



Full wwPDB EM Validation Report ⓘ

May 26, 2025 – 06:38 AM EDT

PDB ID : 7K0Y / pdb_00007k0y
EMDB ID : EMD-22618
Title : Cryo-EM structure of activated-form DNA-PK (complex VI)
Authors : Chen, X.; Gellert, M.; Yang, W.
Deposited on : 2020-09-06
Resolution : 3.70 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev118
MolProbity : 4-5-2 with Phenix2.0rc1
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) : 2.43.1

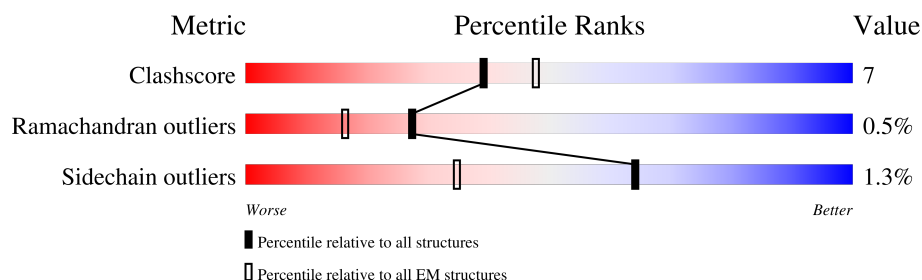
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.70 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	4128	
2	B	609	
3	C	732	
4	D	24	
4	F	24	
5	E	16	
5	G	16	

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 39835 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 DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	3669	Total	C	N	O	S	0	0
			29107	18680	4932	5306	189		

- Molecule 2 is a protein called X-ray repair cross-complementing protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	490	Total	C	N	O	S	2	0
			3973	2545	677	733	18		

- Molecule 3 is a protein called X-ray repair cross-complementing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	655	Total	C	N	O	S	0	0
			5247	3357	876	988	26		

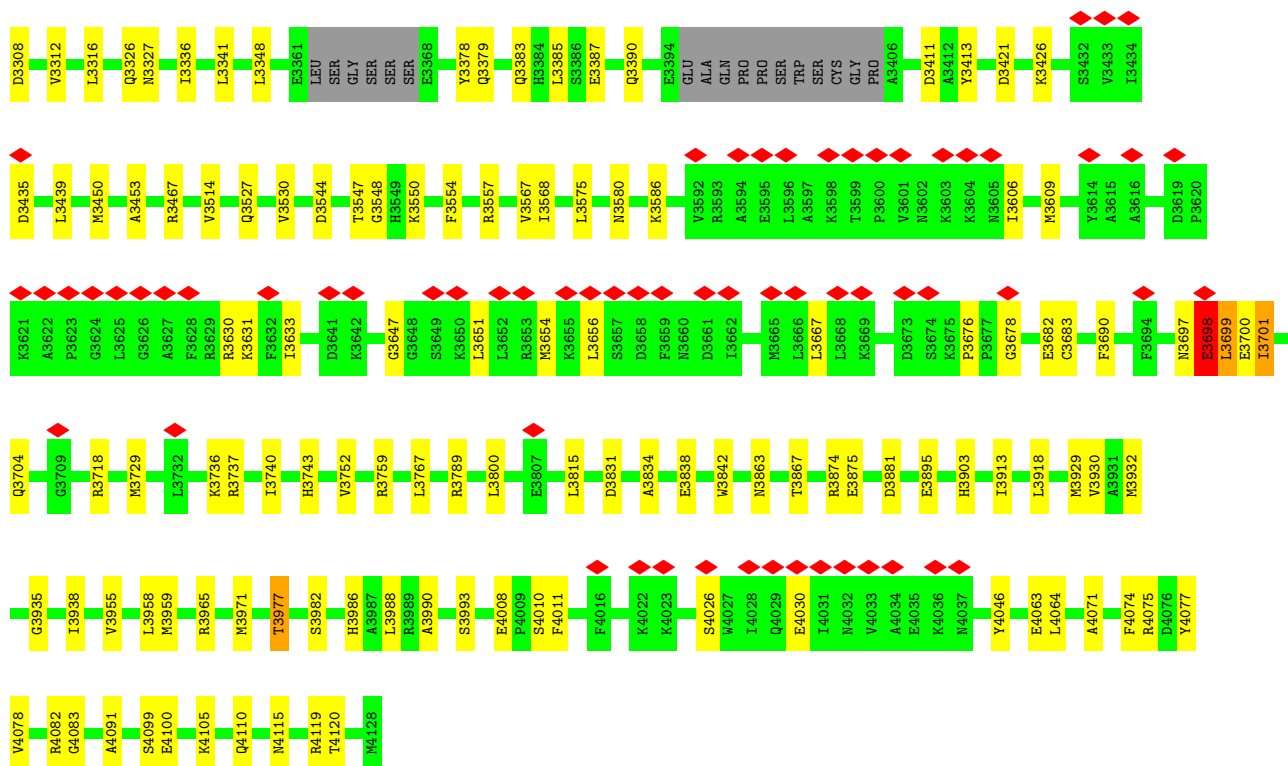
- Molecule 4 is a DNA chain called DNA (5'-D(*GP*CP*AP*TP*GP*CP*TP*CP*TP*AP*CP*TP*GP*CP*TP*TP*CP*GP*AP*TP*AP*TP*CP*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	24	Total	C	N	O	P	0	0
			484	233	82	146	23		
4	F	21	Total	C	N	O	P	0	0
			425	204	69	131	21		

- Molecule 5 is a DNA chain called DNA (5'-D(*AP*AP*GP*CP*AP*GP*TP*AP*GP*AP*GP*CP*A)-3').

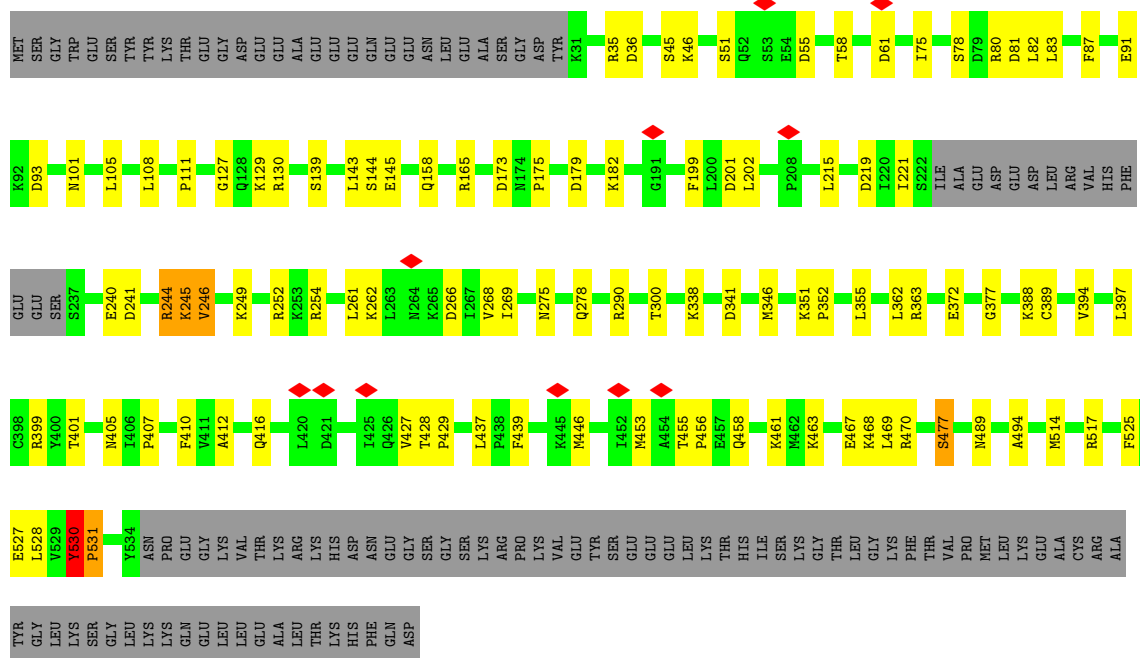
Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	13	Total	C	N	O	P	0	0
			269	128	58	71	12		
5	G	16	Total	C	N	O	P	0	0
			330	157	68	90	15		





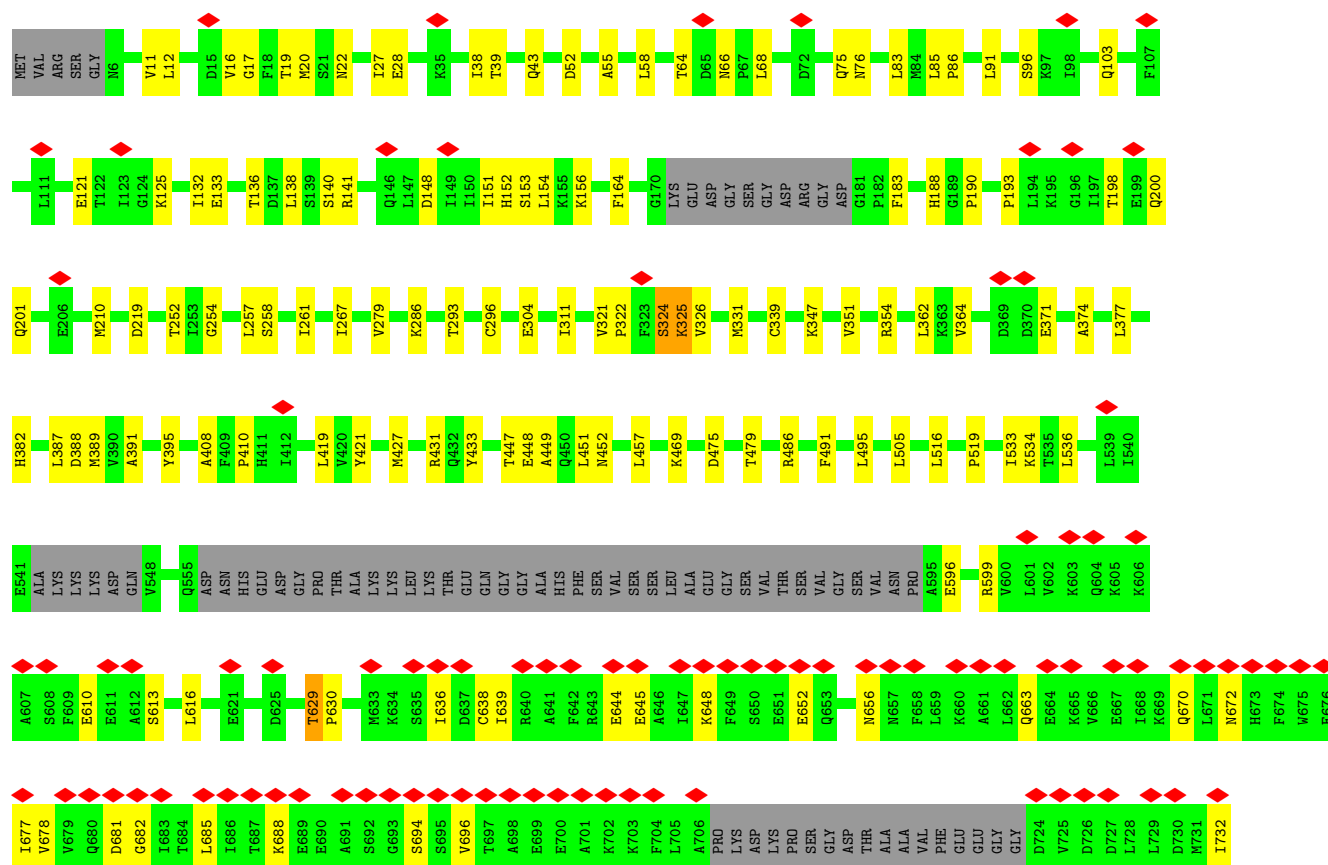
• Molecule 2: X-ray repair cross-complementing protein 6

Chain B: 63% 16% 20%



• Molecule 3: X-ray repair cross-complementing protein 5

Chain C: 13% 71% 18% 11%



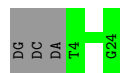
- Molecule 4: DNA (5'-D(*GP*CP*AP*TP*GP*CP*TP*CP*TP*AP*CP*TP*GP*CP*TP*TP*CP*GP*AP*TP*AP*TP*CP*G)-3')

Chain D: 92% 8%



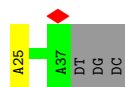
- Molecule 4: DNA (5'-D(*GP*CP*AP*TP*GP*CP*TP*CP*TP*AP*CP*TP*GP*CP*TP*TP*CP*GP*AP*TP*AP*TP*CP*G)-3')

Chain F: 88% 12%



- Molecule 5: DNA (5'-D(*AP*AP*GP*CP*AP*GP*TP*AP*GP*AP*GP*CP*A)-3')

Chain E: 6% 75% 6% 19%



- Molecule 5: DNA (5'-D(*AP*AP*GP*CP*AP*GP*TP*AP*GP*AP*GP*CP*A)-3')

Chain G:



There are no outlier residues recorded for this chain.

