



Full wwPDB EM Validation Report ⓘ

Sep 30, 2024 – 05:19 pm BST

PDB ID : 8S24
EMDB ID : EMD-19653
Title : Structure of the E3 ubiquitin ligase RNF213, determined by cryoEM
Authors : Naydenova, K.; Randow, F.
Deposited on : 2024-02-16
Resolution : 3.00 Å(reported)
Based on initial model : .

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.dev113
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

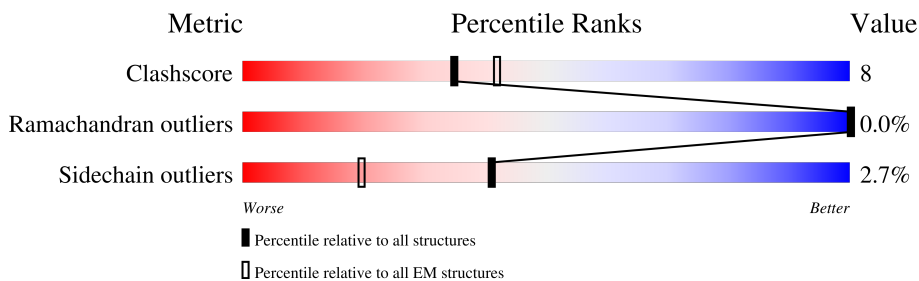
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.00 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	5247	<p>66% 16% 16%</p>

2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 35357 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 E3 ubiquitin-protein ligase RNF213.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	4387	35324	22575	6081	6455	213	0	0

There are 41 discrepancies between the modelled and reference sequences:

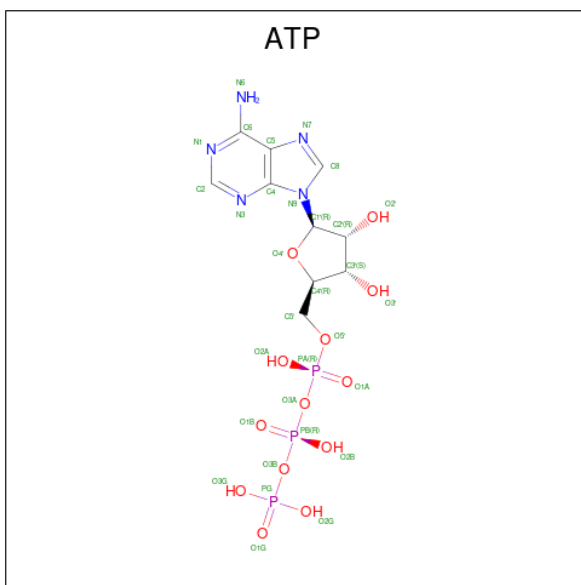
Chain	Residue	Modelled	Actual	Comment	Reference
A	-39	MET	-	initiating methionine	UNP Q63HN8
A	-38	ALA	-	expression tag	UNP Q63HN8
A	-37	SER	-	expression tag	UNP Q63HN8
A	-36	TRP	-	expression tag	UNP Q63HN8
A	-35	SER	-	expression tag	UNP Q63HN8
A	-34	HIS	-	expression tag	UNP Q63HN8
A	-33	PRO	-	expression tag	UNP Q63HN8
A	-32	GLN	-	expression tag	UNP Q63HN8
A	-31	PHE	-	expression tag	UNP Q63HN8
A	-30	GLU	-	expression tag	UNP Q63HN8
A	-29	LYS	-	expression tag	UNP Q63HN8
A	-28	GLY	-	expression tag	UNP Q63HN8
A	-27	SER	-	expression tag	UNP Q63HN8
A	-26	ALA	-	expression tag	UNP Q63HN8
A	-25	GLY	-	expression tag	UNP Q63HN8
A	-24	SER	-	expression tag	UNP Q63HN8
A	-23	ALA	-	expression tag	UNP Q63HN8
A	-22	ALA	-	expression tag	UNP Q63HN8
A	-21	GLY	-	expression tag	UNP Q63HN8
A	-20	SER	-	expression tag	UNP Q63HN8
A	-19	GLY	-	expression tag	UNP Q63HN8
A	-18	ALA	-	expression tag	UNP Q63HN8
A	-17	GLY	-	expression tag	UNP Q63HN8
A	-16	TRP	-	expression tag	UNP Q63HN8
A	-15	SER	-	expression tag	UNP Q63HN8
A	-14	HIS	-	expression tag	UNP Q63HN8
A	-13	PRO	-	expression tag	UNP Q63HN8
A	-12	GLN	-	expression tag	UNP Q63HN8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	PHE	-	expression tag	UNP Q63HN8
A	-10	GLU	-	expression tag	UNP Q63HN8
A	-9	LYS	-	expression tag	UNP Q63HN8
A	-8	GLU	-	expression tag	UNP Q63HN8
A	-7	ASN	-	expression tag	UNP Q63HN8
A	-6	LEU	-	expression tag	UNP Q63HN8
A	-5	TYR	-	expression tag	UNP Q63HN8
A	-4	PHE	-	expression tag	UNP Q63HN8
A	-3	GLN	-	expression tag	UNP Q63HN8
A	-2	ALA	-	expression tag	UNP Q63HN8
A	-1	MET	-	expression tag	UNP Q63HN8
A	0	SER	-	expression tag	UNP Q63HN8
A	1045	ASP	ASN	variant	UNP Q63HN8

- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



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

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
3	A	1	1	1	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

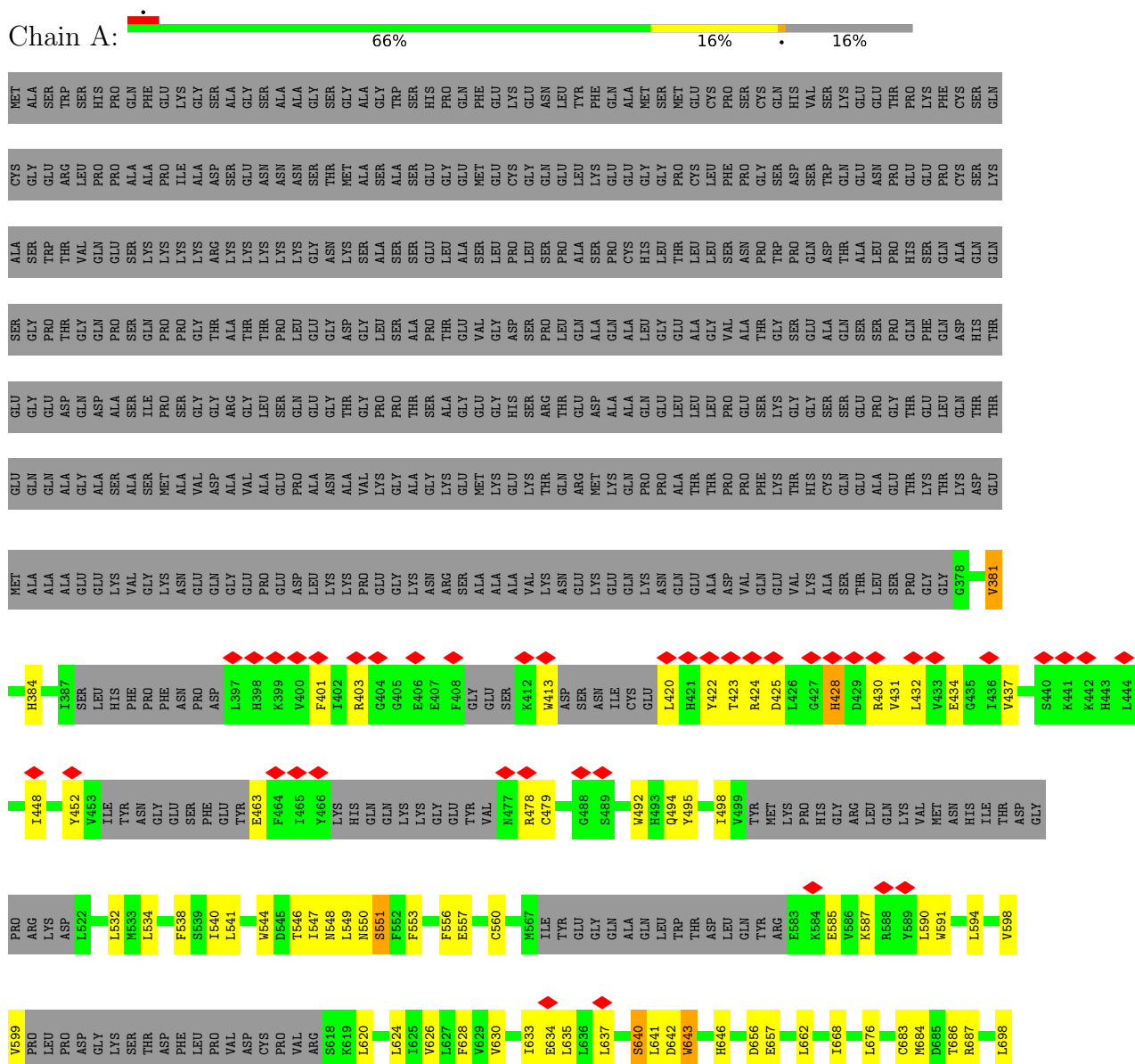
Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
4	A	1	1	1	0

