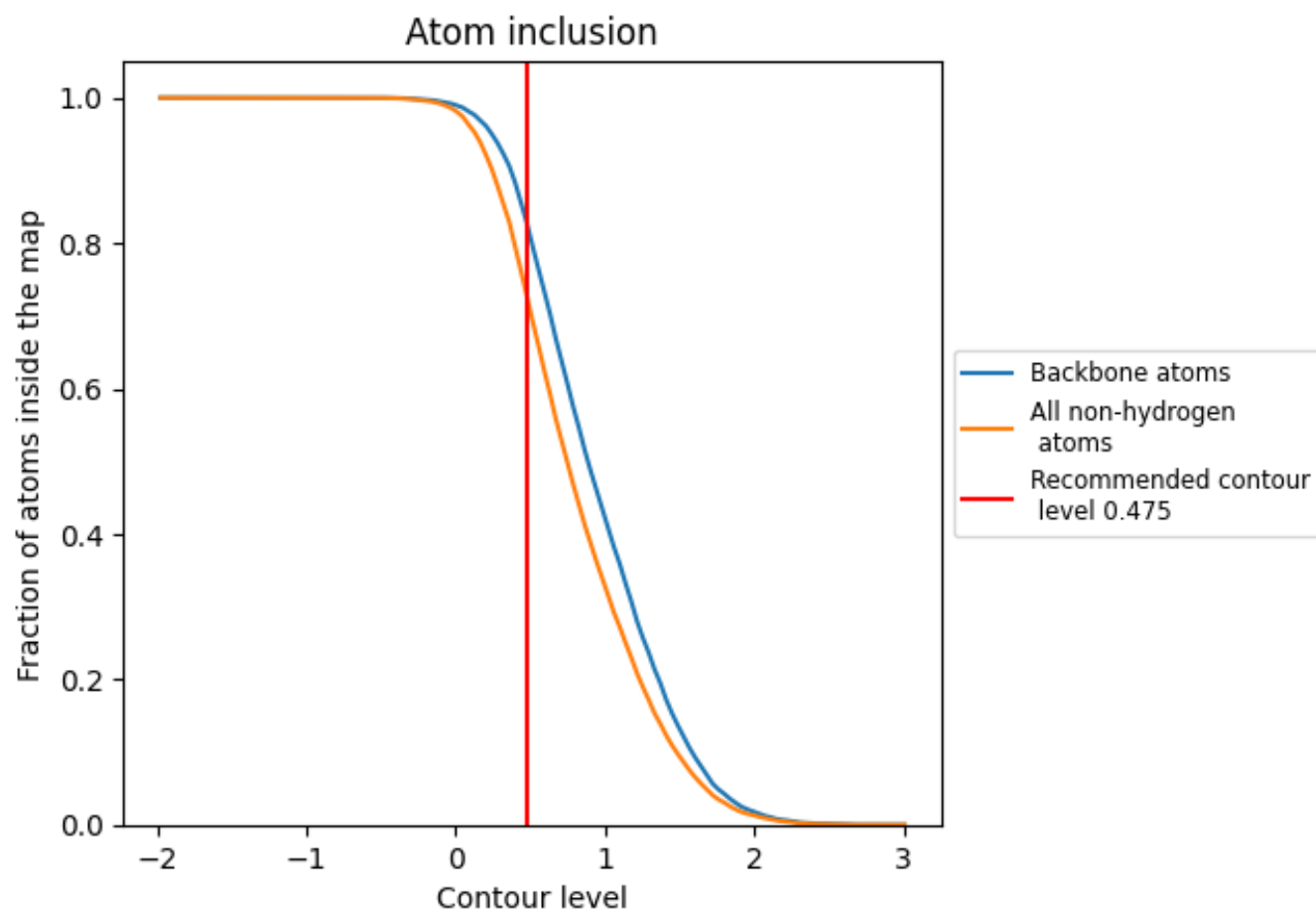
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.475).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 83% of all backbone atoms, 73% 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 (0.475) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.7306	<div></div> 0.3530
A	<div></div> 0.7748	<div></div> 0.3920
B	<div></div> 0.6390	<div></div> 0.2720
C	<div></div> 0.7677	<div></div> 0.3740
D	<div></div> 0.7789	<div></div> 0.3830
E	<div></div> 0.6722	<div></div> 0.3030
F	<div></div> 0.8082	<div></div> 0.4120
G	<div></div> 0.6874	<div></div> 0.3400
H	<div></div> 0.3899	<div></div> 0.2680
I	<div></div> 0.5250	<div></div> 0.2720

1.0

0.0

<0.0