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	254646	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 ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.135	Depositor
Minimum map value	-0.072	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.012	Depositor
Map size (Å)	408.31998, 408.31998, 408.31998	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.16, 1.16, 1.16	Depositor

5 Model quality

5.1 Standard geometry

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	0.41	1/29703 (0.0%)	0.69	21/40166 (0.1%)
2	B	0.36	0/4056	0.73	6/5460 (0.1%)
3	C	0.29	0/5347	0.63	0/7208
4	D	0.45	0/540	0.57	0/831
4	F	0.38	0/473	0.54	0/727
5	E	0.27	0/304	0.40	0/468
5	G	0.42	0/372	0.53	0/573
All	All	0.39	1/40795 (0.0%)	0.68	27/55433 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	356	ASN	CG-OD1	5.10	1.33	1.23

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	2122	LEU	CA-C-N	15.17	138.80	119.84
1	A	2122	LEU	C-N-CA	15.17	138.80	119.84
1	A	3895	GLU	CB-CA-C	10.29	127.15	110.90
2	B	530	TYR	CA-C-N	-10.07	110.00	120.38
2	B	530	TYR	C-N-CA	-10.07	110.00	120.38
1	A	1773	VAL	N-CA-C	-9.46	102.35	113.42
1	A	616	LYS	CA-C-N	8.84	130.89	119.84
1	A	616	LYS	C-N-CA	8.84	130.89	119.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	2285	LEU	CA-C-N	8.80	125.99	119.66
1	A	2285	LEU	C-N-CA	8.80	125.99	119.66
1	A	2572	TYR	CA-C-N	7.55	129.28	119.84
1	A	2572	TYR	C-N-CA	7.55	129.28	119.84
1	A	3895	GLU	N-CA-C	-7.49	103.05	111.14
1	A	3514	VAL	N-CA-C	-7.45	105.51	112.96
2	B	244	ARG	CA-C-N	6.73	134.40	121.54
2	B	244	ARG	C-N-CA	6.73	134.40	121.54
1	A	1772	HIS	CA-C-N	-6.69	113.89	121.85
1	A	1772	HIS	C-N-CA	-6.69	113.89	121.85
1	A	2123	PRO	CA-N-CD	-6.54	102.84	112.00
1	A	8	VAL	CA-C-N	6.16	133.31	121.54
1	A	8	VAL	C-N-CA	6.16	133.31	121.54
1	A	2983	ASP	N-CA-C	-6.15	107.00	114.75
1	A	2573	PRO	CA-N-CD	-5.67	104.07	112.00
1	A	2887	PRO	CB-CA-C	5.32	121.15	112.26
2	B	477	SER	N-CA-C	5.32	117.13	110.91
2	B	530	TYR	N-CA-C	5.21	121.32	109.81
1	A	3149	GLY	N-CA-C	-5.15	100.97	113.18

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1727	ARG	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	29107	0	29371	389	0
2	B	3973	0	4075	89	0
3	C	5247	0	5263	90	0
4	D	484	0	274	3	0
4	F	425	0	240	0	0
5	E	269	0	146	2	0
5	G	330	0	180	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	39835	0	39549	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 7.