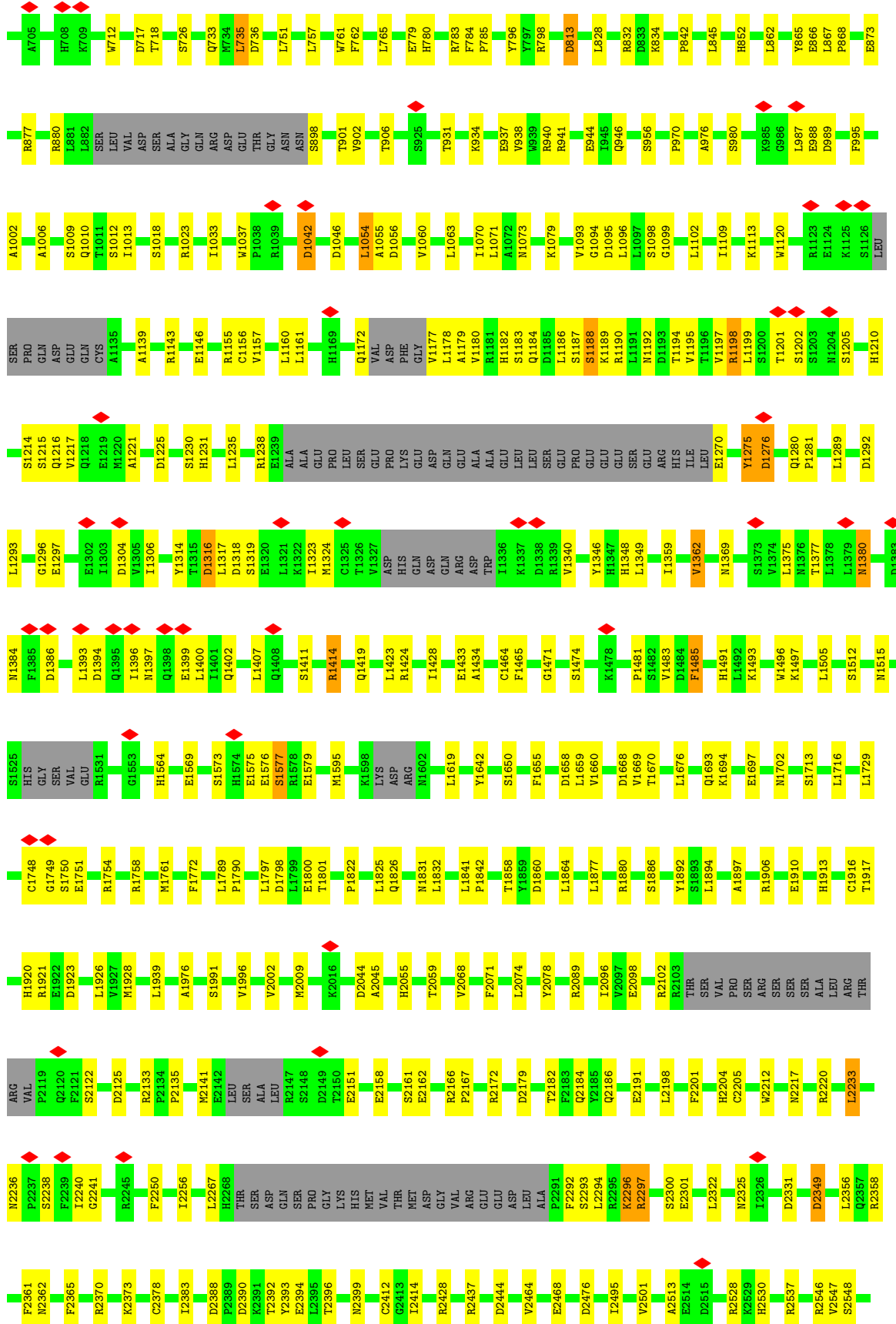
3 Residue-property plots i

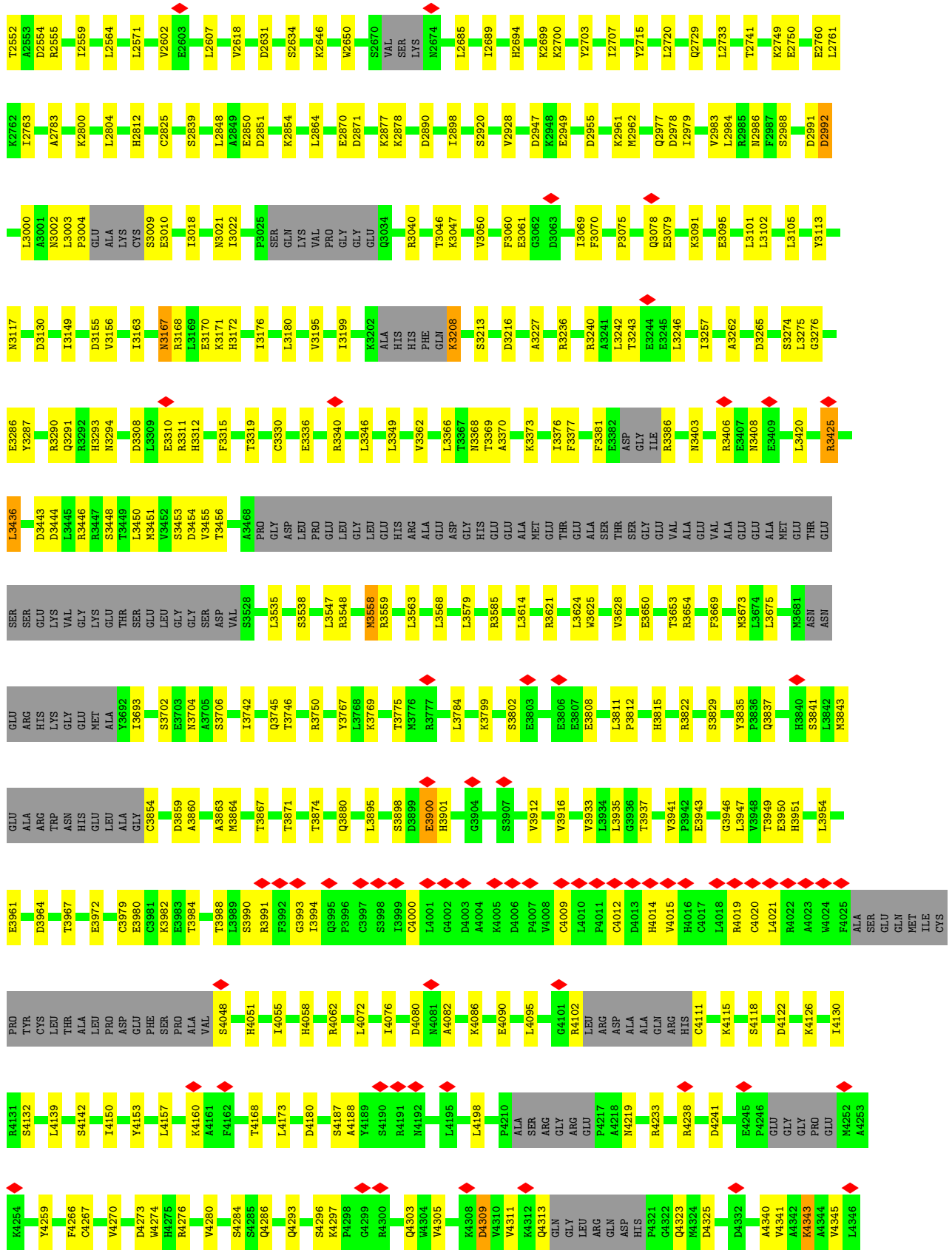
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

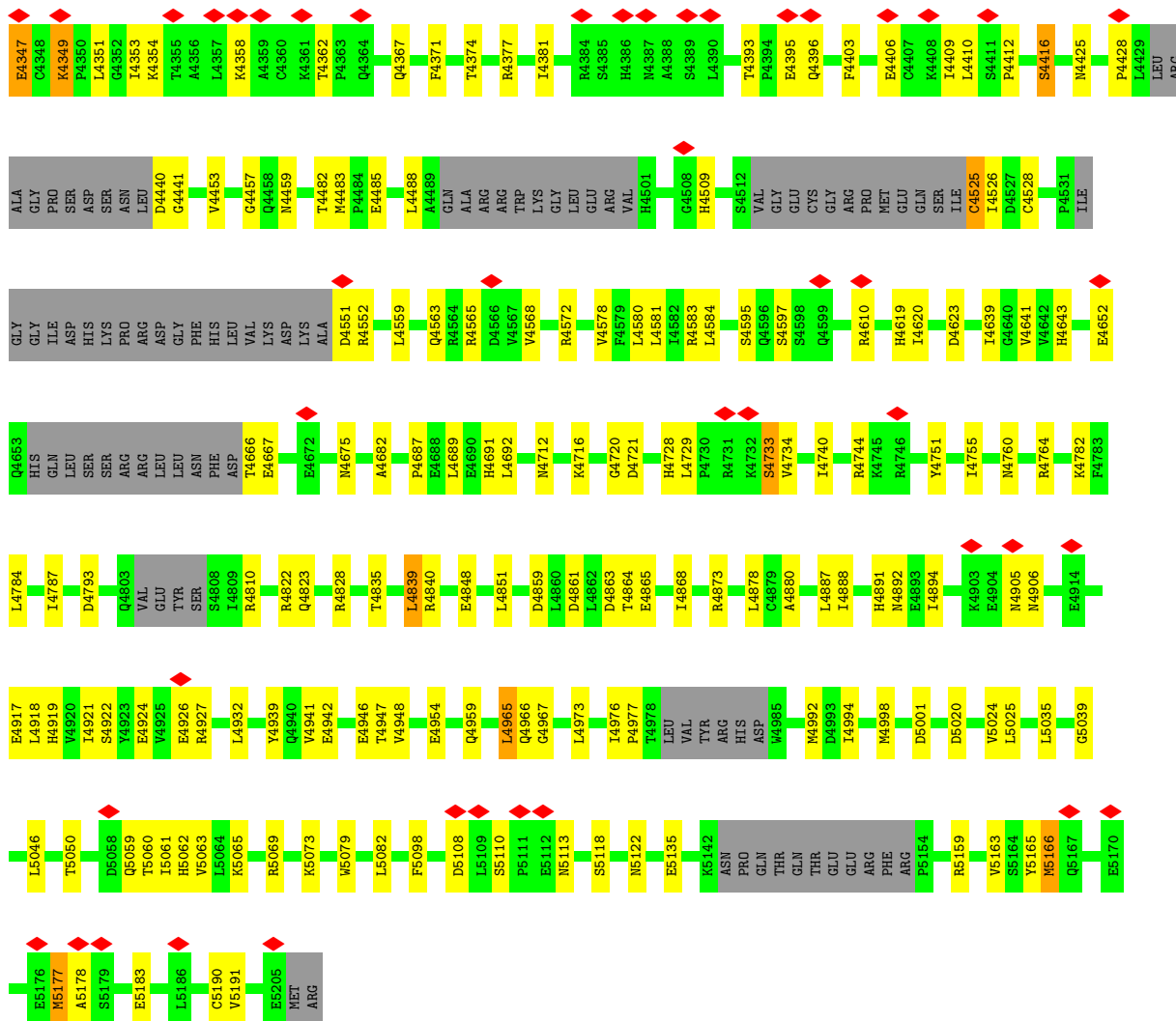
• Molecule 1: E3 ubiquitin-protein ligase RNF213

Chain A:









4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	143490	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	29.8	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.055	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.007	Depositor
Map size (\AA)	471.552, 471.552, 471.552	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.921, 0.921, 0.921	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: ATP, MG, ZN

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	0.33	0/36047	0.40	0/48733

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	35324	0	35571	553	0
2	A	31	0	12	0	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
All	All	35357	0	35583	553	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 8.