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)
2:B:245:LYS:O	2:B:246:VAL:CG2	2.04	1.06
1:A:948:MET:H	1:A:949:PRO:HD2	1.20	1.00
1:A:948:MET:HG3	1:A:949:PRO:HD3	1.40	1.00
1:A:948:MET:H	1:A:949:PRO:CD	1.78	0.96
1:A:630:CYS:O	1:A:634:LEU:HB2	1.69	0.93
2:B:245:LYS:O	2:B:246:VAL:HG23	1.68	0.91
1:A:1771:GLN:O	1:A:1772:HIS:O	1.90	0.90
1:A:3697:ASN:O	1:A:3698:GLU:O	1.89	0.90
3:C:252:THR:HA	3:C:257:LEU:O	1.76	0.85
3:C:19:THR:O	3:C:22:ASN:HB2	1.75	0.84
1:A:607:ASP:HB3	1:A:608:PRO:HD3	1.61	0.83
1:A:949:PRO:HB2	1:A:954:GLY:HA3	1.62	0.81
2:B:245:LYS:O	2:B:246:VAL:HG22	1.77	0.80
1:A:2826:LEU:HD12	1:A:2826:LEU:H	1.45	0.79
1:A:1022:ASP:O	1:A:1026:ARG:HG3	1.83	0.79
2:B:245:LYS:C	2:B:246:VAL:HG23	2.09	0.77
2:B:530:TYR:O	2:B:531:PRO:C	2.23	0.76
1:A:2284:ASP:HB3	1:A:2285:LEU:HD13	1.68	0.75
1:A:948:MET:N	1:A:949:PRO:CD	2.49	0.75
1:A:2572:TYR:N	1:A:2573:PRO:HD3	2.04	0.72
1:A:607:ASP:HB3	1:A:608:PRO:CD	2.18	0.72
3:C:371:GLU:HB2	3:C:374:ALA:HB3	1.72	0.71
2:B:530:TYR:O	2:B:531:PRO:O	2.11	0.69
1:A:1090:ARG:HB2	1:A:1137:ILE:HG12	1.75	0.68
1:A:1825:LEU:O	1:A:1829:TRP:HB2	1.94	0.67
1:A:3530:VAL:HG11	1:A:3568:ILE:HD13	1.78	0.66
2:B:245:LYS:C	2:B:246:VAL:CG2	2.68	0.66
1:A:672:ILE:O	1:A:676:ASN:ND2	2.29	0.65
1:A:1833:LEU:HB3	1:A:1836:LEU:HB2	1.80	0.64
1:A:2308:SER:OG	1:A:2348:GLN:NE2	2.31	0.64
1:A:518:LYS:HD2	1:A:518:LYS:N	2.13	0.63
1:A:1892:LYS:HA	1:A:1896:ILE:HD11	1.79	0.63
2:B:202:LEU:HD23	2:B:221:ILE:HD12	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3243:ILE:HD13	1:A:3259:LEU:HD22	1.81	0.63
1:A:1333:SER:HA	1:A:1336:THR:HG22	1.82	0.62
1:A:1018:VAL:HG12	1:A:1074:LYS:HA	1.81	0.62
2:B:446:MET:SD	2:B:446:MET:N	2.73	0.62
1:A:754:MET:O	1:A:758:LEU:HB2	2.00	0.62
1:A:951:GLY:HA2	1:A:955:ALA:HB3	1.82	0.62
1:A:3177:ASN:OD1	1:A:3177:ASN:N	2.30	0.62
1:A:612:LEU:HB3	1:A:614:PRO:HD3	1.83	0.61
1:A:1794:GLN:HA	1:A:1797:LEU:HD12	1.83	0.61
2:B:530:TYR:C	2:B:531:PRO:O	2.42	0.61
1:A:864:GLY:HA3	1:A:3169:PRO:HA	1.81	0.61
1:A:1069:HIS:O	1:A:1075:ARG:NH1	2.34	0.61
1:A:521:VAL:O	1:A:521:VAL:HG13	2.02	0.60
1:A:3193:ILE:O	1:A:3197:LEU:HB2	2.01	0.60
3:C:688:LYS:HA	3:C:696:VAL:HB	1.84	0.60
3:C:688:LYS:HB2	3:C:694:SER:HB2	1.83	0.59
2:B:461:LYS:HZ3	2:B:528:LEU:HD13	1.67	0.59
1:A:986:PRO:O	1:A:990:GLN:HB2	2.02	0.59
1:A:1022:ASP:OD1	1:A:1025:LEU:HB3	2.03	0.59
1:A:1075:ARG:NH2	1:A:1117:ASP:OD2	2.36	0.59
2:B:241:ASP:OD1	2:B:241:ASP:N	2.36	0.59
1:A:3759:ARG:NH1	1:A:4008:GLU:OE2	2.35	0.59
1:A:1560:TYR:O	1:A:1564:SER:OG	2.20	0.58
2:B:427:VAL:O	3:C:354:ARG:NH2	2.36	0.58
1:A:842:SER:O	1:A:842:SER:OG	2.19	0.58
1:A:3913:ILE:HD11	1:A:3988:LEU:HD22	1.84	0.58
2:B:416:GLN:NE2	2:B:429:PRO:O	2.36	0.58
1:A:2203:THR:HG21	1:A:2247:ASP:HB2	1.85	0.58
1:A:86:LEU:HD13	1:A:127:ALA:HB2	1.86	0.58
1:A:518:LYS:HD2	1:A:518:LYS:H	1.66	0.58
1:A:716:VAL:HB	1:A:1120:SER:HA	1.86	0.58
1:A:958:MET:HB2	1:A:961:LEU:HD12	1.86	0.58
2:B:458:GLN:HG3	2:B:528:LEU:HD11	1.85	0.57
3:C:76:ASN:ND2	3:C:103:GLN:O	2.37	0.57
3:C:652:GLU:O	3:C:656:ASN:ND2	2.37	0.57
1:A:3435:ASP:O	1:A:3439:LEU:HB2	2.04	0.57
1:A:3379:GLN:OE1	1:A:3383:GLN:NE2	2.38	0.57
2:B:346:MET:SD	2:B:399:ARG:NH2	2.78	0.57
1:A:2826:LEU:HA	1:A:2829:LYS:CG	2.34	0.57
1:A:1013:ILE:HG23	1:A:1029:CYS:HB3	1.87	0.57
1:A:1802:TYR:O	1:A:1806:ARG:HB2	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2183:HIS:HA	1:A:2186:VAL:HG22	1.86	0.57
1:A:836:LYS:NZ	4:D:5:DG:OP1	2.37	0.57
1:A:2387:PRO:O	2:B:158:GLN:NE2	2.38	0.57
2:B:82:LEU:HB3	2:B:108:LEU:HD22	1.86	0.57
1:A:4083:GLY:HA3	1:A:4091:ALA:HB2	1.87	0.57
1:A:72:SER:O	1:A:82:ARG:NH1	2.38	0.56
1:A:1894:SER:HA	1:A:1897:ASN:HB2	1.87	0.56
2:B:410:PHE:HB2	2:B:439:PHE:HE1	1.68	0.56
1:A:2506:LEU:O	1:A:2525:TRP:NE1	2.33	0.56
1:A:612:LEU:HD22	1:A:614:PRO:HG3	1.86	0.56
3:C:198:THR:HG22	3:C:201:GLN:HE21	1.68	0.56
1:A:1178:ARG:O	1:A:1184:ARG:NH2	2.39	0.56
3:C:16:VAL:HG11	3:C:58:LEU:HD13	1.86	0.56
1:A:493:LYS:NZ	1:A:527:TYR:OH	2.30	0.56
1:A:667:TYR:HA	1:A:670:LEU:HD12	1.87	0.56
1:A:2952:ILE:HG12	1:A:2975:ALA:HB2	1.87	0.56
1:A:4071:ALA:HB3	1:A:4074:PHE:HB2	1.87	0.56
1:A:573:LEU:HA	1:A:576:VAL:HG12	1.87	0.56
1:A:907:LEU:HD13	1:A:910:PHE:HD2	1.70	0.56
1:A:1726:SER:O	1:A:1727:ARG:HG3	2.06	0.56
1:A:2124:SER:O	1:A:2128:PHE:HB3	2.05	0.56
2:B:407:PRO:HG2	3:C:486:ARG:HD2	1.88	0.56
1:A:1613:HIS:HA	1:A:1616:LEU:HD12	1.88	0.56
1:A:136:GLN:HG3	1:A:180:LEU:HD21	1.87	0.56
1:A:866:ILE:O	1:A:869:ASN:ND2	2.35	0.55
2:B:527:GLU:HA	2:B:531:PRO:HD3	1.88	0.55
1:A:1957:ASN:ND2	1:A:1962:TYR:OH	2.40	0.55
1:A:1568:ASN:ND2	1:A:1599:GLY:O	2.40	0.55
1:A:1750:LEU:HG	1:A:1785:ILE:HD11	1.88	0.55
1:A:1771:GLN:C	1:A:1772:HIS:O	2.47	0.55
1:A:1805:PHE:O	1:A:1816:ARG:NH2	2.33	0.55
1:A:1264:LEU:HD21	1:A:1341:ILE:HG13	1.88	0.55
1:A:1937:ARG:O	1:A:1941:HIS:ND1	2.39	0.55
1:A:561:ASN:N	1:A:561:ASN:OD1	2.40	0.55
1:A:1909:ASN:HD22	3:C:732:ILE:HG23	1.72	0.55
1:A:3294:SER:HB3	1:A:3348:LEU:HD22	1.88	0.55
3:C:141:ARG:NH1	3:C:200:GLN:OE1	2.40	0.55
3:C:64:THR:OG1	3:C:75:GLN:NE2	2.40	0.55
1:A:2285:LEU:H	1:A:2285:LEU:CD1	2.21	0.54
1:A:3630:ARG:HG3	1:A:3633:ILE:H	1.72	0.54
1:A:1063:LEU:HD22	1:A:1078:ALA:HA	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3244:ASP:OD1	1:A:3247:ARG:NH2	2.38	0.54
2:B:528:LEU:HD21	2:B:530:TYR:OH	2.06	0.54
1:A:1850:VAL:O	1:A:1870:LYS:NZ	2.40	0.54
1:A:2131:GLY:O	1:A:2135:ASN:ND2	2.40	0.54
1:A:3697:ASN:C	1:A:3698:GLU:O	2.50	0.54
3:C:140:SER:O	3:C:200:GLN:NE2	2.38	0.54
1:A:529:ASP:OD1	1:A:529:ASP:N	2.35	0.54
1:A:723:ASP:OD1	1:A:723:ASP:N	2.38	0.54
3:C:324:SER:OG	3:C:325:LYS:N	2.39	0.54
1:A:2362:VAL:O	1:A:2366:LYS:NZ	2.41	0.54
1:A:1142:HIS:HE1	1:A:1165:LEU:HD22	1.72	0.54
1:A:3631:LYS:HG2	1:A:3683:CYS:HA	1.90	0.54
1:A:94:GLU:OE1	1:A:133:LYS:NZ	2.38	0.54
1:A:1082:PHE:HZ	1:A:1134:LEU:HD13	1.73	0.54
1:A:3982:SER:O	1:A:3986:HIS:ND1	2.41	0.54
2:B:143:LEU:O	2:B:145:GLU:N	2.41	0.54
3:C:11:VAL:HB	3:C:132:ILE:HG12	1.91	0.53
3:C:448:GLU:O	3:C:452:ASN:ND2	2.42	0.53
1:A:1829:TRP:O	1:A:1883:ARG:NH2	2.42	0.53
1:A:1862:THR:OG1	1:A:1866:GLN:NE2	2.42	0.53
2:B:91:GLU:O	2:B:101:ASN:ND2	2.41	0.53
1:A:1809:ASP:OD2	1:A:1811:ARG:NH2	2.42	0.53
2:B:338:LYS:O	2:B:405:ASN:ND2	2.41	0.53
1:A:2826:LEU:HD12	1:A:2826:LEU:N	2.18	0.53
1:A:3137:GLU:OE1	1:A:3164:TRP:NE1	2.42	0.53
1:A:2129:LEU:O	1:A:2133:LEU:N	2.42	0.53
1:A:3651:LEU:HA	1:A:3654:MET:HB2	1.91	0.53
1:A:3842:TRP:HH2	1:A:3867:THR:HG22	1.73	0.53
1:A:3091:LEU:O	1:A:3192:LYS:NZ	2.42	0.53
2:B:127:GLY:HA2	2:B:130:ARG:HE	1.73	0.53
1:A:949:PRO:HB2	1:A:954:GLY:CA	2.37	0.53
2:B:412:ALA:HB2	2:B:437:LEU:HD11	1.91	0.53
1:A:1049:GLN:NE2	1:A:1055:ASN:OD1	2.42	0.53
1:A:3690:PHE:HZ	1:A:3699:LEU:HD11	1.74	0.53
1:A:859:LEU:HD11	1:A:870:LEU:HD11	1.90	0.53
1:A:3278:GLN:HE21	1:A:3326:GLN:HE21	1.57	0.52
3:C:616:LEU:HD21	3:C:638:CYS:HB3	1.89	0.52
1:A:3170:ASP:N	1:A:3170:ASP:OD1	2.42	0.52
1:A:3654:MET:HG3	1:A:3656:LEU:HB2	1.92	0.52
1:A:4115:ASN:OD1	1:A:4119:ARG:NH1	2.42	0.52
1:A:703:CYS:HA	1:A:706:LEU:HD13	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:750:PRO:HA	1:A:753:GLN:HG2	1.91	0.52
1:A:859:LEU:HD21	1:A:870:LEU:HD21	1.90	0.52
1:A:2571:ASP:C	1:A:2573:PRO:HD3	2.34	0.52
1:A:1727:ARG:HD2	1:A:1727:ARG:O	2.10	0.52
1:A:3701:ILE:HG23	1:A:3704:GLN:HE22	1.73	0.52
1:A:2849:SER:O	1:A:2849:SER:OG	2.27	0.52
2:B:468:LYS:HD2	2:B:517:ARG:HG3	1.91	0.52
1:A:1254:LEU:HD21	1:A:1330:TYR:HB2	1.92	0.52
1:A:2234:ASN:HA	1:A:2237:ILE:HD12	1.92	0.52
1:A:2103:HIS:O	1:A:2107:SER:OG	2.28	0.52
3:C:188:HIS:HB2	3:C:519:PRO:HD3	1.91	0.52
2:B:143:LEU:HD23	2:B:182:LYS:HG2	1.91	0.51
3:C:121:GLU:O	3:C:125:LYS:NZ	2.36	0.51
3:C:136:THR:HG22	3:C:138:LEU:H	1.74	0.51
2:B:261:LEU:HD23	2:B:269:ILE:HD11	1.92	0.51
3:C:11:VAL:HG22	3:C:55:ALA:HB3	1.92	0.51
1:A:3130:GLN:NE2	1:A:3174:ASP:OD1	2.41	0.51
1:A:3990:ALA:O	1:A:3993:SER:OG	2.25	0.51
2:B:514:MET:HE3	3:C:254:GLY:HA2	1.91	0.51
1:A:2471:GLU:O	1:A:2475:ASN:HB2	2.11	0.51
1:A:3959:MET:HE1	1:A:4120:THR:HG21	1.93	0.51
1:A:1896:ILE:HD12	1:A:1906:THR:HG23	1.91	0.51
1:A:3411:ASP:OD1	1:A:3411:ASP:N	2.42	0.51
1:A:3958:LEU:O	1:A:4110:GLN:NE2	2.42	0.51
2:B:35:ARG:NH2	2:B:80:ARG:O	2.44	0.51
3:C:339:CYS:O	3:C:395:TYR:HA	2.10	0.51
1:A:2940:ARG:HH12	1:A:3977:THR:HG22	1.74	0.51
1:A:3226:ASP:OD1	1:A:3226:ASP:N	2.44	0.51
1:A:959:TYR:HA	1:A:962:TYR:HB2	1.93	0.51
1:A:1833:LEU:HG	1:A:1835:ALA:H	1.76	0.51
1:A:3155:VAL:HG23	1:A:3156:PRO:HD3	1.93	0.51
1:A:1459:HIS:HB2	1:A:1464:LEU:HD22	1.93	0.51
1:A:2412:TYR:OH	1:A:2453:GLU:OE2	2.28	0.51
3:C:17:GLY:O	3:C:20:MET:HB3	2.10	0.51
1:A:517:GLY:O	1:A:519:TRP:CE3	2.65	0.51
1:A:3838:GLU:OE1	1:A:3874:ARG:NE	2.38	0.51
3:C:91:LEU:HD21	3:C:495:LEU:HD13	1.91	0.51
3:C:645:GLU:HA	3:C:648:LYS:HZ2	1.75	0.51
1:A:3903:HIS:ND1	1:A:3935:GLY:O	2.41	0.50
1:A:4010:SER:OG	1:A:4011:PHE:N	2.44	0.50
3:C:183:PHE:HB2	3:C:190:PRO:HG2	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2461:PHE:HB2	1:A:2473:MET:HG3	1.93	0.50
1:A:3580:ASN:HD21	1:A:3676:PRO:HB3	1.75	0.50
3:C:448:GLU:HA	3:C:451:LEU:HB2	1.93	0.50
3:C:533:ILE:HA	3:C:536:LEU:HG	1.93	0.50
3:C:670:GLN:OE1	3:C:672:ASN:ND2	2.45	0.50
1:A:1420:ARG:NH1	1:A:1466:ASN:O	2.44	0.50
1:A:3113:ASN:O	1:A:3116:SER:OG	2.29	0.50
1:A:3269:ARG:HH21	1:A:3271:ASP:HB2	1.77	0.50
1:A:2285:LEU:CD1	1:A:2285:LEU:N	2.74	0.50
1:A:3421:ASP:OD1	1:A:3467:ARG:NE	2.38	0.50
2:B:175:PRO:O	2:B:182:LYS:NZ	2.44	0.50
1:A:1963:GLN:HA	1:A:1967:PHE:HD2	1.76	0.50
1:A:3586:LYS:HE2	1:A:3667:LEU:HD13	1.94	0.50
1:A:3863:ASN:OD1	1:A:3863:ASN:N	2.41	0.50
2:B:427:VAL:HG23	2:B:428:THR:HG23	1.94	0.50
1:A:1132:ASP:O	1:A:1136:ARG:NH1	2.45	0.49
1:A:1027:ASP:OD1	1:A:1027:ASP:N	2.44	0.49
1:A:1726:SER:N	1:A:1728:GLU:OE2	2.29	0.49
1:A:36:ARG:NH2	1:A:823:GLN:O	2.45	0.49
1:A:1014:LEU:O	1:A:1018:VAL:HG22	2.13	0.49
1:A:2575:PRO:HD2	1:A:2786:LYS:HA	1.93	0.49
2:B:83:LEU:HD12	2:B:111:PRO:HD3	1.94	0.49
1:A:1949:ILE:HD13	1:A:2096:PRO:HB2	1.94	0.49
2:B:266:ASP:OD2	3:C:534:LYS:NZ	2.45	0.49
1:A:1003:SER:OG	1:A:1005:ASP:OD1	2.24	0.49
2:B:240:GLU:O	2:B:245:LYS:NZ	2.41	0.49
1:A:1493:PRO:HB3	1:A:1501:PRO:HD3	1.94	0.49
1:A:2103:HIS:O	1:A:2107:SER:CB	2.61	0.49
2:B:300:THR:HB	3:C:293:THR:HG23	1.93	0.49
1:A:3104:GLN:OE1	1:A:3139:GLN:NE2	2.40	0.49
2:B:165:ARG:HA	2:B:199:PHE:O	2.13	0.49
4:D:24:DG:H2'	5:E:25:DA:N7	2.27	0.49
1:A:60:SER:OG	1:A:61:ARG:N	2.46	0.49
3:C:387:LEU:HB2	3:C:389:MET:HG2	1.94	0.49
3:C:636:ILE:HA	3:C:639:ILE:HG22	1.94	0.49
1:A:950:GLU:H	1:A:954:GLY:HA3	1.77	0.48
1:A:2810:SER:OG	1:A:2857:CYS:SG	2.70	0.48
1:A:2826:LEU:HA	1:A:2829:LYS:HG2	1.94	0.48
1:A:2133:LEU:HD23	1:A:2164:TRP:HZ3	1.78	0.48
2:B:51:SER:O	2:B:51:SER:OG	2.31	0.48
3:C:677:ILE:O	3:C:681:ASP:HB2	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:228:SER:O	1:A:228:SER:OG	2.28	0.48
1:A:425:ASP:OD1	1:A:425:ASP:N	2.41	0.48
1:A:2527:HIS:ND1	1:A:2528:GLU:O	2.46	0.48
1:A:2786:LYS:O	1:A:2789:SER:OG	2.29	0.48
2:B:489:ASN:ND2	3:C:331:MET:O	2.45	0.48
1:A:887:ASP:OD1	1:A:887:ASP:N	2.46	0.48
1:A:3048:LYS:NZ	1:A:3060:SER:OG	2.47	0.48
3:C:629:THR:HG23	3:C:630:PRO:HD3	1.96	0.48
1:A:518:LYS:N	1:A:518:LYS:CD	2.73	0.48
2:B:362:LEU:HD12	2:B:363:ARG:HB2	1.96	0.48
1:A:294:PHE:HE2	1:A:344:GLN:HG2	1.79	0.48
1:A:901:MET:HE1	1:A:2823:PHE:HZ	1.77	0.48
1:A:3018:SER:O	1:A:3018:SER:OG	2.31	0.48
3:C:85:LEU:HD12	3:C:86:PRO:HD2	1.94	0.48
1:A:288:ASP:OD1	1:A:288:ASP:N	2.47	0.48
1:A:517:GLY:O	1:A:519:TRP:HE3	1.96	0.48
1:A:657:SER:HA	1:A:660:LEU:HB2	1.96	0.48
1:A:1442:GLN:O	1:A:1446:SER:CB	2.61	0.48
1:A:1079:SER:O	1:A:1083:ASN:ND2	2.36	0.48
1:A:1753:SER:O	1:A:1753:SER:OG	2.29	0.48
2:B:78:SER:OG	2:B:81:ASP:OD2	2.23	0.48
2:B:351:LYS:HB3	2:B:355:LEU:HD21	1.96	0.48
3:C:11:VAL:HA	3:C:55:ALA:O	2.13	0.48
3:C:678:VAL:O	3:C:682:GLY:N	2.37	0.48
1:A:3767:LEU:HD13	1:A:3918:LEU:HD22	1.95	0.48
2:B:372:GLU:OE2	2:B:377:GLY:N	2.46	0.48
1:A:414:LEU:HD12	1:A:464:VAL:HG21	1.96	0.47
1:A:2180:GLU:OE2	1:A:2183:HIS:ND1	2.37	0.47
1:A:2190:VAL:HA	1:A:2193:ILE:HG22	1.96	0.47
2:B:266:ASP:OD1	2:B:266:ASP:N	2.46	0.47
3:C:279:VAL:HG12	3:C:286:LYS:HA	1.96	0.47
1:A:1949:ILE:HG21	1:A:2096:PRO:HB2	1.96	0.47
1:A:4099:SER:OG	1:A:4100:GLU:N	2.46	0.47
2:B:58:THR:HG23	2:B:61:ASP:H	1.79	0.47
1:A:1488:TYR:OH	1:A:1534:ASN:ND2	2.47	0.47
1:A:1750:LEU:HD22	1:A:1762:MET:HE1	1.96	0.47
1:A:1896:ILE:HD13	1:A:1908:GLY:HA2	1.96	0.47
1:A:2426:HIS:CD2	1:A:2427:ARG:H	2.32	0.47
1:A:3308:ASP:OD1	1:A:3308:ASP:N	2.44	0.47
1:A:1053:PRO:O	1:A:1062:ARG:NH2	2.47	0.47
1:A:1203:SER:HB3	1:A:1206:LEU:HD12	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2122:LEU:HA	1:A:2123:PRO:HD2	1.59	0.47
1:A:3929:MET:HE3	1:A:3929:MET:HB2	1.82	0.47
2:B:477:SER:O	2:B:477:SER:OG	2.31	0.47
1:A:9:ARG:HA	1:A:12:LEU:HB2	1.95	0.47
1:A:948:MET:HG3	1:A:949:PRO:CD	2.28	0.47
1:A:2122:LEU:HA	1:A:2122:LEU:HD23	1.79	0.47
1:A:3554:PHE:HD1	1:A:3557:ARG:HH21	1.60	0.47
3:C:52:ASP:N	3:C:52:ASP:OD1	2.48	0.47
3:C:219:ASP:OD1	3:C:219:ASP:N	2.46	0.47
1:A:1952:ILE:HA	1:A:1955:VAL:HG22	1.95	0.47
1:A:2826:LEU:H	1:A:2826:LEU:CD1	2.21	0.47
1:A:1175:HIS:HB3	1:A:1178:ARG:HD2	1.96	0.47
1:A:1407:LYS:HD3	1:A:1463:LEU:HD23	1.97	0.47
1:A:2788:SER:O	1:A:2792:THR:OG1	2.23	0.47
3:C:12:LEU:HD23	3:C:133:GLU:HB2	1.97	0.47
3:C:151:ILE:HD13	3:C:154:LEU:HD12	1.97	0.47
3:C:447:THR:HG22	3:C:449:ALA:H	1.80	0.47
1:A:1018:VAL:HG11	1:A:1074:LYS:HD3	1.97	0.46
1:A:1470:SER:OG	1:A:1471:GLN:N	2.48	0.46
1:A:3296:GLN:HA	1:A:3299:THR:HG22	1.97	0.46
2:B:93:ASP:N	2:B:93:ASP:OD1	2.48	0.46
1:A:863:GLY:HA2	1:A:3167:ARG:HG3	1.96	0.46
1:A:2149:LEU:O	1:A:2153:THR:OG1	2.30	0.46
1:A:2197:THR:OG1	1:A:2198:GLY:N	2.48	0.46
1:A:2290:PRO:HD3	1:A:2296:SER:HB3	1.96	0.46
2:B:215:LEU:HD23	2:B:215:LEU:HA	1.84	0.46
1:A:1055:ASN:O	1:A:1059:LEU:N	2.37	0.46
1:A:2150:VAL:HG13	1:A:2157:PHE:HD2	1.80	0.46
1:A:3875:GLU:O	1:A:3965:ARG:NH2	2.47	0.46
1:A:3881:ASP:OD1	1:A:3881:ASP:N	2.49	0.46
3:C:75:GLN:NE2	3:C:76:ASN:OD1	2.45	0.46
3:C:296:CYS:HA	3:C:304:GLU:HA	1.98	0.46
1:A:608:PRO:O	1:A:610:ALA:N	2.49	0.46
3:C:96:SER:O	3:C:96:SER:OG	2.32	0.46
1:A:2980:ASP:N	1:A:2980:ASP:OD1	2.42	0.46
2:B:275:ASN:O	3:C:431:ARG:NH2	2.48	0.46
1:A:1730:PRO:HG2	1:A:1733:THR:HG21	1.97	0.46
1:A:3647:GLY:HA2	1:A:3651:LEU:HD13	1.97	0.46
1:A:2931:ARG:NH2	1:A:3000:ASP:OD2	2.49	0.46
2:B:453:MET:HE3	2:B:453:MET:HB3	1.79	0.46
1:A:165:LYS:HD2	1:A:165:LYS:HA	1.72	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2285:LEU:HD13	1:A:2285:LEU:H	1.81	0.46
1:A:2919:ASP:OD2	1:A:2922:ARG:NH1	2.49	0.46
1:A:2973:ASP:HA	1:A:2976:LEU:HB2	1.98	0.46
2:B:528:LEU:HD21	2:B:530:TYR:CZ	2.50	0.46
3:C:153:SER:HA	3:C:156:LYS:HG2	1.97	0.46
2:B:399:ARG:NH1	3:C:516:LEU:O	2.43	0.46
3:C:133:GLU:HB3	3:C:164:PHE:HE2	1.80	0.46
3:C:364:VAL:HG13	3:C:419:LEU:HB3	1.98	0.46
2:B:241:ASP:HA	2:B:245:LYS:HG3	1.97	0.46
1:A:879:MET:O	1:A:882:SER:OG	2.33	0.45
1:A:2514:ASN:ND2	1:A:2515:PRO:O	2.49	0.45
1:A:1671:VAL:O	1:A:1674:THR:OG1	2.30	0.45
1:A:2155:GLU:HG2	1:A:2156:VAL:HG13	1.98	0.45
1:A:332:GLU:O	1:A:335:LYS:NZ	2.39	0.45
1:A:3697:ASN:O	1:A:3698:GLU:C	2.57	0.45
3:C:431:ARG:HD2	3:C:433:TYR:HE2	1.80	0.45
1:A:300:TRP:HD1	1:A:303:HIS:HD2	1.63	0.45
1:A:141:SER:OG	1:A:142:ARG:N	2.49	0.45
1:A:1143:VAL:HG22	1:A:1197:LEU:HD21	1.98	0.45
1:A:3800:LEU:HD12	1:A:3800:LEU:HA	1.79	0.45
2:B:341:ASP:HB3	2:B:401:THR:HG21	1.99	0.45
3:C:325:LYS:HE3	3:C:325:LYS:HB2	1.54	0.45
1:A:1104:LEU:HD12	1:A:1134:LEU:HD23	1.99	0.45
1:A:1690:GLY:HA2	1:A:1693:VAL:HG12	1.98	0.45
1:A:258:PRO:HD3	1:A:296:VAL:HG11	1.99	0.45
1:A:300:TRP:CD1	1:A:303:HIS:HD2	2.35	0.45
1:A:1458:LEU:HD13	1:A:1467:ILE:HD12	1.98	0.45
1:A:2551:GLU:OE2	1:A:2849:SER:OG	2.34	0.45
1:A:3718:ARG:H	1:A:3743:HIS:HD2	1.63	0.45
2:B:262:LYS:HB3	2:B:268:VAL:HG12	1.99	0.45
2:B:453:MET:SD	3:C:382:HIS:NE2	2.90	0.45
2:B:530:TYR:CD1	2:B:530:TYR:N	2.84	0.45
1:A:377:ASN:ND2	1:A:380:ASP:OD2	2.49	0.45
1:A:3606:ILE:HA	1:A:3609:MET:HG2	1.98	0.45
1:A:406:ARG:HG2	1:A:409:GLN:HE22	1.80	0.45
1:A:732:PHE:O	1:A:735:SER:OG	2.29	0.45
1:A:893:SER:O	1:A:893:SER:OG	2.34	0.45
1:A:1366:THR:O	1:A:1366:THR:OG1	2.29	0.45
1:A:1525:CYS:SG	1:A:1574:ASN:ND2	2.87	0.45
1:A:1801:VAL:HA	1:A:1804:MET:HG2	1.97	0.45
2:B:494:ALA:HB2	3:C:321:VAL:HG11	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:362:LEU:HB3	3:C:421:TYR:HB3	1.99	0.45
1:A:3547:THR:HA	1:A:3550:LYS:HE3	1.98	0.45
1:A:3698:GLU:OE2	1:A:3698:GLU:HA	2.12	0.45
1:A:3959:MET:SD	1:A:3959:MET:N	2.79	0.45
1:A:888:ARG:NH1	1:A:3932:MET:O	2.50	0.44
1:A:4105:LYS:HE3	1:A:4105:LYS:HB2	1.83	0.44
2:B:55:ASP:OD1	2:B:55:ASP:N	2.50	0.44
1:A:754:MET:SD	1:A:1021:VAL:HG13	2.57	0.44
1:A:858:MET:HB3	1:A:858:MET:HE3	1.69	0.44
1:A:3387:GLU:HA	1:A:3390:GLN:HE21	1.82	0.44
2:B:245:LYS:H	2:B:245:LYS:HG2	1.57	0.44
1:A:303:HIS:O	1:A:303:HIS:ND1	2.44	0.44