All (553) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:5061:ILE:O	1:A:5065:LYS:NZ	2.02	0.92
1:A:3979:CYS:O	1:A:3982:LYS:O	1.89	0.91
1:A:4525:CYS:SG	1:A:4526:ILE:N	2.47	0.87
1:A:1096:LEU:O	1:A:1143:ARG:NH1	2.08	0.86
1:A:687:ARG:NH2	1:A:733:GLN:OE1	2.10	0.84
1:A:1172:GLN:O	1:A:1270:GLU:N	2.10	0.84
1:A:4483:MET:O	1:A:4572:ARG:NH2	2.10	0.83
1:A:1094:GLY:O	1:A:1098:SER:OG	1.96	0.83
1:A:3381:PHE:O	1:A:3425:ARG:NH2	2.12	0.83
1:A:1023:ARG:NH2	1:A:1073:ASN:O	2.12	0.82
1:A:1155:ARG:NH2	1:A:1225:ASP:OD1	2.12	0.82
1:A:2864:LEU:O	1:A:2878:LYS:NZ	2.12	0.81
1:A:4509:HIS:ND1	1:A:4528:CYS:SG	2.54	0.81
1:A:3654:ARG:NH2	1:A:3704:ASN:O	2.14	0.81
1:A:403:ARG:NH1	1:A:413:TRP:O	2.15	0.80
1:A:2741:THR:O	1:A:2961:LYS:NZ	2.15	0.80
1:A:4341:VAL:HG12	1:A:4353:ILE:HD12	1.63	0.80
1:A:3199:ILE:O	1:A:3208:LYS:NZ	2.15	0.80
1:A:3937:THR:HG23	1:A:3941:VAL:HG23	1.64	0.79
1:A:2694:HIS:O	1:A:2700:LYS:NZ	2.17	0.78
1:A:2172:ARG:NH2	1:A:2191:GLU:OE1	2.16	0.78
1:A:4095:LEU:O	1:A:4115:LYS:NZ	2.12	0.78
1:A:4233:ARG:NH1	1:A:4740:ILE:O	2.16	0.78
1:A:3961:GLU:N	1:A:3961:GLU:OE1	2.17	0.77
1:A:880:ARG:NH1	1:A:946:GLN:O	2.18	0.77
1:A:2158:GLU:O	1:A:2161:SER:OG	2.03	0.76
1:A:3403:ASN:OD1	1:A:3406:ARG:NE	2.20	0.75
1:A:2296:LYS:NZ	1:A:2301:GLU:OE1	2.18	0.75
1:A:4293:GLN:O	1:A:4296:SER:OG	2.05	0.74
1:A:1095:ASP:O	1:A:1099:GLY:N	2.20	0.74
1:A:587:LYS:NZ	1:A:634:GLU:OE1	2.15	0.74
1:A:1033:ILE:HD11	1:A:1060:VAL:HG21	1.68	0.74
1:A:1564:HIS:ND1	1:A:1579:GLU:OE2	2.21	0.74
1:A:4000:CYS:SG	1:A:4019:ARG:NH2	2.61	0.74
1:A:2198:LEU:HD21	1:A:2212:TRP:CH2	2.23	0.73
1:A:2631:ASP:OD2	1:A:2699:LYS:NZ	2.16	0.73
1:A:2729:GLN:NE2	1:A:2750:GLU:OE1	2.21	0.73
1:A:2548:SER:O	1:A:2552:THR:HG23	1.89	0.73
1:A:5024:VAL:HG22	1:A:5063:VAL:HG13	1.71	0.73
1:A:1694:LYS:NZ	1:A:1800:GLU:OE1	2.21	0.73
1:A:3242:LEU:HD23	1:A:3243:THR:N	2.03	0.73
1:A:3558:MET:SD	1:A:3558:MET:N	2.62	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4946:GLU:OE1	1:A:4946:GLU:N	2.22	0.73
1:A:5183:GLU:N	1:A:5183:GLU:OE1	2.22	0.73
1:A:4062:ARG:NE	1:A:4122:ASP:OD2	2.22	0.73
1:A:4393:THR:N	1:A:4396:GLN:OE1	2.22	0.73
1:A:3176:ILE:HG21	1:A:3227:ALA:HB1	1.72	0.72
1:A:3654:ARG:NH1	1:A:3706:SER:OG	2.22	0.72
1:A:2236:ASN:OD1	1:A:2238:SER:OG	2.05	0.72
1:A:3585:ARG:NH1	1:A:3669:PHE:O	2.22	0.72
1:A:1758:ARG:NH1	1:A:1761:MET:SD	2.64	0.71
1:A:684:MET:O	1:A:687:ARG:NH1	2.23	0.71
1:A:762:PHE:O	1:A:798:ARG:NH2	2.24	0.71
1:A:2365:PHE:O	1:A:2373:LYS:NZ	2.16	0.71
1:A:3585:ARG:NH2	1:A:3675:LEU:O	2.24	0.71
1:A:2122:SER:OG	1:A:2125:ASP:OD2	2.09	0.70
1:A:4425:ASN:O	1:A:4425:ASN:ND2	2.24	0.70
1:A:3843:MET:SD	1:A:3843:MET:N	2.65	0.70
1:A:1897:ALA:HB1	1:A:1939:LEU:HD23	1.72	0.70
1:A:478:ARG:NH2	1:A:498:ILE:O	2.25	0.70
1:A:976:ALA:O	1:A:980:SER:OG	2.09	0.69
1:A:1396:ILE:HG23	1:A:1397:ASN:H	1.56	0.69
1:A:4412:PRO:O	1:A:4416:SER:OG	2.11	0.69
1:A:1184:GLN:OE1	1:A:1210:HIS:NE2	2.26	0.69
1:A:2217:ASN:OD1	1:A:2220:ARG:NH2	2.26	0.69
1:A:3450:LEU:HD13	1:A:3625:TRP:CE3	2.27	0.69
1:A:642:ASP:OD1	1:A:643:TRP:N	2.26	0.69
1:A:3021:ASN:ND2	1:A:3170:GLU:OE1	2.24	0.69
1:A:1749:GLY:O	1:A:1754:ARG:NH2	2.26	0.68
1:A:2977:GLN:NE2	1:A:2978:ASP:OD1	2.27	0.68
1:A:3559:ARG:NH1	1:A:3650:GLU:OE2	2.26	0.68
1:A:3061:GLU:OE1	1:A:3061:GLU:N	2.25	0.68
1:A:3990:SER:OG	1:A:3993:GLY:N	2.27	0.68
1:A:3091:LYS:NZ	1:A:3095:GLU:OE2	2.19	0.68
1:A:862:LEU:HD11	1:A:938:VAL:HG21	1.74	0.68
1:A:3294:ASN:ND2	1:A:3454:ASP:OD2	2.26	0.68
1:A:2528:ARG:NH2	1:A:2634:SER:O	2.26	0.67
1:A:5118:SER:O	1:A:5122:ASN:ND2	2.27	0.67
1:A:2984:LEU:O	1:A:2988:SER:OG	2.09	0.67
1:A:3964:ASP:O	1:A:3967:THR:OG1	2.11	0.67
1:A:5159:ARG:HH21	1:A:5163:VAL:HG23	1.60	0.67
1:A:4187:SER:OG	1:A:4926:GLU:O	2.07	0.67
1:A:5190:CYS:SG	1:A:5191:VAL:N	2.68	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1377:THR:O	1:A:1380:ASN:ND2	2.27	0.67
1:A:3075:PRO:O	1:A:3078:GLN:NE2	2.27	0.67
1:A:1573:SER:OG	1:A:1575:GLU:OE1	2.13	0.66
1:A:2293:SER:O	1:A:2294:LEU:HD23	1.95	0.66
1:A:1402:GLN:N	1:A:1402:GLN:OE1	2.29	0.66
1:A:1569:GLU:N	1:A:1569:GLU:OE1	2.29	0.66
1:A:1913:HIS:O	1:A:1917:THR:HG23	1.96	0.66
1:A:3946:GLY:O	1:A:3949:THR:HG22	1.95	0.65
1:A:970:PRO:HB3	1:A:1002:ALA:HB1	1.77	0.65
1:A:2074:LEU:O	1:A:2089:ARG:NH1	2.29	0.65
1:A:2322:LEU:HD12	1:A:2361:PHE:CD2	2.32	0.65
1:A:620:LEU:HD13	1:A:662:LEU:CD2	2.27	0.65
1:A:2325:ASN:ND2	1:A:2331:ASP:OD2	2.29	0.65
1:A:2812:HIS:O	1:A:2854:LYS:NZ	2.29	0.65
1:A:4563:GLN:OE1	1:A:4563:GLN:N	2.30	0.65
1:A:2133:ARG:NH1	1:A:2141:MET:SD	2.70	0.64
1:A:4482:THR:HG22	1:A:4583:ARG:HG2	1.78	0.64
1:A:2044:ASP:OD1	1:A:2045:ALA:N	2.30	0.64
1:A:1892:TYR:O	1:A:1926:LEU:HD12	1.97	0.64
1:A:2962:MET:SD	1:A:2986:ASN:ND2	2.72	0.63
1:A:3455:VAL:O	1:A:3456:THR:HG22	1.98	0.63
1:A:1858:THR:OG1	1:A:1860:ASP:OD1	2.15	0.63
1:A:1375:LEU:HD21	1:A:1485:PHE:CZ	2.34	0.63
1:A:1186:LEU:HD23	1:A:1189:LYS:HD3	1.80	0.63
1:A:3808:GLU:N	1:A:3808:GLU:OE1	2.32	0.63
1:A:3444:ASP:OD2	1:A:3621:ARG:NH1	2.31	0.63
1:A:3450:LEU:HD12	1:A:3451:MET:N	2.14	0.63
1:A:2870:GLU:N	1:A:2870:GLU:OE1	2.32	0.62
1:A:5135:GLU:OE2	1:A:5165:TYR:OH	2.16	0.62
1:A:3742:ILE:O	1:A:3746:THR:HG23	1.98	0.62
1:A:2602:VAL:HG22	1:A:2607:LEU:HG	1.80	0.62
1:A:4782:LYS:NZ	1:A:4924:GLU:OE2	2.32	0.62
1:A:452:TYR:O	1:A:463:GLU:N	2.32	0.62
1:A:5062:HIS:ND1	1:A:5062:HIS:O	2.32	0.62
1:A:585:GLU:OE1	1:A:585:GLU:N	2.32	0.62
1:A:1375:LEU:HD11	1:A:1485:PHE:HE1	1.63	0.62
1:A:2370:ARG:NH2	1:A:2390:ASP:O	2.33	0.62
1:A:4568:VAL:HG21	1:A:4580:LEU:HD13	1.82	0.62
1:A:1318:ASP:OD2	1:A:1319:SER:N	2.33	0.61
1:A:3673:MET:SD	1:A:3673:MET:N	2.74	0.61
1:A:2825:CYS:SG	1:A:2839:SER:OG	2.57	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:598:VAL:HG13	1:A:599:VAL:HG23	1.81	0.61
1:A:944:GLU:O	1:A:946:GLN:NE2	2.34	0.61
1:A:1575:GLU:OE1	1:A:1575:GLU:N	2.33	0.61
1:A:432:LEU:HD12	1:A:532:LEU:HD13	1.83	0.61
1:A:4393:THR:OG1	1:A:4395:GLU:OE2	2.18	0.60
1:A:3912:VAL:O	1:A:3916:VAL:HG23	2.02	0.60
1:A:4362:THR:O	1:A:4367:GLN:NE2	2.34	0.60
1:A:598:VAL:HG11	1:A:643:TRP:CZ2	2.37	0.60
1:A:717:ASP:OD1	1:A:718:THR:N	2.35	0.60
1:A:1297:GLU:N	1:A:1297:GLU:OE1	2.34	0.60
1:A:2618:VAL:HG11	1:A:2685:LEU:HD11	1.84	0.60
1:A:5020:ASP:O	1:A:5024:VAL:HG23	2.02	0.60
1:A:1822:PRO:HD2	1:A:1825:LEU:HD12	1.84	0.60
1:A:4840:ARG:NH1	1:A:4859:ASP:OD1	2.35	0.59
1:A:3370:ALA:O	1:A:3373:LYS:NZ	2.35	0.59
1:A:2537:ARG:NH1	1:A:2631:ASP:O	2.35	0.59
1:A:3837:GLN:O	1:A:3841:SER:OG	2.11	0.59
1:A:5001:ASP:N	1:A:5073:LYS:O	2.36	0.59
1:A:1160:LEU:HD11	1:A:1221:ALA:HB2	1.84	0.59
1:A:3980:GLU:C	1:A:3982:LYS:O	2.40	0.59
1:A:4377:ARG:HA	1:A:4381:ILE:HD12	1.83	0.59
1:A:1369:ASN:N	1:A:1481:PRO:O	2.36	0.59
1:A:425:ASP:HA	1:A:431:VAL:HG23	1.85	0.59
1:A:1194:THR:OG1	1:A:1195:VAL:N	2.35	0.59
1:A:5035:LEU:O	1:A:5039:GLY:N	2.35	0.59
1:A:1433:GLU:OE1	1:A:1434:ALA:N	2.36	0.59
1:A:4485:GLU:OE2	1:A:4675:ASN:ND2	2.35	0.59
1:A:865:TYR:OH	1:A:937:GLU:OE2	2.20	0.58
1:A:779:GLU:OE1	1:A:783:ARG:NH1	2.35	0.58
1:A:1713:SER:OG	1:A:1797:LEU:O	2.16	0.58
1:A:2322:LEU:N	1:A:2362:ASN:OD1	2.36	0.58
1:A:401:PHE:HA	1:A:420:LEU:HD13	1.86	0.58
1:A:988:GLU:OE1	1:A:988:GLU:N	2.33	0.58
1:A:3368:ASN:OD1	1:A:3369:THR:N	2.34	0.58
1:A:4584:LEU:HD11	1:A:4620:ILE:HG23	1.84	0.58
1:A:1716:LEU:HD21	1:A:1729:LEU:HD11	1.86	0.58
1:A:5110:SER:OG	1:A:5113:ASN:ND2	2.36	0.58
1:A:656:ASP:OD1	1:A:657:GLU:N	2.37	0.58
1:A:1375:LEU:HD11	1:A:1485:PHE:CE1	2.38	0.58
1:A:1143:ARG:NH2	1:A:1198:ARG:O	2.37	0.58
1:A:2162:GLU:OE2	1:A:2166:ARG:NH1	2.34	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2650:TRP:HB2	1:A:2761:LEU:HD21	1.85	0.57
1:A:3308:ASP:OD2	1:A:3311:ARG:NH1	2.37	0.57
1:A:3448:SER:OG	1:A:3451:MET:O	2.14	0.57
1:A:4325:ASP:OD1	1:A:4377:ARG:NE	2.36	0.57
1:A:1006:ALA:HB1	1:A:1013:ILE:HD11	1.85	0.57
1:A:4198:LEU:HD21	1:A:4259:TYR:HB2	1.85	0.57
1:A:2646:LYS:HG2	1:A:2761:LEU:HD22	1.86	0.57
1:A:1323:ILE:HG23	1:A:1324:MET:HE2	1.86	0.57
1:A:4048:SER:O	1:A:4051:HIS:NE2	2.38	0.57
1:A:1493:LYS:O	1:A:1497:LYS:NZ	2.33	0.57
1:A:3336:GLU:O	1:A:3340:ARG:NH2	2.36	0.57
1:A:550:ASN:OD1	1:A:551:SER:N	2.39	0.56
1:A:594:LEU:O	1:A:598:VAL:HG12	2.05	0.56
1:A:2715:TYR:HA	1:A:2720:LEU:HD23	1.87	0.56
1:A:4733:SER:OG	1:A:4734:VAL:N	2.38	0.56
1:A:1198:ARG:NH1	1:A:1199:LEU:O	2.35	0.56
1:A:3274:SER:OG	1:A:3276:GLY:O	2.24	0.56
1:A:4764:ARG:NE	1:A:4954:GLU:OE2	2.31	0.56
1:A:591:TRP:CH2	1:A:630:VAL:HG11	2.40	0.56
1:A:3980:GLU:O	1:A:3982:LYS:O	2.23	0.56
1:A:3563:LEU:HD22	1:A:3653:THR:HG21	1.87	0.56