1:A:654:ILE:O	1:A:658:THR:OG1	2.30	0.44
1:A:1896:ILE:HA	1:A:1899:VAL:HG12	1.97	0.44
2:B:36:ASP:N	2:B:81:ASP:OD1	2.45	0.44
1:A:1279:LEU:HA	1:A:1358:LEU:HD21	1.99	0.44
1:A:1643:MET:HA	1:A:1646:LEU:HD12	1.99	0.44
2:B:389:CYS:HA	2:B:394:VAL:HG12	1.99	0.44
3:C:83:LEU:HD12	3:C:121:GLU:HB3	1.98	0.44
1:A:476:ARG:HH21	1:A:563:LEU:HD21	1.83	0.44
1:A:985:GLU:HG3	1:A:986:PRO:HD3	2.00	0.44
1:A:3235:LYS:HA	1:A:3238:MET:HE2	1.99	0.44
1:A:3327:ASN:ND2	1:A:3387:GLU:OE1	2.50	0.44
1:A:3736:LYS:HB2	1:A:3752:VAL:HG23	1.99	0.44
3:C:66:ASN:ND2	3:C:68:LEU:O	2.41	0.44
1:A:1392:MET:HE3	1:A:1392:MET:HB3	1.89	0.44
1:A:2124:SER:O	1:A:2128:PHE:CB	2.65	0.44
2:B:469:LEU:HD21	2:B:514:MET:HG3	2.00	0.44
1:A:670:LEU:HA	1:A:673:THR:HG22	2.00	0.44
1:A:1106:ILE:HA	1:A:1109:GLU:HB2	2.00	0.44
3:C:610:GLU:HA	3:C:613:SER:HB2	2.00	0.44
4:D:24:DG:H2'	5:E:25:DA:C8	2.53	0.44
1:A:2415:LEU:HD23	1:A:2415:LEU:HA	1.77	0.44
1:A:2826:LEU:HA	1:A:2829:LYS:HG3	1.99	0.44
2:B:397:LEU:HD21	3:C:479:THR:HG21	1.99	0.44
3:C:11:VAL:O	3:C:132:ILE:HA	2.18	0.44
3:C:27:ILE:HG13	3:C:28:GLU:H	1.83	0.44
1:A:385:TYR:HE2	1:A:428:PRO:HD2	1.83	0.44
1:A:2227:LYS:HA	1:A:2227:LYS:HD3	1.74	0.44
1:A:2848:PHE:HB2	1:A:3077:ILE:HD11	1.99	0.44
1:A:269:SER:O	1:A:269:SER:OG	2.36	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:427:VAL:HA	1:A:428:PRO:HD3	1.79	0.43
1:A:616:LYS:HA	1:A:617:PRO:HD2	1.79	0.43
1:A:3312:VAL:HG13	1:A:3316:LEU:HB2	1.99	0.43
1:A:4064:LEU:HD21	1:A:4077:TYR:HB3	2.00	0.43
2:B:388:LYS:HA	2:B:388:LYS:HD3	1.79	0.43
3:C:374:ALA:HA	3:C:377:LEU:HG	2.00	0.43
1:A:128:LEU:HD23	1:A:128:LEU:HA	1.87	0.43
1:A:1000:LYS:HE3	1:A:1000:LYS:HB3	1.86	0.43
2:B:352:PRO:HA	2:B:394:VAL:HA	2.00	0.43
1:A:791:ASP:OD1	1:A:791:ASP:N	2.51	0.43
1:A:3631:LYS:NZ	1:A:3678:GLY:O	2.51	0.43
3:C:39:THR:O	3:C:43:GLN:CB	2.66	0.43
3:C:267:ILE:H	3:C:267:ILE:HG13	1.55	0.43
3:C:388:ASP:OD1	3:C:388:ASP:N	2.41	0.43
2:B:87:PHE:HE2	2:B:105:LEU:HD22	1.83	0.43
3:C:12:LEU:HD13	3:C:38:ILE:HD11	2.00	0.43
1:A:2995:GLU:OE2	1:A:3040:TYR:OH	2.33	0.43
1:A:3631:LYS:NZ	1:A:3682:GLU:OE2	2.41	0.43
1:A:3789:ARG:HH11	1:A:3938:ILE:HD11	1.83	0.43
1:A:3815:LEU:HD22	1:A:3930:VAL:HG11	2.00	0.43
2:B:129:LYS:HD2	2:B:129:LYS:HA	1.85	0.43
1:A:171:LEU:HD12	1:A:171:LEU:HA	1.76	0.43
1:A:356:ASN:HD22	1:A:356:ASN:N	2.17	0.43
1:A:1103:ALA:HA	1:A:1106:ILE:HG12	1.99	0.43
2:B:173:ASP:OD1	2:B:173:ASP:N	2.48	0.43
3:C:325:LYS:O	3:C:326:VAL:C	2.59	0.43
1:A:86:LEU:HD11	1:A:114:VAL:HG11	2.00	0.43
1:A:1413:ASP:O	1:A:1417:THR:OG1	2.28	0.43
1:A:2085:MET:HB2	1:A:2090:ARG:HG2	2.01	0.43
1:A:410:MET:HA	1:A:413:PHE:HB2	2.00	0.43
1:A:3527:GLN:CD	1:A:3699:LEU:O	2.62	0.43
1:A:2527:HIS:HB3	1:A:2530:ARG:HE	1.84	0.43
3:C:663:GLN:HE22	3:C:685:LEU:HD12	1.83	0.43
1:A:841:SER:O	1:A:841:SER:OG	2.32	0.42
1:A:3300:VAL:HG11	1:A:3336:ILE:HG21	2.01	0.42
2:B:467:GLU:HA	2:B:470:ARG:HB2	2.00	0.42
1:A:1818:SER:HB3	1:A:1822:ARG:HH11	1.83	0.42
1:A:3567:VAL:HG22	1:A:3699:LEU:HD21	2.01	0.42
2:B:252:ARG:HD2	2:B:278:GLN:HE21	1.84	0.42
1:A:868:LYS:HE3	1:A:3126:LEU:HD23	2.01	0.42
1:A:1019:ASP:O	1:A:1026:ARG:NH1	2.51	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:455:THR:HA	2:B:456:PRO:HD3	1.89	0.42
1:A:816:SER:O	1:A:820:ARG:NH2	2.52	0.42
1:A:1340:ARG:HD3	1:A:1340:ARG:HA	1.81	0.42
1:A:3729:MET:HE3	1:A:3737:ARG:HD3	2.01	0.42
3:C:261:ILE:HD13	3:C:377:LEU:HD22	2.01	0.42
3:C:391:ALA:HB3	3:C:408:ALA:HB3	2.02	0.42
1:A:471:LYS:HE2	1:A:471:LYS:HB3	1.80	0.42
1:A:1762:MET:HE3	1:A:1762:MET:HB2	1.69	0.42
1:A:3699:LEU:O	1:A:3700:GLU:CB	2.67	0.42
1:A:47:SER:HB3	1:A:50:VAL:HG22	2.02	0.42
2:B:525:PHE:O	2:B:530:TYR:CE2	2.72	0.42
1:A:1825:LEU:HD22	1:A:1879:VAL:HG21	2.02	0.42
1:A:1982:ILE:HG22	1:A:1983:ASP:H	1.85	0.42
3:C:457:LEU:HD22	3:C:533:ILE:HD13	2.02	0.42
1:A:1435:ASN:OD1	1:A:1435:ASN:N	2.53	0.42
1:A:1588:ASP:OD1	1:A:1588:ASP:N	2.36	0.42
1:A:2085:MET:H	1:A:2085:MET:HG3	1.60	0.42
1:A:2857:CYS:O	1:A:2861:ILE:HG12	2.20	0.42
1:A:2929:LEU:HD23	1:A:2929:LEU:HA	1.88	0.42
1:A:2952:ILE:HD11	1:A:2971:GLN:HB2	2.02	0.42
3:C:644:GLU:HG3	3:C:648:LYS:HD3	2.02	0.42
1:A:911:LEU:HD23	1:A:911:LEU:HA	1.86	0.42
1:A:1960:LYS:HB3	1:A:1963:GLN:HE21	1.84	0.42
1:A:3378:TYR:OH	1:A:3426:LYS:NZ	2.45	0.42
2:B:219:ASP:OD1	2:B:219:ASP:N	2.52	0.42
3:C:148:ASP:O	3:C:152:HIS:HB2	2.20	0.42
1:A:868:LYS:HB3	1:A:868:LYS:HE2	1.93	0.41
1:A:3385:LEU:HD23	1:A:3385:LEU:HA	1.91	0.41
1:A:3544:ASP:HA	1:A:3548:GLY:HA3	2.01	0.41
2:B:470:ARG:HE	3:C:347:LYS:HB3	1.84	0.41
1:A:1664:SER:HA	1:A:1668:PHE:HB3	2.01	0.41
1:A:2284:ASP:O	1:A:2285:LEU:O	2.37	0.41
1:A:3971:MET:HB3	1:A:3971:MET:HE3	1.86	0.41
1:A:4075:ARG:HA	1:A:4078:VAL:HG12	2.01	0.41
2:B:240:GLU:C	2:B:245:LYS:HZ3	2.24	0.41
1:A:1089:PHE:HE2	1:A:1100:VAL:HG11	1.84	0.41
1:A:1442:GLN:O	1:A:1446:SER:HB2	2.20	0.41
1:A:2795:GLN:O	1:A:2799:GLN:NE2	2.53	0.41
1:A:3550:LYS:HE2	1:A:3550:LYS:HB3	1.80	0.41
3:C:252:THR:HG22	3:C:258:SER:HA	2.02	0.41
1:A:1370:ARG:HA	1:A:1370:ARG:HD2	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1640:GLU:HA	1:A:1643:MET:HE2	2.03	0.41
1:A:3413:TYR:HD2	1:A:3453:ALA:HB2	1.86	0.41
1:A:4030:GLU:H	1:A:4030:GLU:HG3	1.74	0.41
1:A:1582:LEU:HD12	1:A:1582:LEU:HA	1.89	0.41
1:A:2285:LEU:HD13	1:A:2285:LEU:N	2.36	0.41
2:B:179:ASP:OD2	2:B:182:LYS:N	2.47	0.41
2:B:249:LYS:HD2	2:B:249:LYS:HA	1.79	0.41
1:A:196:LEU:HD22	1:A:230:LEU:HD22	2.03	0.41
1:A:1890:HIS:CE1	1:A:1912:THR:HG21	2.56	0.41
1:A:1909:ASN:O	1:A:1913:LYS:NZ	2.44	0.41
1:A:2103:HIS:O	1:A:2107:SER:HB3	2.20	0.41
3:C:39:THR:O	3:C:43:GLN:HB2	2.20	0.41
1:A:724:GLU:O	1:A:728:SER:OG	2.35	0.41
1:A:1678:LEU:HD23	1:A:1678:LEU:HA	1.91	0.41
1:A:3029:LYS:HA	1:A:3029:LYS:HD3	1.83	0.41
1:A:4082:ARG:HD2	1:A:4082:ARG:HA	1.77	0.41
1:A:12:LEU:HA	1:A:12:LEU:HD23	1.90	0.41
1:A:2207:LYS:HA	1:A:2210:VAL:HG12	2.03	0.41
1:A:2262:GLY:H	1:A:2270:ASN:ND2	2.19	0.41
1:A:2531:LEU:HD12	1:A:2531:LEU:HA	1.88	0.41
1:A:4026:SER:O	1:A:4026:SER:OG	2.32	0.41
2:B:244:ARG:HB3	2:B:245:LYS:HZ2	1.86	0.41
2:B:290:ARG:HB3	3:C:311:ILE:HG12	2.03	0.41
1:A:356:ASN:HD22	1:A:356:ASN:H	1.68	0.41
1:A:356:ASN:N	1:A:356:ASN:ND2	2.69	0.41
1:A:540:MET:SD	1:A:540:MET:N	2.94	0.41
1:A:1722:PHE:HD1	1:A:1722:PHE:HA	1.71	0.41
1:A:3103:ILE:HD12	1:A:3103:ILE:HA	1.88	0.41
1:A:3450:MET:HE3	1:A:3450:MET:HB2	1.93	0.41
1:A:3567:VAL:HG22	1:A:3699:LEU:CD2	2.51	0.41
1:A:3740:ILE:HD13	1:A:3740:ILE:HG21	1.88	0.41
1:A:4046:TYR:CE2	1:A:4063:GLU:HG2	2.56	0.41
2:B:75:ILE:HG13	2:B:111:PRO:HB2	2.02	0.41
2:B:461:LYS:H	2:B:461:LYS:HG2	1.72	0.41
2:B:463:LYS:HD3	3:C:387:LEU:HD11	2.02	0.41
3:C:475:ASP:OD1	3:C:475:ASP:N	2.44	0.41
1:A:10:CYS:SG	1:A:11:SER:N	2.93	0.41
1:A:1221:ILE:HD12	1:A:1221:ILE:HA	1.84	0.41
1:A:1406:LEU:HD12	1:A:1415:LEU:HD22	2.03	0.41
1:A:164:LYS:HA	1:A:164:LYS:HD3	1.83	0.40
1:A:1684:LEU:HD23	1:A:1684:LEU:HA	1.90	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2285:LEU:HA	1:A:2286:PRO:HD2	1.72	0.40
1:A:2379:MET:HE3	1:A:2404:ARG:HB2	2.03	0.40
1:A:2477:LEU:HA	1:A:2480:ILE:HG22	2.02	0.40
1:A:3831:ASP:HB3	1:A:3834:ALA:HB2	2.01	0.40
2:B:45:SER:OG	2:B:46:LYS:N	2.54	0.40
3:C:210:MET:HE3	3:C:210:MET:HB3	1.95	0.40
1:A:214:GLU:HG3	1:A:215:PRO:HD2	2.04	0.40
1:A:485:GLN:O	1:A:489:ARG:HG2	2.21	0.40
1:A:754:MET:SD	1:A:1021:VAL:CG1	3.09	0.40
1:A:1538:LEU:HD11	1:A:1555:HIS:CD2	2.56	0.40
1:A:2492:ASP:OD1	1:A:2492:ASP:N	2.52	0.40
1:A:3051:LEU:HD12	1:A:3051:LEU:HA	1.95	0.40
2:B:201:ASP:HA	2:B:221:ILE:HG13	2.04	0.40
2:B:477:SER:H	3:C:427:MET:HG3	1.85	0.40
3:C:469:LYS:HD3	3:C:469:LYS:HA	1.79	0.40
1:A:1803:GLU:OE2	1:A:1806:ARG:NH2	2.54	0.40
1:A:3575:LEU:HD23	1:A:3575:LEU:HA	1.89	0.40
2:B:46:LYS:NZ	2:B:139:SER:O	2.45	0.40
1:A:657:SER:HB2	1:A:666:PHE:HB3	2.03	0.40
1:A:1403:MET:HE2	1:A:1403:MET:HB3	1.69	0.40
1:A:1697:PRO:HG3	1:A:1753:SER:HB3	2.02	0.40
1:A:2524:PHE:CE1	1:A:2530:ARG:HG2	2.55	0.40
3:C:43:GLN:CD	3:C:491:PHE:HB3	2.47	0.40
3:C:596:GLU:HA	3:C:599:ARG:HB2	2.03	0.40
1:A:73:LEU:HG	1:A:117:LYS:HD2	2.03	0.40
1:A:1534:ASN:HA	1:A:1535:PRO:HD3	1.86	0.40
1:A:2362:VAL:O	1:A:2366:LYS:HG2	2.21	0.40
1:A:3120:LEU:H	1:A:3120:LEU:HD23	1.86	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	3635/4128 (88%)	3076 (85%)	543 (15%)	16 (0%)	30	62
2	B	488/609 (80%)	410 (84%)	73 (15%)	5 (1%)	13	44
3	C	645/732 (88%)	547 (85%)	94 (15%)	4 (1%)	22	54
All	All	4768/5469 (87%)	4033 (85%)	710 (15%)	25 (0%)	27	57