1:A:4009:CYS:HA	1:A:4015:VAL:HG12	1.87	0.56
1:A:4267:CYS:O	1:A:4276:ARG:NH1	2.36	0.56
1:A:4744:ARG:NH2	1:A:4939:TYR:OH	2.36	0.56
1:A:1054:LEU:HD23	1:A:1055:ALA:H	1.71	0.56
1:A:2850:GLU:OE2	1:A:2890:ASP:N	2.38	0.56
1:A:845:LEU:HD22	1:A:902:VAL:HG11	1.88	0.56
1:A:2240:ILE:HD12	1:A:2241:GLY:N	2.20	0.56
1:A:3941:VAL:HG23	1:A:3941:VAL:O	2.06	0.56
1:A:4086:LYS:NZ	1:A:4090:GLU:OE2	2.30	0.55
1:A:423:THR:HG21	1:A:434:GLU:HG3	1.88	0.55
1:A:540:ILE:O	1:A:548:ASN:ND2	2.38	0.55
1:A:5059:GLN:OE1	1:A:5059:GLN:N	2.39	0.55
1:A:428:HIS:O	1:A:430:ARG:NH2	2.39	0.55
1:A:3624:LEU:O	1:A:3628:VAL:HG23	2.06	0.55
1:A:2468:GLU:OE2	1:A:2513:ALA:N	2.38	0.55
1:A:4687:PRO:O	1:A:4691:HIS:ND1	2.39	0.55
1:A:1906:ARG:NH1	1:A:1910:GLU:OE2	2.39	0.55
1:A:2059:THR:O	1:A:2102:ARG:NH2	2.40	0.55
1:A:751:LEU:HD23	1:A:757:LEU:HD23	1.87	0.55
1:A:538:PHE:CD1	1:A:541:LEU:HD12	2.42	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1991:SER:CB	1:A:1996:VAL:HG21	2.37	0.54
1:A:2184:GLN:O	1:A:2186:GLN:NE2	2.39	0.54
1:A:4266:PHE:CE1	1:A:4270:VAL:HG21	2.42	0.54
1:A:4020:CYS:SG	1:A:4021:LEU:N	2.81	0.54
1:A:5177:MET:SD	1:A:5178:ALA:N	2.81	0.54
1:A:3822:ARG:NH1	1:A:4917:GLU:OE2	2.41	0.54
1:A:1577:SER:OG	1:A:1577:SER:O	2.20	0.54
1:A:4274:TRP:CE2	1:A:4729:LEU:HD22	2.43	0.54
1:A:4341:VAL:HG12	1:A:4353:ILE:CD1	2.36	0.54
1:A:1595:MET:O	1:A:3091:LYS:NZ	2.39	0.54
1:A:3102:LEU:HD22	1:A:3105:LEU:HB2	1.90	0.54
1:A:4311:VAL:O	1:A:4311:VAL:HG13	2.07	0.54
1:A:1396:ILE:HG23	1:A:1397:ASN:N	2.23	0.54
1:A:3535:LEU:HD21	1:A:3628:VAL:HG12	1.90	0.53
1:A:4666:THR:OG1	1:A:4667:GLU:N	2.41	0.53
1:A:637:LEU:HD22	1:A:641:LEU:HD13	1.90	0.53
1:A:3262:ALA:O	1:A:3287:TYR:OH	2.12	0.53
1:A:765:LEU:O	1:A:798:ARG:NH2	2.39	0.53
1:A:3117:ASN:OD1	1:A:3168:ARG:NH2	2.36	0.53
1:A:4102:ARG:NE	1:A:4111:CYS:SG	2.81	0.53
1:A:1380:ASN:O	1:A:1384:ASN:ND2	2.42	0.53
1:A:548:ASN:OD1	1:A:549:LEU:N	2.41	0.53
1:A:1289:LEU:HD11	1:A:1306:ILE:HD13	1.90	0.53
1:A:1642:TYR:O	1:A:1669:VAL:HG21	2.08	0.53
1:A:4180:ASP:OD1	1:A:4744:ARG:NH2	2.42	0.53
1:A:1042:ASP:OD2	1:A:1042:ASP:N	2.41	0.53
1:A:1275:TYR:O	1:A:1280:GLN:N	2.39	0.53
1:A:1464:CYS:O	1:A:1465:PHE:HB3	2.09	0.53
1:A:3859:ASP:OD1	1:A:3860:ALA:N	2.41	0.53
1:A:2292:PHE:CZ	1:A:2564:LEU:HD22	2.44	0.53
1:A:3319:THR:OG1	1:A:3420:LEU:HD12	2.09	0.53
1:A:3837:GLN:OE1	1:A:3837:GLN:N	2.38	0.53
1:A:1177:VAL:O	1:A:1180:VAL:N	2.42	0.52
1:A:3213:SER:OG	1:A:3216:ASP:OD2	2.26	0.52
1:A:3863:ALA:O	1:A:3867:THR:HG23	2.09	0.52
1:A:4891:HIS:HE2	1:A:4965:LEU:HD13	1.73	0.52
1:A:1655:PHE:CD1	1:A:1660:VAL:HG11	2.44	0.52
1:A:4565:ARG:NH2	1:A:4619:HIS:O	2.42	0.52
1:A:2135:PRO:HB3	1:A:2198:LEU:HD22	1.91	0.52
1:A:4921:ILE:HD11	1:A:4965:LEU:HD11	1.91	0.52
1:A:898:SER:N	1:A:901:THR:HG1	2.07	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1177:VAL:HG23	1:A:1178:LEU:N	2.25	0.52
1:A:4482:THR:HB	1:A:4559:LEU:HD11	1.91	0.52
1:A:598:VAL:HG11	1:A:643:TRP:HZ2	1.74	0.52
1:A:3240:ARG:CD	1:A:3246:LEU:HD11	2.39	0.52
1:A:2871:ASP:N	1:A:2871:ASP:OD1	2.42	0.51
1:A:2618:VAL:HG23	1:A:2707:ILE:HG13	1.91	0.51
1:A:3547:LEU:O	1:A:3548:ARG:NH1	2.40	0.51
1:A:423:THR:OG1	1:A:424:ARG:N	2.43	0.51
1:A:2763:ILE:HG21	1:A:2898:ILE:HD12	1.93	0.51
1:A:3799:LYS:O	1:A:3802:SER:OG	2.20	0.51
1:A:4072:LEU:HD12	1:A:4076:ILE:HD12	1.91	0.51
1:A:2370:ARG:NH1	1:A:2393:TYR:O	2.43	0.51
1:A:1864:LEU:HD13	1:A:2068:VAL:HG13	1.93	0.51
1:A:3050:VAL:HG11	1:A:3176:ILE:HG12	1.93	0.51
1:A:3069:ILE:HB	1:A:3102:LEU:HD23	1.92	0.51
1:A:4153:TYR:CE1	1:A:4157:LEU:HD11	2.45	0.51
1:A:4822:ARG:NE	1:A:4823:GLN:OE1	2.34	0.51
1:A:735:LEU:HD12	1:A:736:ASP:N	2.26	0.51
1:A:712:TRP:HZ3	1:A:796:TYR:HH	1.58	0.50
1:A:1156:CYS:HB3	1:A:1221:ALA:HB1	1.92	0.50
1:A:2871:ASP:OD2	1:A:2877:LYS:NZ	2.41	0.50
1:A:4115:LYS:NZ	1:A:4118:SER:O	2.42	0.50
1:A:4395:GLU:OE1	1:A:4395:GLU:N	2.42	0.50
1:A:2055:HIS:NE2	1:A:2098:GLU:OE1	2.45	0.50
1:A:3330:CYS:SG	1:A:3346:LEU:HD22	2.51	0.50
1:A:4716:LYS:O	1:A:4720:GLY:N	2.40	0.50
1:A:1424:ARG:O	1:A:1428:ILE:HD12	2.12	0.50
1:A:3979:CYS:O	1:A:3982:LYS:C	2.50	0.50
1:A:1146:GLU:HB3	1:A:1195:VAL:HG11	1.93	0.50
1:A:1877:LEU:HD23	1:A:1894:LEU:HD13	1.93	0.50
1:A:640:SER:O	1:A:640:SER:OG	2.27	0.50
1:A:1826:GLN:N	1:A:1831:ASN:OD1	2.42	0.50
1:A:2552:THR:OG1	1:A:2555:ARG:NH2	2.45	0.50
1:A:4273:ASP:HB2	1:A:4729:LEU:HD23	1.92	0.50
1:A:4353:ILE:HG23	1:A:4403:PHE:CE1	2.47	0.50
1:A:4891:HIS:NE2	1:A:4965:LEU:HD13	2.27	0.50
1:A:553:PHE:CE1	1:A:668:ILE:HD13	2.47	0.50
1:A:624:LEU:HD11	1:A:662:LEU:CD1	2.41	0.50
1:A:780:HIS:O	1:A:784:PHE:N	2.44	0.50
1:A:1702:ASN:O	1:A:1880:ARG:NH1	2.45	0.50
1:A:4641:VAL:HG22	1:A:4692:LEU:HD22	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2233:LEU:HD23	1:A:2233:LEU:H	1.77	0.49
1:A:3880:GLN:HG3	1:A:3935:LEU:HD11	1.94	0.49
1:A:1214:SER:O	1:A:1217:VAL:N	2.45	0.49
1:A:1991:SER:HB2	1:A:1996:VAL:HG21	1.93	0.49
1:A:3240:ARG:HD3	1:A:3246:LEU:HD11	1.93	0.49
1:A:590:LEU:HD13	1:A:635:LEU:HD11	1.94	0.49
1:A:1393:LEU:O	1:A:1396:ILE:HG22	2.12	0.49
1:A:1668:ASP:OD2	1:A:1670:THR:OG1	2.29	0.49
1:A:2296:LYS:HD2	1:A:2297:ARG:H	1.76	0.49
1:A:4921:ILE:CD1	1:A:4965:LEU:HD11	2.42	0.49
1:A:492:TRP:NE1	1:A:494:GLN:OE1	2.37	0.49
1:A:4080:ASP:OD2	1:A:4082:ALA:N	2.46	0.49
1:A:4966:GLN:NE2	1:A:4967:GLY:O	2.42	0.49
1:A:5159:ARG:NH2	1:A:5163:VAL:HG23	2.25	0.49
1:A:3547:LEU:HD23	1:A:3693:ILE:HB	1.94	0.49
1:A:751:LEU:HD21	1:A:761:TRP:CZ3	2.48	0.49
1:A:3078:GLN:N	1:A:3079:GLU:OE1	2.45	0.49
1:A:4891:HIS:NE2	1:A:4919:HIS:O	2.44	0.49
1:A:620:LEU:HD13	1:A:662:LEU:HD21	1.95	0.49
1:A:2240:ILE:HD12	1:A:2241:GLY:C	2.32	0.49
1:A:2322:LEU:HD12	1:A:2361:PHE:CE2	2.48	0.49
1:A:3242:LEU:HD23	1:A:3243:THR:H	1.78	0.49
1:A:1693:GLN:NE2	1:A:1697:GLU:OE2	2.46	0.48
1:A:765:LEU:O	1:A:798:ARG:NH1	2.47	0.48
1:A:934:LYS:O	1:A:938:VAL:HG23	2.12	0.48
1:A:2979:ILE:O	1:A:2983:VAL:HG23	2.13	0.48
1:A:3767:TYR:OH	1:A:3815:HIS:NE2	2.39	0.48
1:A:4584:LEU:HD13	1:A:4623:ASP:HB3	1.95	0.48
1:A:1231:HIS:NE2	1:A:1235:LEU:HD11	2.29	0.48
1:A:3769:LYS:HD3	1:A:3784:LEU:HD21	1.95	0.48
1:A:4347:GLU:OE1	1:A:4349:LYS:HB3	2.14	0.48
1:A:4409:ILE:HG13	1:A:4410:LEU:HD12	1.95	0.48
1:A:3900:GLU:N	1:A:3900:GLU:OE1	2.47	0.48
1:A:1292:ASP:O	1:A:1296:GLY:N	2.41	0.48
1:A:4851:LEU:HD21	1:A:4878:LEU:HB3	1.95	0.48
1:A:1161:LEU:N	1:A:1161:LEU:HD23	2.29	0.48
1:A:813:ASP:OD1	1:A:813:ASP:N	2.44	0.48
1:A:1323:ILE:HG23	1:A:1324:MET:CE	2.43	0.48
1:A:4810:ARG:NH2	1:A:4863:ASP:OD2	2.47	0.48
1:A:2689:ILE:HG23	1:A:2703:TYR:OH	2.14	0.47
1:A:3568:LEU:HA	1:A:3579:LEU:HD13	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:676:LEU:HD13	1:A:698:LEU:HA	1.94	0.47
1:A:3009:SER:OG	1:A:3010:GLU:N	2.45	0.47
1:A:4459:ASN:ND2	1:A:4652:GLU:OE1	2.43	0.47
1:A:4888:ILE:HG22	1:A:4892:ASN:OD1	2.13	0.47
1:A:1054:LEU:HD23	1:A:1055:ALA:N	2.29	0.47
1:A:3176:ILE:HG22	1:A:3180:LEU:HG	1.96	0.47
1:A:4219:ASN:O	1:A:4219:ASN:ND2	2.47	0.47
1:A:5025:LEU:HD13	1:A:5082:LEU:HB2	1.97	0.47
1:A:3315:PHE:HB2	1:A:3436:LEU:O	2.15	0.47
1:A:4861:ASP:OD1	1:A:4861:ASP:N	2.46	0.47
1:A:2378:CYS:O	1:A:2383:ILE:N	2.48	0.47
1:A:1789:LEU:N	1:A:1790:PRO:CD	2.77	0.47
1:A:3450:LEU:HD13	1:A:3625:TRP:CZ3	2.50	0.47
1:A:381:VAL:HG12	1:A:437:VAL:HG13	1.97	0.47
1:A:1359:ILE:O	1:A:1362:VAL:HG12	2.15	0.47
1:A:1576:GLU:N	1:A:1576:GLU:OE1	2.47	0.47
1:A:4012:CYS:O	1:A:4014:HIS:ND1	2.47	0.47
1:A:4440:ASP:OD1	1:A:4441:GLY:N	2.42	0.47
1:A:2495:ILE:HD11	1:A:2571:LEU:HD23	1.96	0.47
1:A:1197:VAL:CG2	1:A:1199:LEU:HD21	2.45	0.47
1:A:1483:VAL:HG23	1:A:1483:VAL:O	2.13	0.47
1:A:2204:HIS:HB3	1:A:2256:ILE:HD12	1.97	0.47
1:A:4280:VAL:HG23	1:A:4305:VAL:HG12	1.97	0.47
1:A:5025:LEU:HD11	1:A:5079:TRP:CD1	2.49	0.47
1:A:2559:ILE:HG21	1:A:2564:LEU:HD21	1.97	0.46
1:A:4835:THR:O	1:A:4839:LEU:HD23	2.16	0.46
1:A:2267:LEU:HD12	1:A:2294:LEU:HB3	1.97	0.46
1:A:2392:THR:OG1	1:A:2428:ARG:NH2	2.48	0.46
1:A:3242:LEU:O	1:A:3243:THR:OG1	2.31	0.46
1:A:3362:VAL:HG12	1:A:3366:LEU:HD12	1.96	0.46
1:A:4994:ILE:O	1:A:4998:MET:N	2.49	0.46
1:A:3408:ASN:N	1:A:3408:ASN:OD1	2.47	0.46
1:A:3947:LEU:HD11	1:A:3984:THR:HG21	1.98	0.46
1:A:4309:ASP:OD1	1:A:4309:ASP:N	2.47	0.46
1:A:423:THR:HG21	1:A:434:GLU:CG	2.45	0.46
1:A:1139:ALA:O	1:A:1143:ARG:HG2	2.16	0.46
1:A:1317:LEU:HD21	1:A:1340:VAL:CG2	2.46	0.46
1:A:4130:ILE:HG21	1:A:4157:LEU:HD13	1.98	0.46
1:A:1864:LEU:HD11	1:A:2071:PHE:HD2	1.81	0.46
1:A:2733:LEU:HD22	1:A:2749:LYS:HG2	1.97	0.46
1:A:3898:SER:OG	1:A:3900:GLU:OE1	2.33	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4861:ASP:H	1:A:4864:THR:HG1	1.64	0.46
1:A:3018:ILE:HG22	1:A:3022:ILE:HD12	1.98	0.46
1:A:2002:VAL:HG22	1:A:2096:ILE:HG21	1.98	0.46
1:A:4130:ILE:HD12	1:A:4157:LEU:HD22	1.98	0.46
1:A:2198:LEU:HD21	1:A:2212:TRP:HH2	1.74	0.46
1:A:3895:LEU:O	1:A:3898:SER:OG	2.26	0.46
1:A:3265:ASP:OD1	1:A:3614:LEU:HD22	2.15	0.45
1:A:3346:LEU:HD12	1:A:3376:ILE:HB	1.98	0.45
1:A:495:TYR:OH	1:A:532:LEU:HB2	2.16	0.45
1:A:1471:GLY:HA3	1:A:1505:LEU:HD21	1.99	0.45
1:A:3900:GLU:OE1	1:A:3901:HIS:N	2.49	0.45
1:A:4241:ASP:OD1	1:A:4286:GLN:NE2	2.49	0.45
1:A:5166:MET:SD	1:A:5166:MET:N	2.90	0.45
1:A:1650:SER:HB3	1:A:1669:VAL:HG22	1.99	0.45
1:A:4168:THR:HG23	1:A:4740:ILE:CD1	2.46	0.45
1:A:4345:VAL:HG13	1:A:4396:GLN:HB3	1.98	0.45
1:A:5046:LEU:O	1:A:5050:THR:HG23	2.15	0.45
1:A:1054:LEU:HD22	1:A:1056:ASP:HB2	1.99	0.45
1:A:1976:ALA:HB1	1:A:2009:MET:SD	2.57	0.45
1:A:2955:ASP:OD1	1:A:3040:ARG:NH1	2.45	0.45
1:A:1407:LEU:HD21	1:A:1485:PHE:CZ	2.52	0.45
1:A:1748:CYS:HB3	1:A:1801:THR:HG23	1.98	0.45
1:A:1109:ILE:O	1:A:1113:LYS:N	2.50	0.45
1:A:4581:LEU:HD11	1:A:4689:LEU:HD21	1.99	0.45
1:A:683:CYS:H	1:A:686:THR:HG22	1.81	0.45
1:A:3002:ASN:HB2	1:A:3003:LEU:HD22	1.98	0.45
1:A:4639:ILE:HG22	1:A:4643:HIS:CD2	2.52	0.45
1:A:3984:THR:O	1:A:3988:THR:HG22	2.17	0.45
1:A:852:HIS:CD2	1:A:906:THR:HG23	2.52	0.44
1:A:3003:LEU:HB3	1:A:3004:PRO:HD2	1.99	0.44
1:A:4297:LYS:O	1:A:4303:GLN:NE2	2.47	0.44
1:A:4340:ALA:O	1:A:4343:LYS:HG3	2.17	0.44
1:A:4559:LEU:HD13	1:A:4583:ARG:NH2	2.33	0.44
1:A:3286:GLU:OE1	1:A:3290:ARG:NH1	2.50	0.44
1:A:3871:THR:O	1:A:3874:THR:OG1	2.33	0.44
1:A:1407:LEU:HD21	1:A:1485:PHE:HZ	1.83	0.44
1:A:1832:LEU:HD12	1:A:1928:MET:O	2.17	0.44
1:A:3933:VAL:HG12	1:A:3933:VAL:O	2.15	0.44
1:A:4721:ASP:OD2	1:A:4721:ASP:N	2.46	0.44
1:A:3101:LEU:HD23	1:A:3149:ILE:HB	1.99	0.44
1:A:3349:LEU:HD21	1:A:3377:PHE:HB3	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3046:THR:OG1	1:A:3047:LYS:N	2.51	0.44
1:A:4751:TYR:CE2	1:A:4755:ILE:HD11	2.53	0.44
1:A:1512:SER:O	1:A:1515:ASN:N	2.50	0.44
1:A:4917:GLU:O	1:A:4918:LEU:HD12	2.16	0.44
1:A:1280:GLN:N	1:A:1281:PRO:HD2	2.32	0.44
1:A:2356:LEU:O	1:A:2358:ARG:NH1	2.51	0.44
1:A:3799:LYS:HA	1:A:3802:SER:HB3	1.99	0.44
1:A:557:GLU:HA	1:A:560:CYS:SG	2.58	0.43
1:A:1659:LEU:HD11	1:A:1761:MET:HG2	1.99	0.43
1:A:2166:ARG:HB3	1:A:2167:PRO:HD3	2.00	0.43
1:A:3167:ASN:N	1:A:3167:ASN:OD1	2.51	0.43
1:A:2133:ARG:NH2	1:A:2151:GLU:OE2	2.51	0.43
1:A:2201:PHE:O	1:A:2205:CYS:N	2.51	0.43
1:A:3000:LEU:O	1:A:3002:ASN:N	2.52	0.43
1:A:4293:GLN:NE2	1:A:4323:GLN:OE1	2.44	0.43
1:A:1094:GLY:O	1:A:1098:SER:CB	2.66	0.43
1:A:3745:GLN:O	1:A:3750:ARG:NH2	2.51	0.43
1:A:898:SER:O	1:A:902:VAL:HG23	2.18	0.43
1:A:4132:SER:HB3	1:A:4173:LEU:HD11	2.01	0.43
1:A:3195:VAL:O	1:A:3199:ILE:HG12	2.19	0.43
1:A:1414:ARG:NH1	1:A:1496:TRP:CD1	2.87	0.43
1:A:1474:SER:O	1:A:1491:HIS:NE2	2.51	0.43
1:A:4048:SER:O	1:A:4051:HIS:CD2	2.71	0.43
1:A:987:LEU:HD22	1:A:987:LEU:N	2.34	0.43
1:A:1289:LEU:HD23	1:A:1289:LEU:O	2.19	0.43
1:A:1314:TYR:OH	1:A:1348:HIS:NE2	2.51	0.43
1:A:1886:SER:OG	1:A:1921:ARG:NH1	2.52	0.43
1:A:1920:HIS:ND1	1:A:1921:ARG:O	2.52	0.43
1:A:1798:ASP:OD1	1:A:1798:ASP:N	2.50	0.42
1:A:2349:ASP:OD1	1:A:2349:ASP:N	2.50	0.42
1:A:4188:ALA:O	1:A:4927:ARG:NH2	2.52	0.42
1:A:4351:LEU:O	1:A:4354:LYS:HB3	2.19	0.42
1:A:1916:CYS:HA	1:A:1920:HIS:CD2	2.54	0.42
1:A:4947:THR:HG22	1:A:4948:VAL:N	2.35	0.42
1:A:546:THR:HG23	1:A:547:ILE:HD12	2.01	0.42
1:A:2464:VAL:HG21	1:A:2501:VAL:HG21	2.00	0.42
1:A:3943:GLU:OE1	1:A:3943:GLU:N	2.41	0.42
1:A:940:ARG:NH2	1:A:989:ASP:OD2	2.49	0.42
1:A:2444:ASP:N	1:A:2444:ASP:OD1	2.52	0.42
1:A:3105:LEU:N	1:A:3105:LEU:HD22	2.34	0.42
1:A:4891:HIS:O	1:A:4894:ILE:HG22	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4198:LEU:HD12	1:A:4238:ARG:HH22	1.85	0.42
1:A:633:ILE:HG22	1:A:633:ILE:O	2.19	0.42
1:A:726:SER:O	1:A:726:SER:OG	2.35	0.42
1:A:1375:LEU:HD21	1:A:1485:PHE:CE1	2.54	0.42
1:A:1419:GLN:NE2	1:A:1423:LEU:HD11	2.35	0.42
1:A:2396:THR:OG1	1:A:2399:ASN:OD1	2.33	0.42
1:A:2928:VAL:HG12	1:A:2928:VAL:O	2.19	0.42
1:A:1010:GLN:N	1:A:1010:GLN:OE1	2.52	0.42
1:A:3811:LEU:N	1:A:3812:PRO:CD	2.83	0.42
1:A:4198:LEU:C	1:A:4198:LEU:HD23	2.39	0.42
1:A:4428:PRO:HB3	1:A:4595:SER:HB2	2.01	0.42
1:A:4584:LEU:HD13	1:A:4623:ASP:CB	2.50	0.42
1:A:556:PHE:CZ	1:A:633:ILE:HD11	2.54	0.42
1:A:594:LEU:HD22	1:A:643:TRP:HH2	1.85	0.42
1:A:785:PRO:HG3	1:A:834:LYS:HG3	2.02	0.42
1:A:1179:ALA:O	1:A:1183:SER:OG	2.37	0.42
1:A:2412:CYS:SG	1:A:2414:ILE:HD12	2.60	0.42
1:A:547:ILE:HG22	1:A:548:ASN:N	2.34	0.42
1:A:1276:ASP:HA	1:A:1280:GLN:HB3	2.02	0.42
1:A:2992:ASP:OD1	1:A:2992:ASP:N	2.52	0.42
1:A:3864:MET:O	1:A:3867:THR:OG1	2.38	0.42
1:A:3950:GLU:OE1	1:A:3951:HIS:N	2.53	0.42
1:A:4343:LYS:O	1:A:4347:GLU:CG	2.68	0.42
1:A:4992:MET:N	1:A:4992:MET:SD	2.93	0.42
1:A:2783:ALA:HB2	1:A:2804:LEU:HD11	2.00	0.42
1:A:3155:ASP:OD1	1:A:3156:VAL:N	2.52	0.42
1:A:4784:LEU:HD12	1:A:4787:ILE:HD11	2.02	0.42
1:A:1093:VAL:HG21	1:A:1120:TRP:CD2	2.54	0.41
1:A:3070:PHE:HA	1:A:3105:LEU:HD21	2.02	0.41
1:A:3972:GLU:OE1	1:A:3972:GLU:N	2.52	0.41
1:A:4784:LEU:HD13	1:A:4887:LEU:HD12	2.00	0.41
1:A:5098:PHE:CD2	1:A:5191:VAL:HG13	2.55	0.41
1:A:384:HIS:HB2	1:A:495:TYR:HD1	1.84	0.41
1:A:448:ILE:O	1:A:448:ILE:HG22	2.19	0.41
1:A:1349:LEU:HD22	1:A:1400:LEU:HD13	2.02	0.41
1:A:1619:LEU:HD13	1:A:1676:LEU:HD22	2.01	0.41
1:A:4551:ASP:OD1	1:A:4552:ARG:N	2.51	0.41
1:A:4868:ILE:O	1:A:4880:ALA:HB2	2.20	0.41
1:A:867:LEU:HB2	1:A:868:PRO:HD3	2.02	0.41
1:A:1182:HIS:ND1	1:A:1182:HIS:O	2.52	0.41
1:A:1751:GLU:OE2	1:A:1754:ARG:NH1	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2552:THR:HG22	1:A:2851:ASP:OD2	2.20	0.41
1:A:3275:LEU:N	1:A:3275:LEU:HD22	2.35	0.41
1:A:4153:TYR:CZ	1:A:4157:LEU:HD11	2.56	0.41
1:A:4274:TRP:CZ2	1:A:4729:LEU:HD22	2.56	0.41
1:A:828:LEU:O	1:A:832:ARG:N	2.53	0.41
1:A:1063:LEU:C	1:A:1070:ILE:HD11	2.41	0.41
1:A:1216:GLN:CD	1:A:1217:VAL:HG23	2.40	0.41
1:A:2370:ARG:NE	1:A:2388:ASP:OD2	2.52	0.41
1:A:4139:LEU:HD21	1:A:4150:ILE:CD1	2.50	0.41
1:A:1304:ASP:CG	1:A:1346:TYR:HH	2.24	0.41
1:A:2547:VAL:CG2	1:A:2552:THR:HG22	2.49	0.41
1:A:2618:VAL:O	1:A:2707:ILE:HD11	2.20	0.41
1:A:4864:THR:HG22	1:A:4865:GLU:N	2.35	0.41
1:A:4873:ARG:HH11	1:A:4973:LEU:HD13	1.86	0.41
1:A:2383:ILE:HD11	1:A:2437:ARG:CG	2.50	0.41
1:A:3535:LEU:O	1:A:3538:SER:OG	2.32	0.41
1:A:866:GLU:OE2	1:A:941:ARG:NE	2.43	0.41
1:A:1102:LEU:HD12	1:A:1188:SER:C	2.41	0.41
1:A:1190:ARG:NE	1:A:1192:ASN:OD1	2.54	0.41
1:A:1316:ASP:OD1	1:A:1316:ASP:N	2.53	0.41
1:A:3455:VAL:HG12	1:A:3456:THR:N	2.36	0.41
1:A:4760:ASN:O	1:A:4760:ASN:ND2	2.53	0.41
1:A:1157:VAL:O	1:A:1161:LEU:HG	2.20	0.41
1:A:2530:HIS:CE1	1:A:2634:SER:HG	2.39	0.41
1:A:2949:GLU:O	1:A:3163:ILE:HG23	2.21	0.41
1:A:1184:GLN:CD	1:A:1210:HIS:HE2	2.24	0.41
1:A:1289:LEU:O	1:A:1293:LEU:HG	2.20	0.41
1:A:1658:ASP:OD1	1:A:1658:ASP:N	2.54	0.41
1:A:2394:GLU:HG3	1:A:2396:THR:HG23	2.03	0.41
1:A:2495:ILE:CD1	1:A:2571:LEU:HD23	2.51	0.41
1:A:2760:GLU:OE2	1:A:2800:LYS:N	2.53	0.41
1:A:3994:ILE:HG21	1:A:4058:HIS:ND1	2.36	0.41
1:A:4341:VAL:HG21	1:A:4374:THR:HB	2.02	0.41
1:A:842:PRO:O	1:A:845:LEU:HB2	2.21	0.41
1:A:4453:VAL:O	1:A:4457:GLY:N	2.52	0.41
1:A:873:GLU:O	1:A:877:ARG:HG2	2.21	0.40
1:A:1923:ASP:OD1	1:A:1923:ASP:N	2.50	0.40
1:A:2618:VAL:HG23	1:A:2707:ILE:CG1	2.51	0.40
1:A:4293:GLN:OE1	1:A:4712:ASN:ND2	2.54	0.40
1:A:4488:LEU:HD21	1:A:4848:GLU:HA	2.04	0.40
1:A:4932:LEU:HD11	1:A:4959:GLN:CB	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:594:LEU:HD21	1:A:626:VAL:HG22	2.04	0.40
1:A:1177:VAL:CG2	1:A:1178:LEU:N	2.83	0.40
1:A:2546:ARG:HD3	1:A:2848:LEU:HD23	2.02	0.40
1:A:3000:LEU:C	1:A:3002:ASN:H	2.24	0.40
1:A:3994:ILE:HD11	1:A:4055:ILE:HD13	2.03	0.40
1:A:4578:VAL:HG11	1:A:4682:ALA:CB	2.52	0.40
1:A:2179:ASP:OD1	1:A:2182:THR:HG22	2.22	0.40
1:A:3171:LYS:O	1:A:3172:HIS:CG	2.75	0.40
1:A:4941:VAL:HG12	1:A:4942:GLU:O	2.21	0.40
1:A:1071:LEU:O	1:A:1079:LYS:NZ	2.48	0.40
1:A:1841:LEU:HB2	1:A:1842:PRO:HD3	2.04	0.40
1:A:3236:ARG:NH2	1:A:3257:ILE:HD11	2.37	0.40
1:A:4793:ASP:OD2	1:A:4828:ARG:NH1	2.55	0.40
1:A:1199:LEU:HB2	1:A:1201:THR:HG23	2.02	0.40
1:A:3291:GLN:OE1	1:A:3293:HIS:NE2	2.45	0.40
1:A:4349:LYS:O	1:A:4349:LYS:HD2	2.22	0.40
1:A:4351:LEU:O	1:A:4354:LYS:N	2.54	0.40
1:A:4584:LEU:HD13	1:A:4623:ASP:CG	2.42	0.40
1:A:4976:ILE:HB	1:A:4977:PRO:HD3	2.04	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	4307/5247 (82%)	4098 (95%)	208 (5%)	1 (0%)	100 100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2297	ARG