All (25) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	948	MET
1	A	1772	HIS
1	A	2123	PRO
1	A	2285	LEU
1	A	2573	PRO
1	A	3698	GLU
2	B	144	SER
2	B	245	LYS
1	A	167	PRO
1	A	609	ALA
1	A	2284	ASP
1	A	3083	SER
2	B	246	VAL
3	C	324	SER
3	C	410	PRO
1	A	617	PRO
1	A	682	TYR
1	A	2467	THR
1	A	681	LYS
2	B	531	PRO
3	C	322	PRO
1	A	661	PRO
2	B	530	TYR
1	A	614	PRO
3	C	193	PRO

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	3207/3671 (87%)	3160 (98%)	47 (2%)	60	75
2	B	447/548 (82%)	444 (99%)	3 (1%)	81	88
3	C	586/649 (90%)	582 (99%)	4 (1%)	81	88
All	All	4240/4868 (87%)	4186 (99%)	54 (1%)	64	77

All (54) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	267	VAL
1	A	352	VAL
1	A	356	ASN
1	A	427	VAL
1	A	434	VAL
1	A	443	ILE
1	A	518	LYS
1	A	520	LYS
1	A	617	PRO
1	A	618	LYS
1	A	743	LEU
1	A	809	THR
1	A	920	THR
1	A	948	MET
1	A	991	LEU
1	A	1022	ASP
1	A	1027	ASP
1	A	1045	THR
1	A	1089	PHE
1	A	1096	VAL
1	A	1105	VAL
1	A	1145	LEU
1	A	1220	LEU
1	A	1540	THR
1	A	1727	ARG
1	A	1728	GLU
1	A	1773	VAL
1	A	1820	VAL
1	A	1982	ILE
1	A	1992	VAL
1	A	2085	MET
1	A	2249	LEU
1	A	2285	LEU
1	A	2491	THR

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Mol	Chain	Res	Type
1	A	2824	LYS
1	A	2827	SER
1	A	2861	ILE
1	A	2938	VAL
1	A	2949	THR
1	A	3117	ILE
1	A	3177	ASN
1	A	3341	LEU
1	A	3698	GLU
1	A	3699	LEU
1	A	3701	ILE
1	A	3955	VAL
1	A	3977	THR
2	B	254[A]	ARG
2	B	254[B]	ARG
2	B	530	TYR
3	C	325	LYS
3	C	351	VAL
3	C	505	LEU
3	C	629	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (74) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	109	ASN
1	A	233	ASN
1	A	322	GLN
1	A	325	ASN
1	A	356	ASN
1	A	454	GLN
1	A	833	HIS
1	A	978	GLN
1	A	982	GLN
1	A	1126	GLN
1	A	1142	HIS
1	A	1146	ASN
1	A	1175	HIS
1	A	1201	ASN
1	A	1280	GLN
1	A	1457	GLN
1	A	1476	HIS
1	A	1534	ASN

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Mol	Chain	Res	Type
1	A	1598	ASN
1	A	1603	GLN
1	A	1624	GLN
1	A	1625	HIS
1	A	1737	ASN
1	A	1738	ASN
1	A	1794	GLN
1	A	1866	GLN
1	A	1957	ASN
1	A	2016	ASN
1	A	2152	ASN
1	A	2163	HIS
1	A	2177	ASN
1	A	2270	ASN
1	A	2348	GLN
1	A	2352	HIS
1	A	2365	ASN
1	A	2414	GLN
1	A	2514	ASN
1	A	2799	GLN
1	A	2807	GLN
1	A	2885	GLN
1	A	2979	GLN
1	A	3003	ASN
1	A	3108	GLN
1	A	3113	ASN
1	A	3148	GLN
1	A	3249	GLN
1	A	3251	ASN
1	A	3278	GLN
1	A	3327	ASN
1	A	3524	ASN
1	A	3564	GLN
1	A	3569	GLN
1	A	3573	ASN
1	A	3671	ASN
1	A	3704	GLN
1	A	3772	ASN
1	A	3966	GLN
2	B	98	ASN
2	B	106	GLN
2	B	360	HIS

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Mol	Chain	Res	Type
2	B	423	GLN
2	B	426	GLN
3	C	75	GLN
3	C	201	GLN
3	C	256	ASN
3	C	298	ASN
3	C	411	HIS
3	C	440	ASN
3	C	452	ASN
3	C	510	GLN
3	C	527	GLN
3	C	627	ASN
3	C	656	ASN
3	C	680	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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.