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	3945/4653 (85%)	3838 (97%)	107 (3%)	40 71

All (107) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	381	VAL
1	A	422	TYR
1	A	428	HIS
1	A	479	CYS
1	A	534	LEU
1	A	544	TRP
1	A	551	SER
1	A	628	PHE
1	A	640	SER
1	A	643	TRP
1	A	646	HIS
1	A	735	LEU
1	A	813	ASP
1	A	931	THR
1	A	956	SER
1	A	995	PHE
1	A	1009	SER
1	A	1012	SER
1	A	1018	SER
1	A	1037	TRP
1	A	1042	ASP
1	A	1046	ASP
1	A	1054	LEU
1	A	1187	SER
1	A	1188	SER
1	A	1198	ARG
1	A	1202	SER
1	A	1205	SER
1	A	1215	SER
1	A	1230	SER

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Mol	Chain	Res	Type
1	A	1238	ARG
1	A	1275	TYR
1	A	1276	ASP
1	A	1316	ASP
1	A	1362	VAL
1	A	1380	ASN
1	A	1386	ASP
1	A	1394	ASP
1	A	1399	GLU
1	A	1411	SER
1	A	1414	ARG
1	A	1485	PHE
1	A	1577	SER
1	A	1750	SER
1	A	1772	PHE
1	A	2078	TYR
1	A	2233	LEU
1	A	2250	PHE
1	A	2296	LYS
1	A	2300	SER
1	A	2349	ASP
1	A	2476	ASP
1	A	2554	ASP
1	A	2920	SER
1	A	2947	ASP
1	A	2991	ASP
1	A	2992	ASP
1	A	3060	PHE
1	A	3113	TYR
1	A	3130	ASP
1	A	3167	ASN
1	A	3208	LYS
1	A	3310	GLU
1	A	3312	HIS
1	A	3386	ARG
1	A	3425	ARG
1	A	3436	LEU
1	A	3443	ASP
1	A	3446	ARG
1	A	3453	SER
1	A	3558	MET
1	A	3702	SER

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Mol	Chain	Res	Type
1	A	3775	THR
1	A	3829	SER
1	A	3835	TYR
1	A	3854	CYS
1	A	3900	GLU
1	A	3954	LEU
1	A	3991	ARG
1	A	4126	LYS
1	A	4142	SER
1	A	4160	LYS
1	A	4284	SER
1	A	4309	ASP
1	A	4313	GLN
1	A	4343	LYS
1	A	4347	GLU
1	A	4349	LYS
1	A	4358	LYS
1	A	4371	PHE
1	A	4406	GLU
1	A	4416	SER
1	A	4525	CYS
1	A	4597	SER
1	A	4610	ARG
1	A	4728	HIS
1	A	4733	SER
1	A	4839	LEU
1	A	4905	ASN
1	A	4906	ASN
1	A	4922	SER
1	A	4965	LEU
1	A	5060	THR
1	A	5069	ARG
1	A	5108	ASP
1	A	5166	MET
1	A	5177	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	477	ASN
1	A	946	GLN
1	A	1008	GLN

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Mol	Chain	Res	Type
1	A	1342	GLN
1	A	1369	ASN
1	A	1384	ASN
1	A	1679	GLN
1	A	1784	GLN
1	A	2787	GLN
1	A	3053	GLN
1	A	3704	ASN
1	A	4049	GLN
1	A	4081	ASN
1	A	4275	HIS
1	A	4507	ASN
1	A	4816	HIS
1	A	4905	ASN
1	A	4906	ASN
1	A	5113	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 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
2	ATP	A	5301	3	26,33,33	0.86	1 (3%)	31,52,52	1.65	6 (19%)

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
2	ATP	A	5301	3	-	5/18/38/38	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	5301	ATP	C5-C4	2.05	1.46	1.40

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	5301	ATP	PB-O3B-PG	-3.80	119.77	132.83
2	A	5301	ATP	PA-O3A-PB	-3.75	119.97	132.83
2	A	5301	ATP	N3-C2-N1	-3.28	123.55	128.68
2	A	5301	ATP	C3'-C2'-C1'	3.05	105.57	100.98
2	A	5301	ATP	C4-C5-N7	-2.58	106.72	109.40
2	A	5301	ATP	C1'-N9-C4	-2.05	123.03	126.64

There are no chirality outliers.

All (5) torsion outliers are listed below:

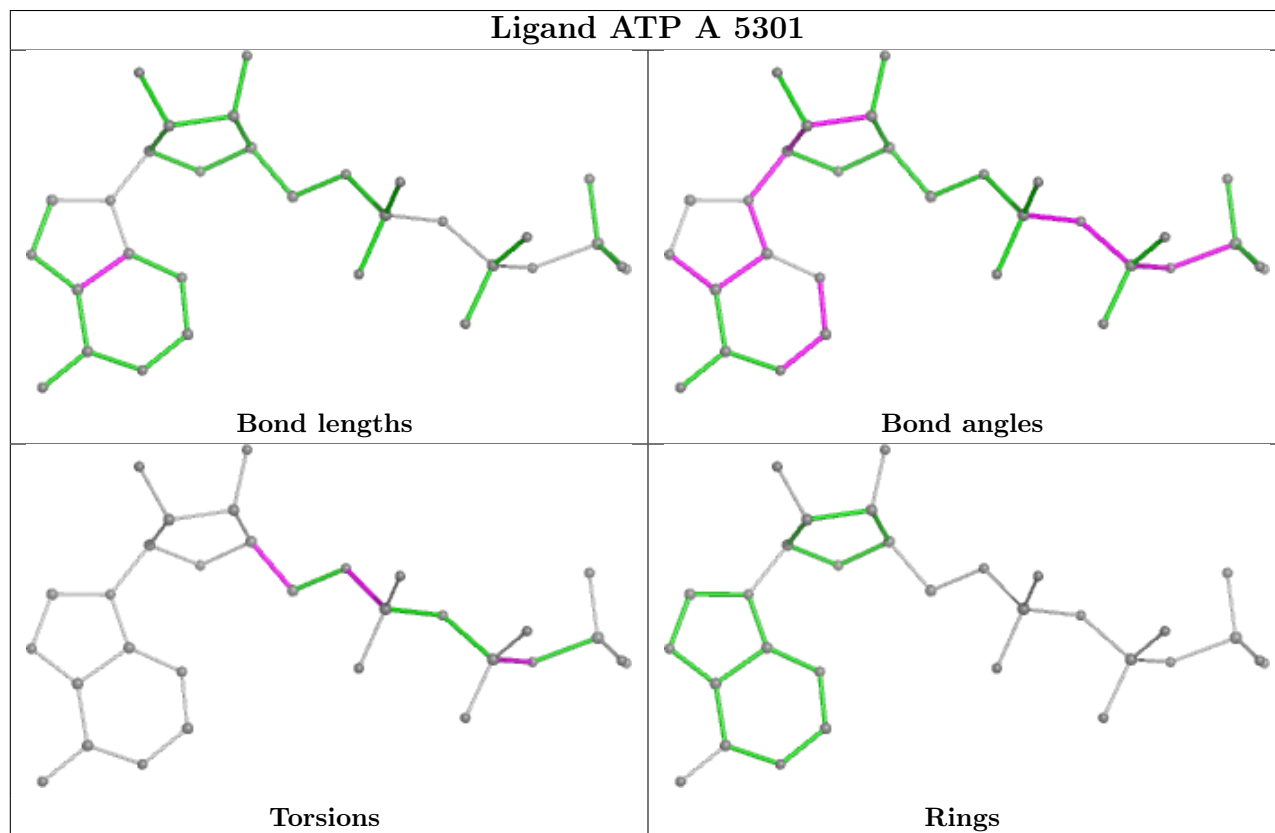
Mol	Chain	Res	Type	Atoms
2	A	5301	ATP	C5'-O5'-PA-O1A
2	A	5301	ATP	C5'-O5'-PA-O2A
2	A	5301	ATP	PG-O3B-PB-O2B
2	A	5301	ATP	C5'-O5'-PA-O3A
2	A	5301	ATP	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

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

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



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.

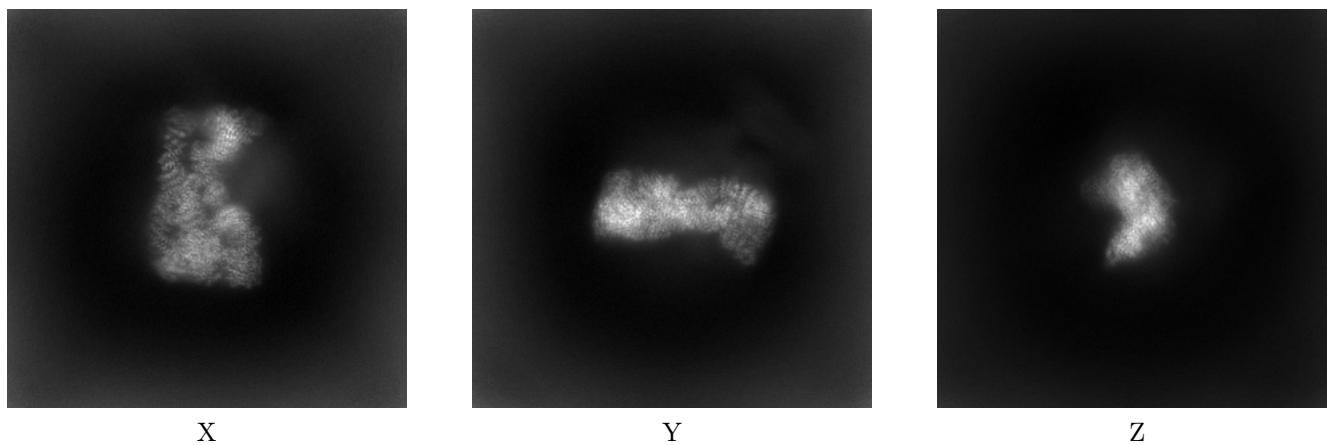
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19653. 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](#)

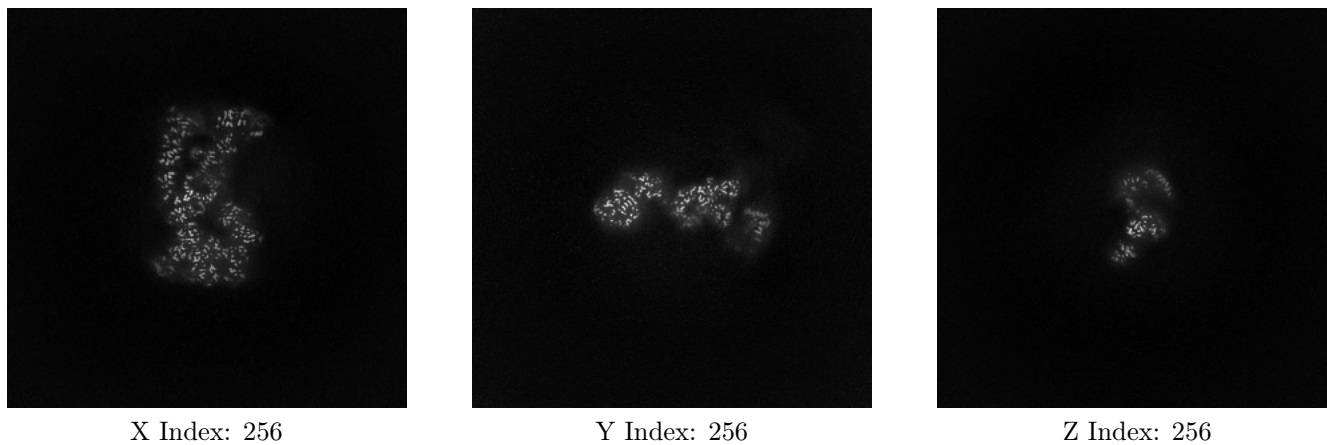
6.1.1 Primary map



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

6.2 Central slices [i](#)

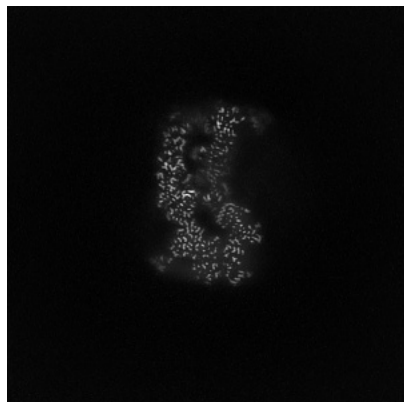
6.2.1 Primary map



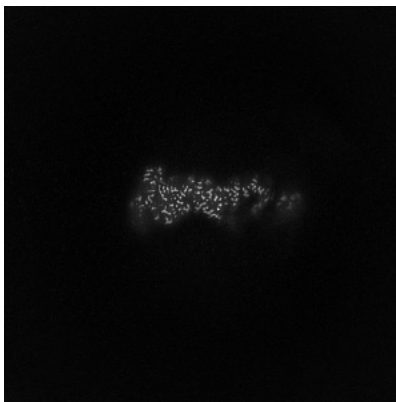
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

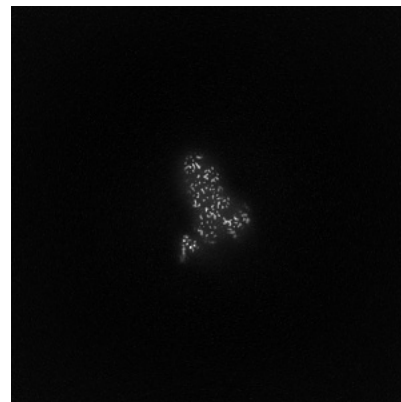
6.3.1 Primary map



X Index: 251



Y Index: 237

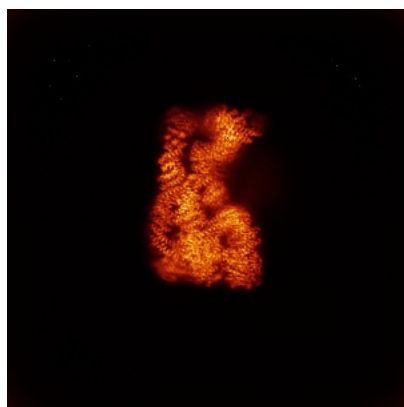


Z Index: 199

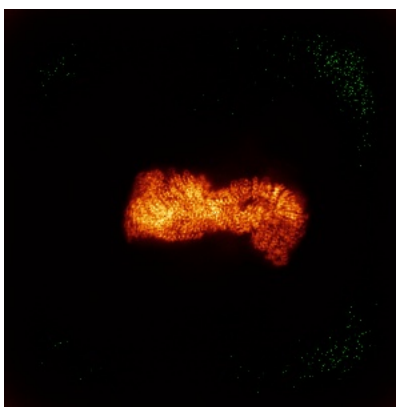
The images above show the largest variance slices of the map in three orthogonal directions.

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

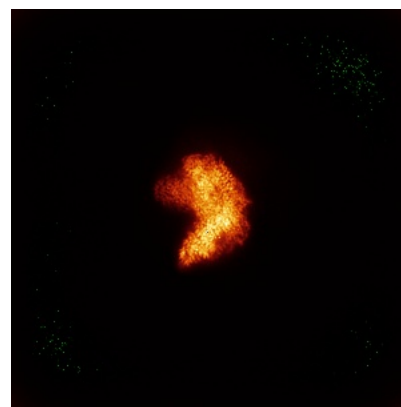
6.4.1 Primary map



X



Y

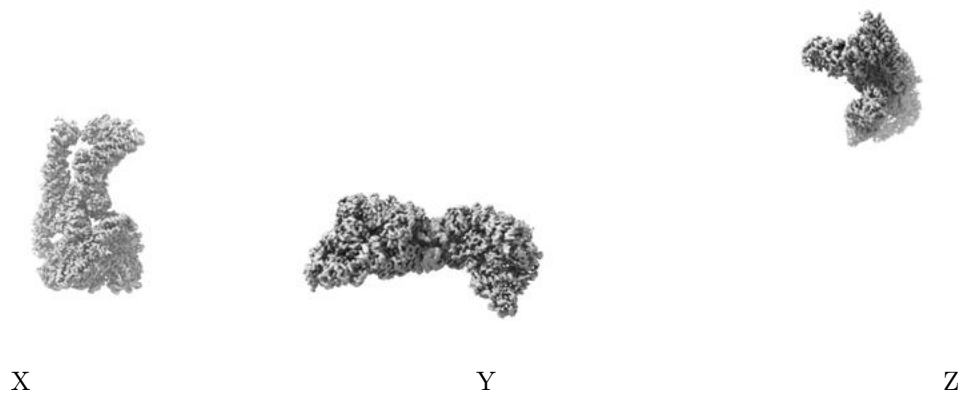


Z

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

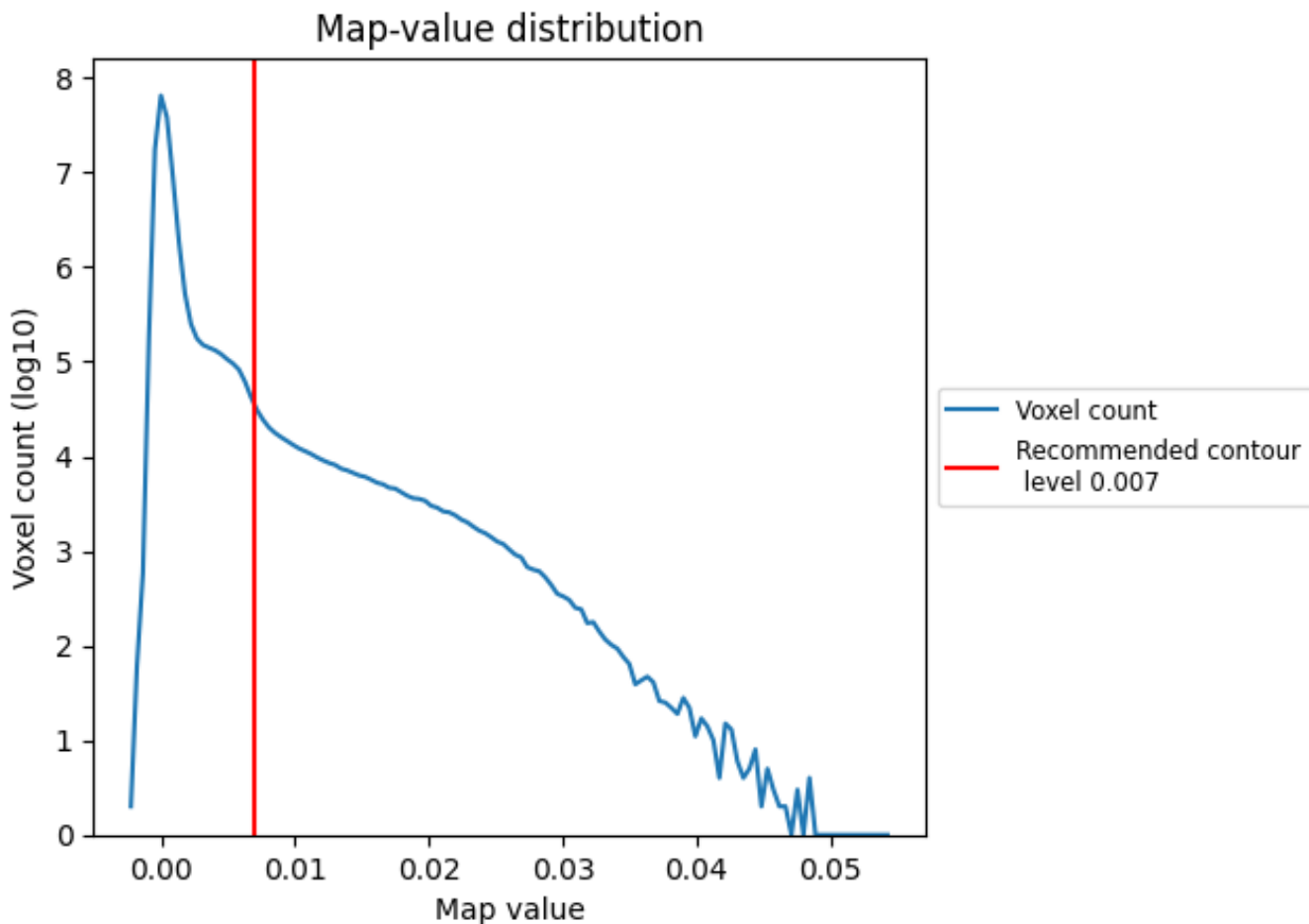
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

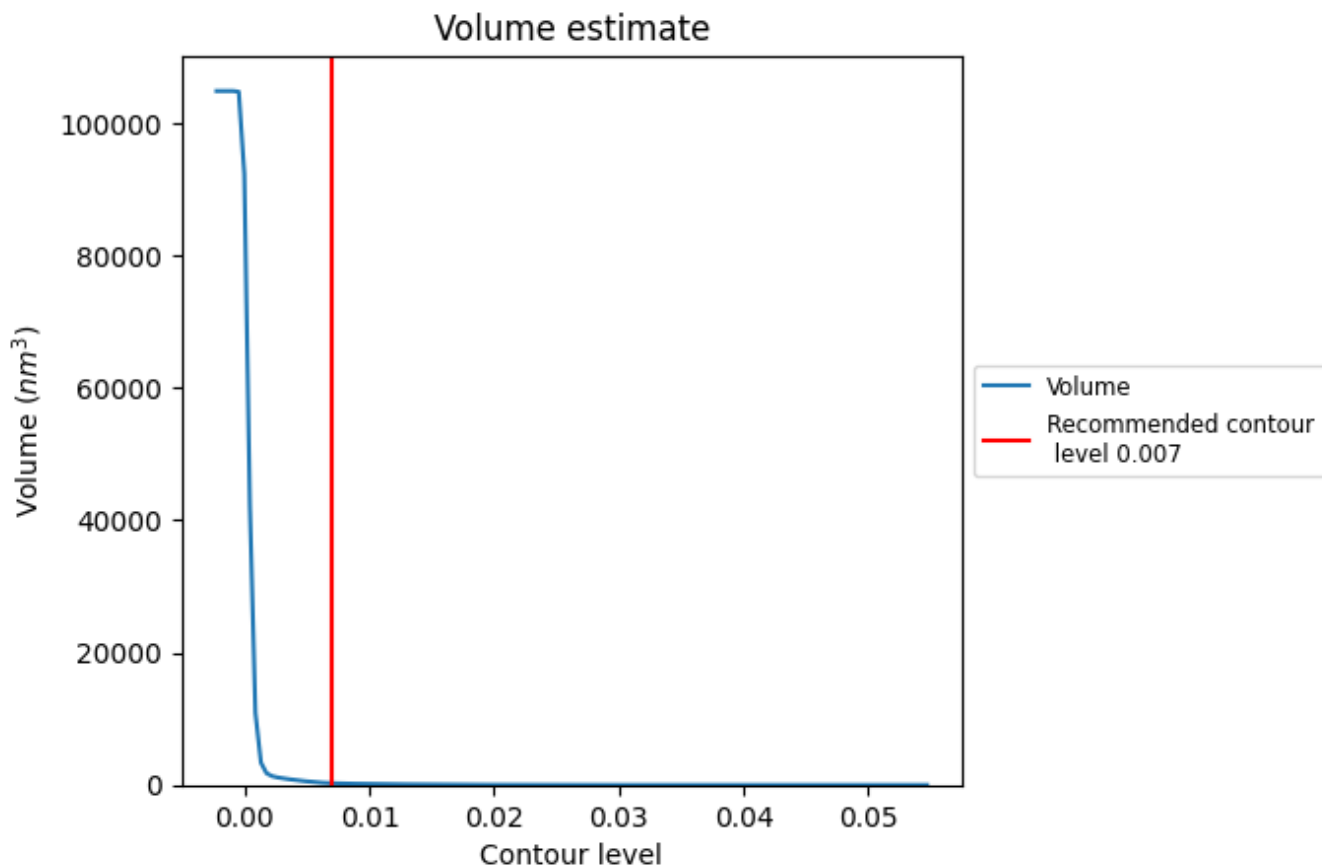
This section contains the results of statistical analysis of the map.