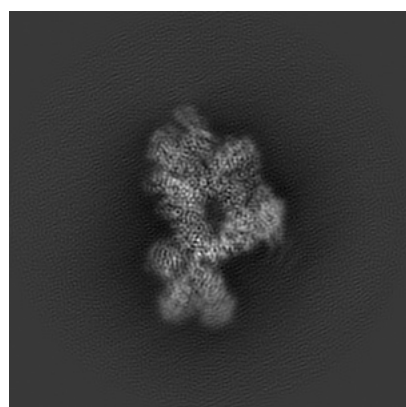
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22618. These allow visual inspection of the internal detail of the map and identification of artifacts.

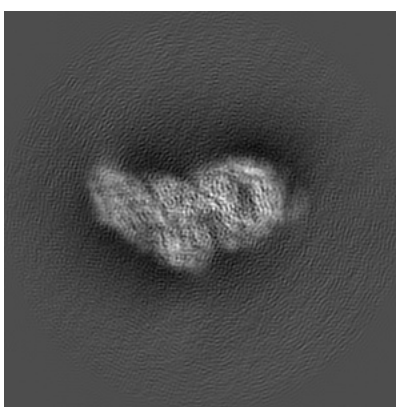
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

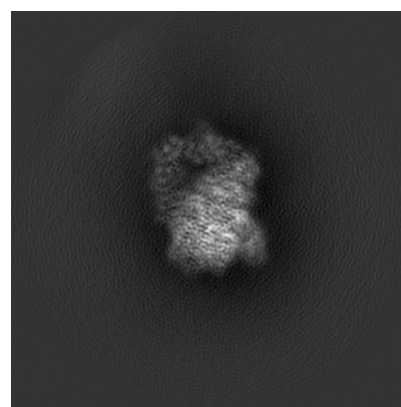
6.1.1 Primary map



X



Y

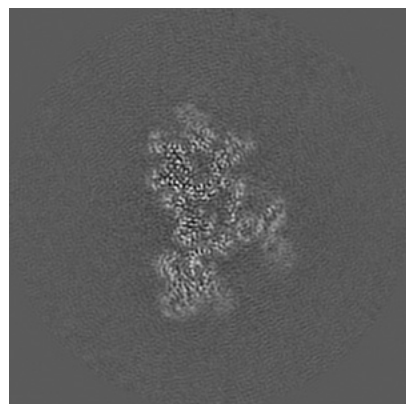


Z

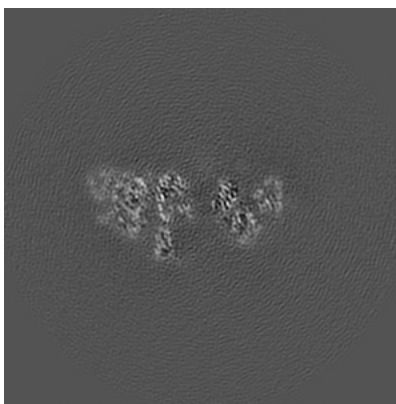
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

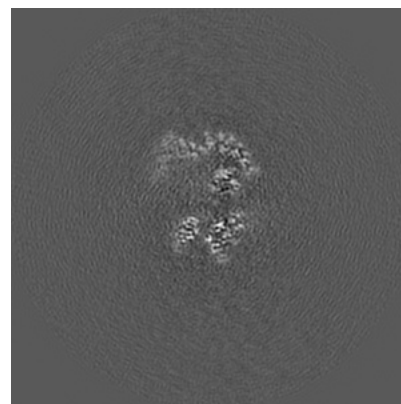
6.2.1 Primary map



X Index: 176



Y Index: 176

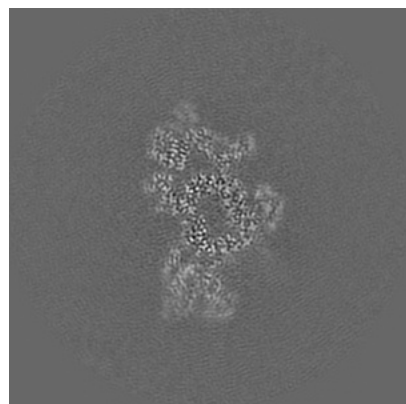


Z Index: 176

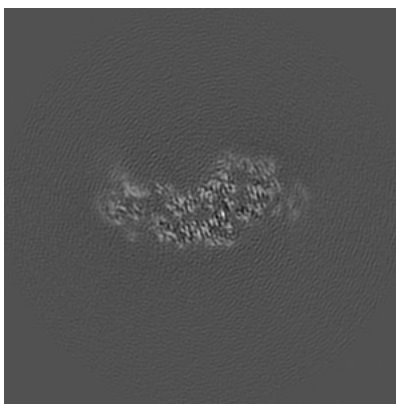
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

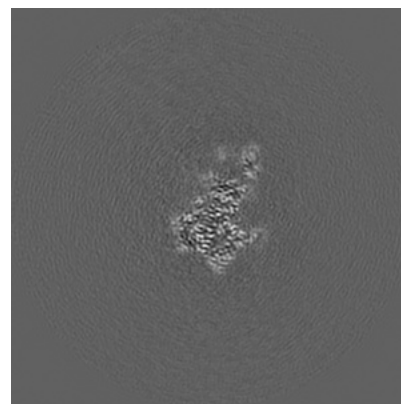
6.3.1 Primary map



X Index: 186



Y Index: 154

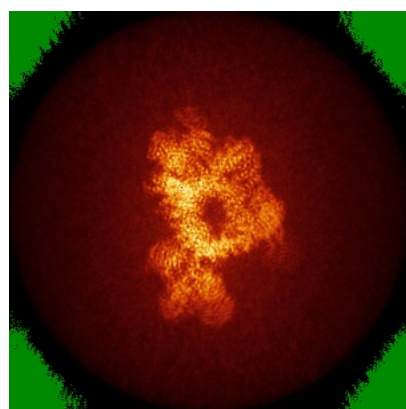


Z Index: 195

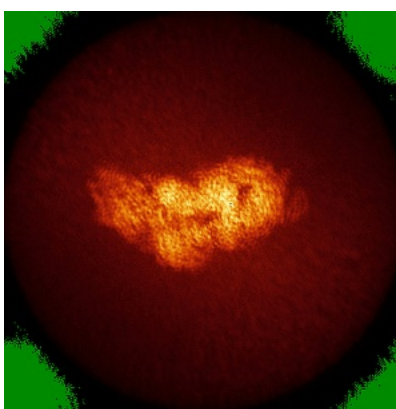
The images above show the largest variance slices of the map in three orthogonal directions.

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

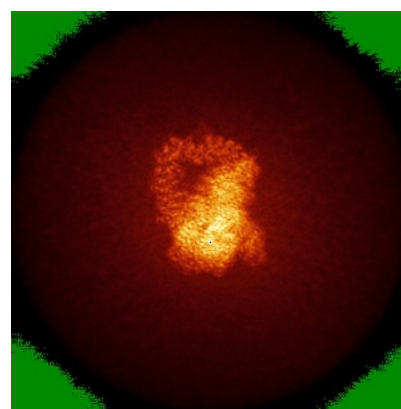
6.4.1 Primary map



X



Y

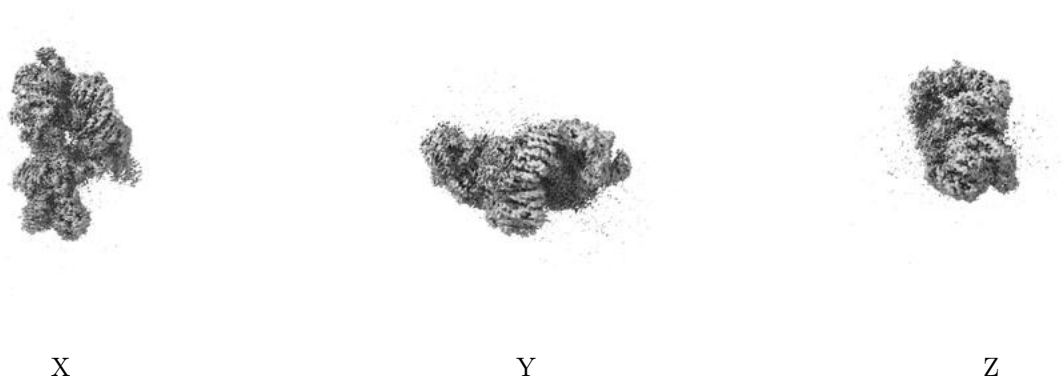


Z

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

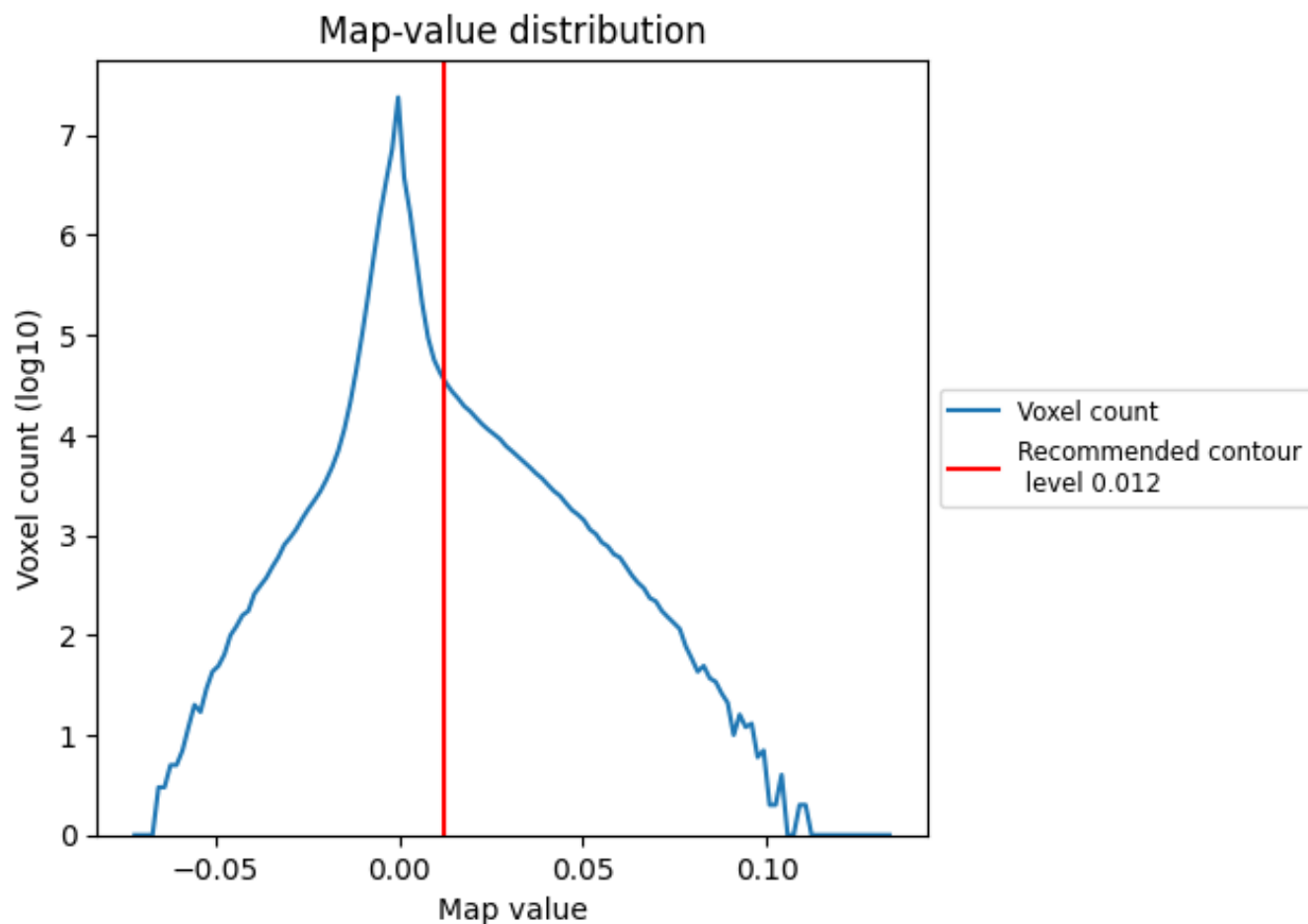
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