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.

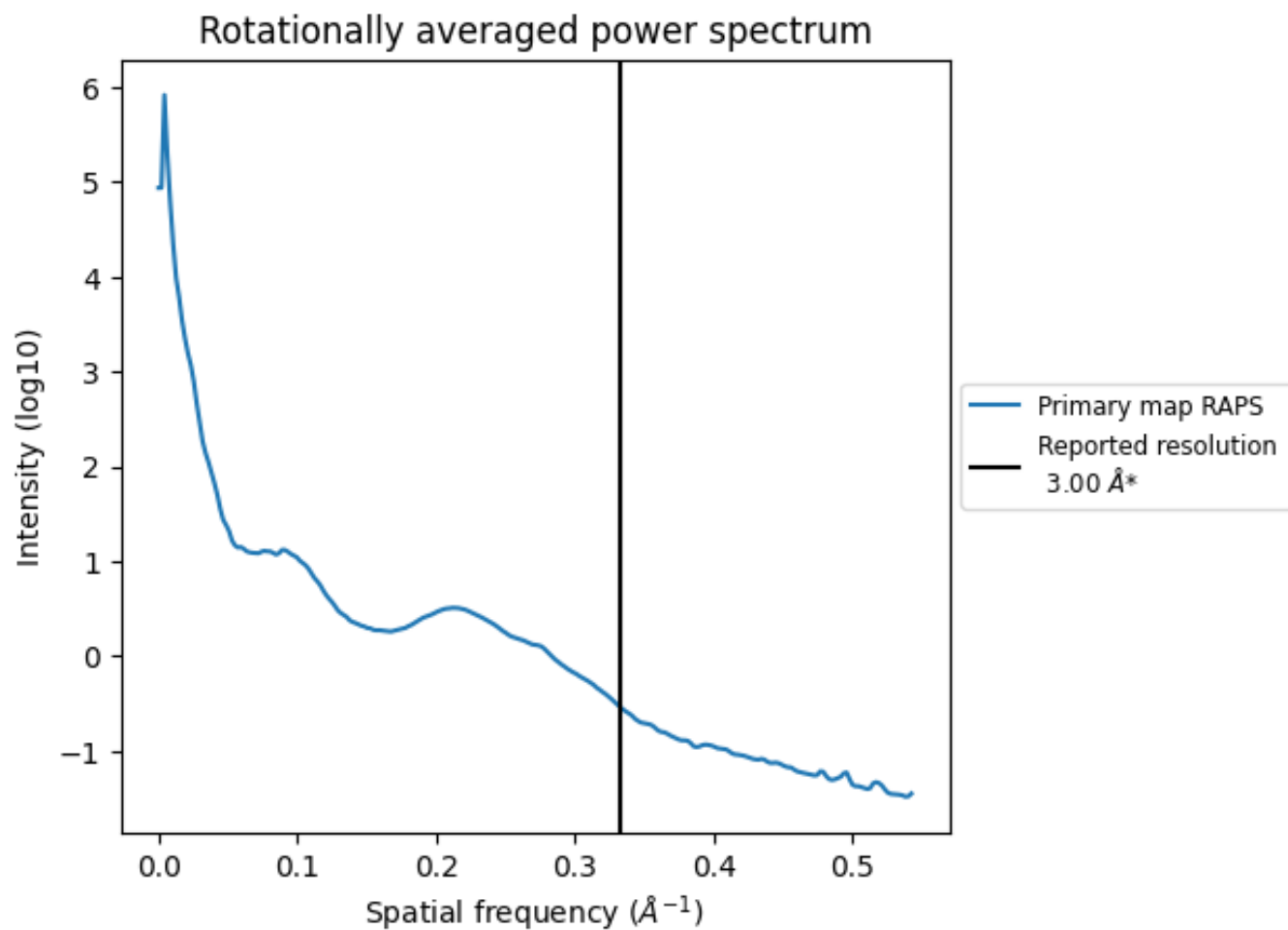
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 261 nm^3 ; this corresponds to an approximate mass of 236 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 0.333 \AA^{-1}

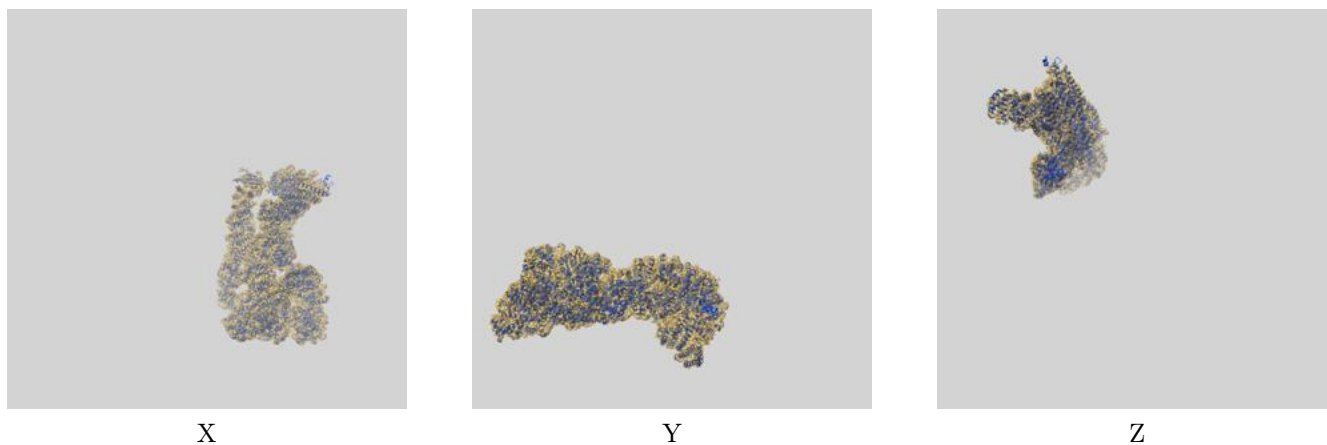
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

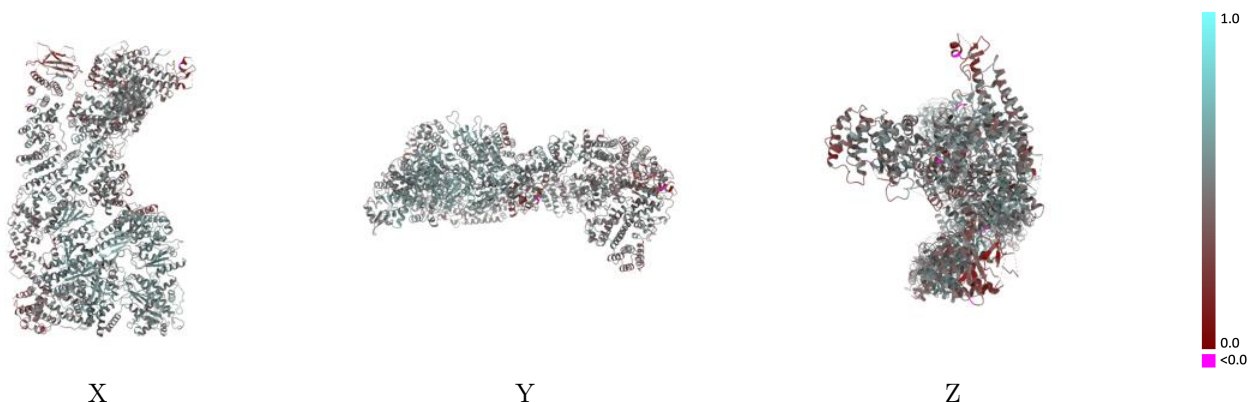
This section contains information regarding the fit between EMDB map EMD-19653 and PDB model 8S24. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlay [i](#)



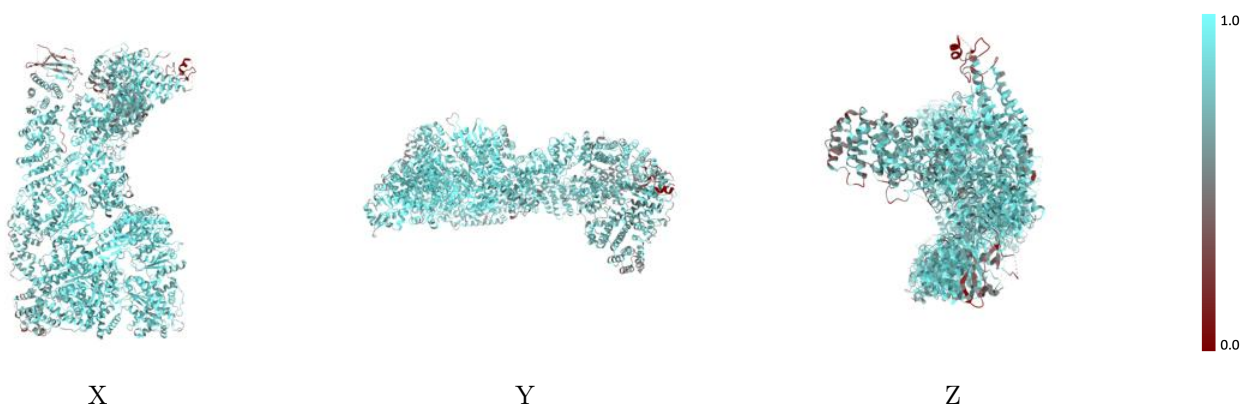
The images above show the 3D surface view of the map at the recommended contour level 0.007 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



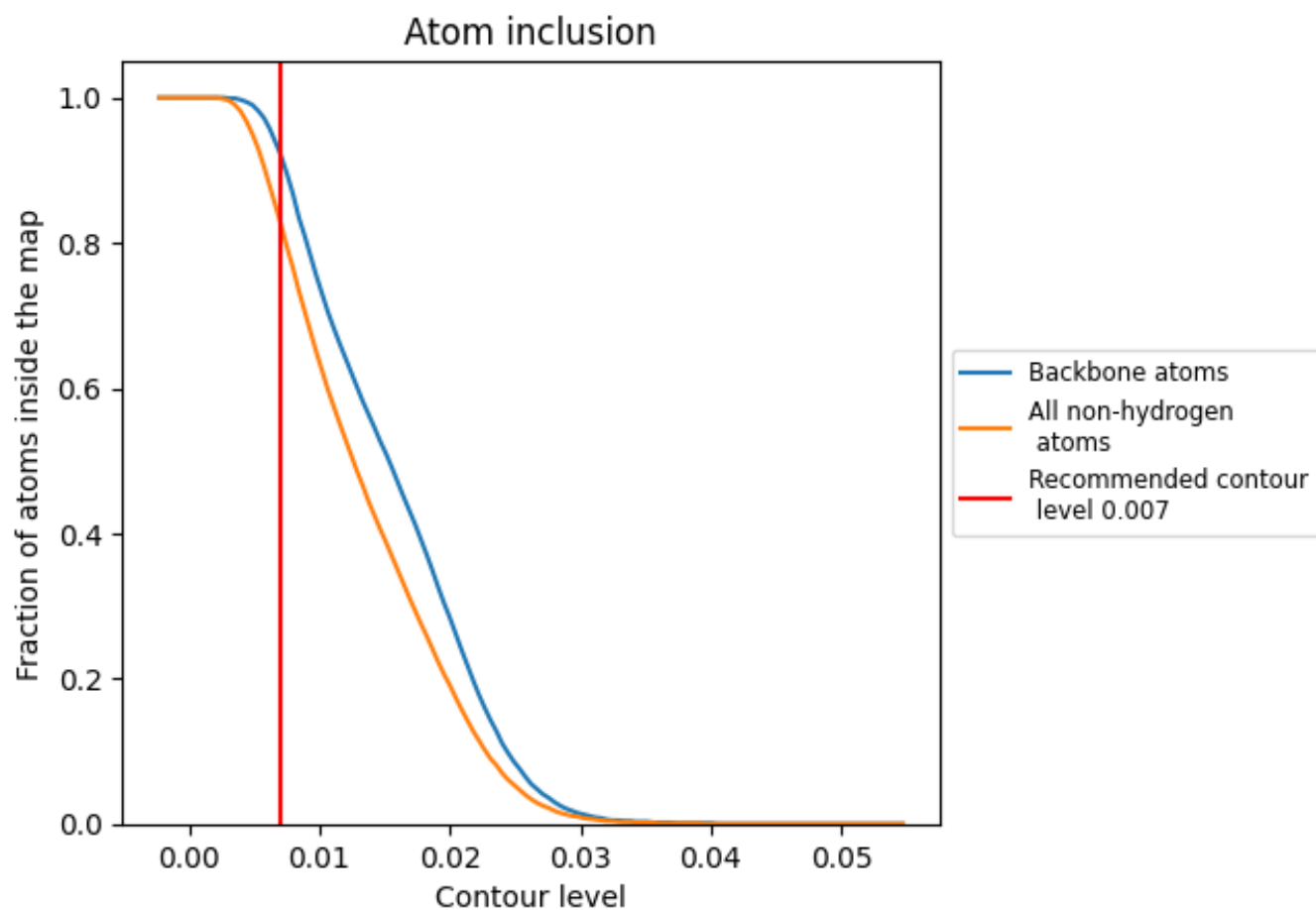
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.007).





9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 83% 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 (0.007) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8280	 0.4820
A	 0.8290	 0.4820