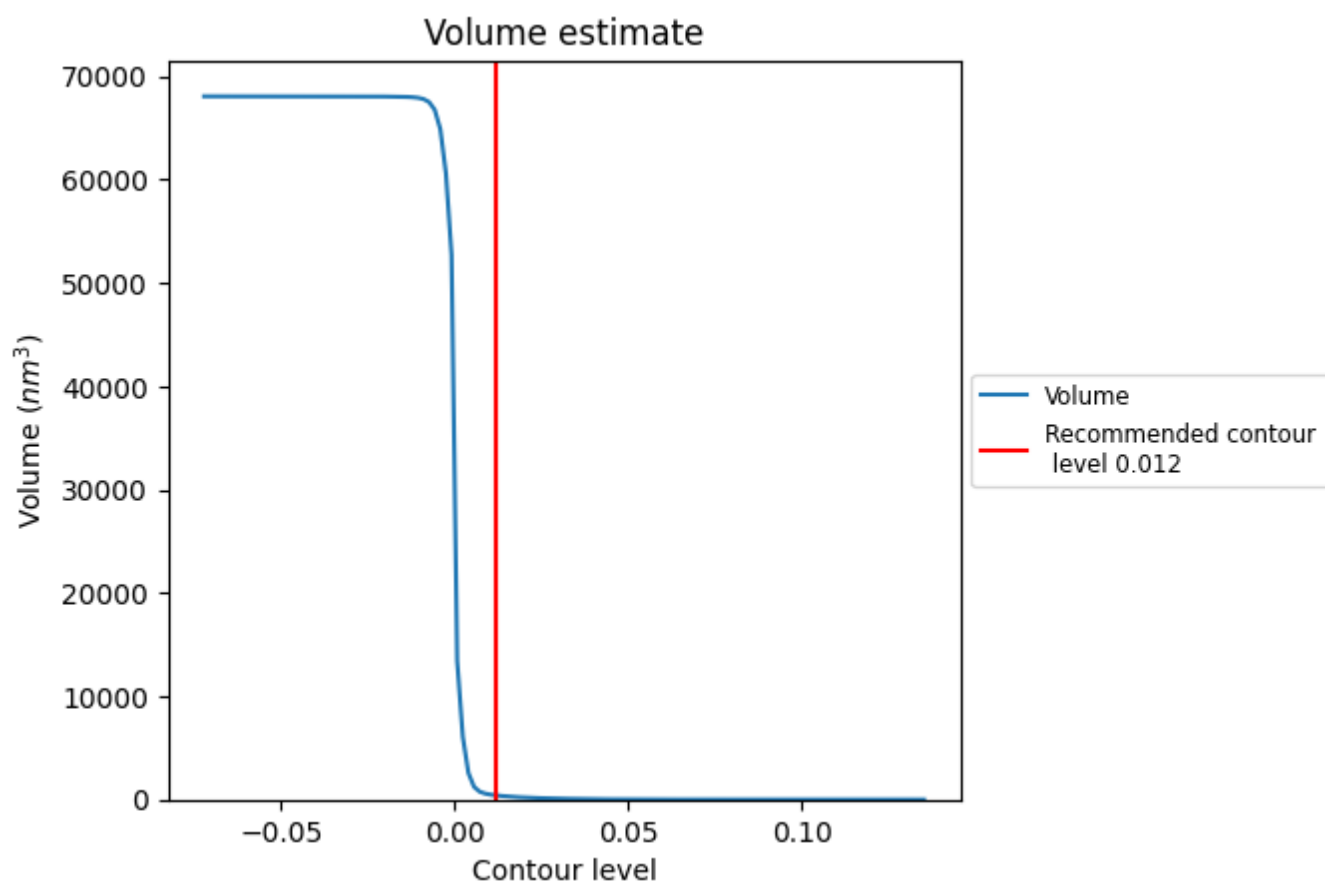
This section contains the results of statistical analysis of the map.

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.

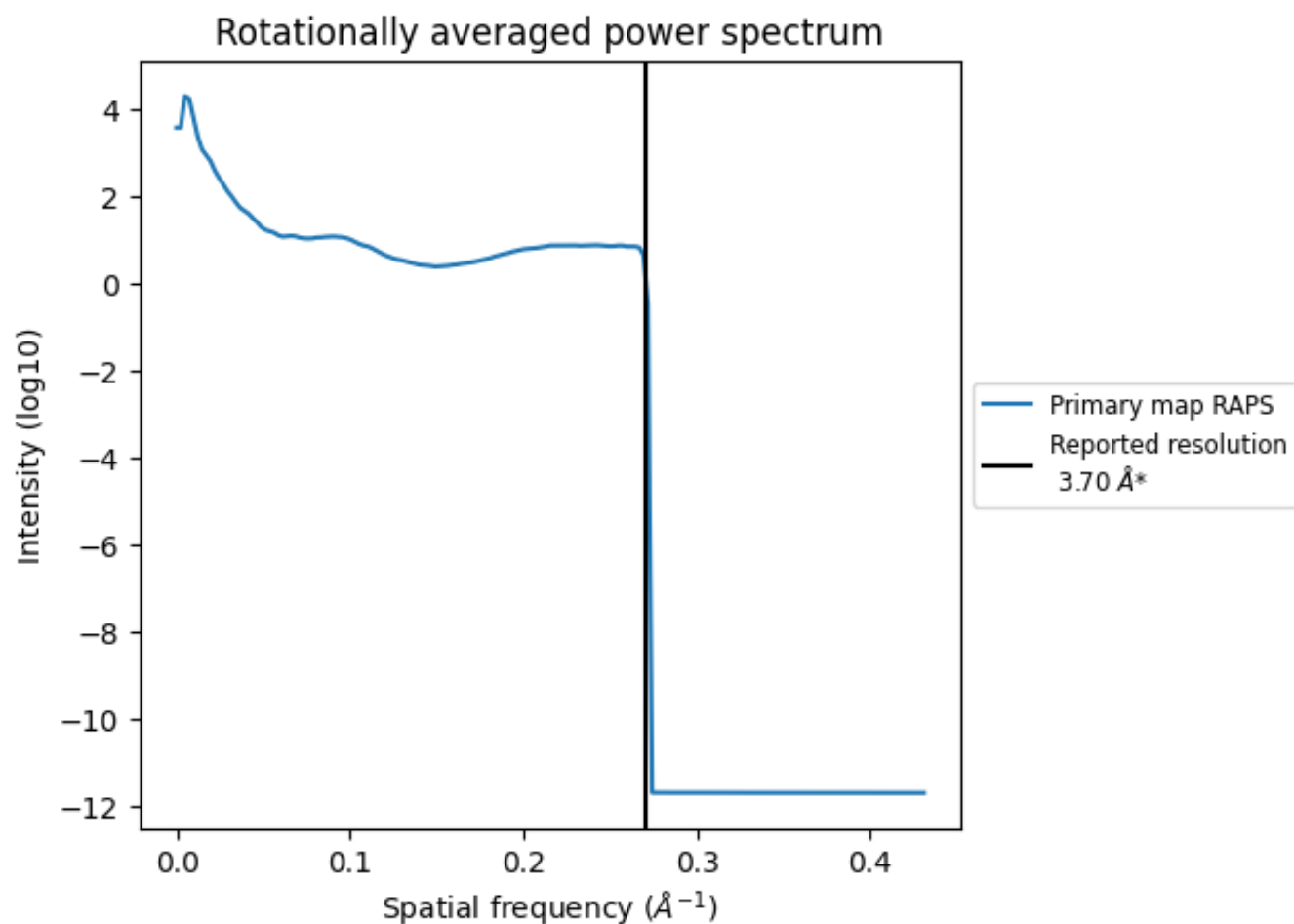
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 405 nm^3 ; this corresponds to an approximate mass of 366 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 0.270 Å⁻¹

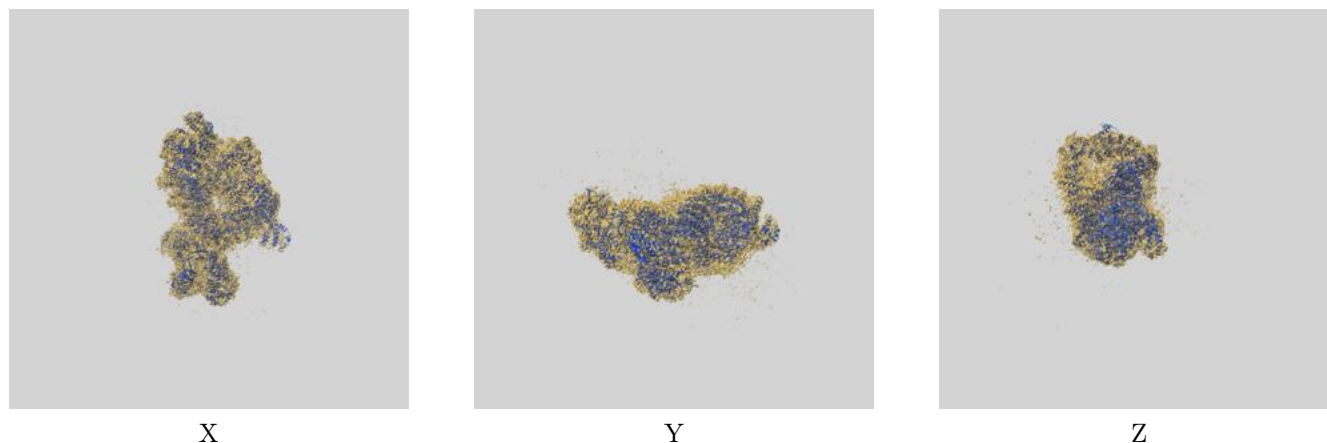
8 Fourier-Shell correlation ⓘ

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

9 Map-model fit [i](#)

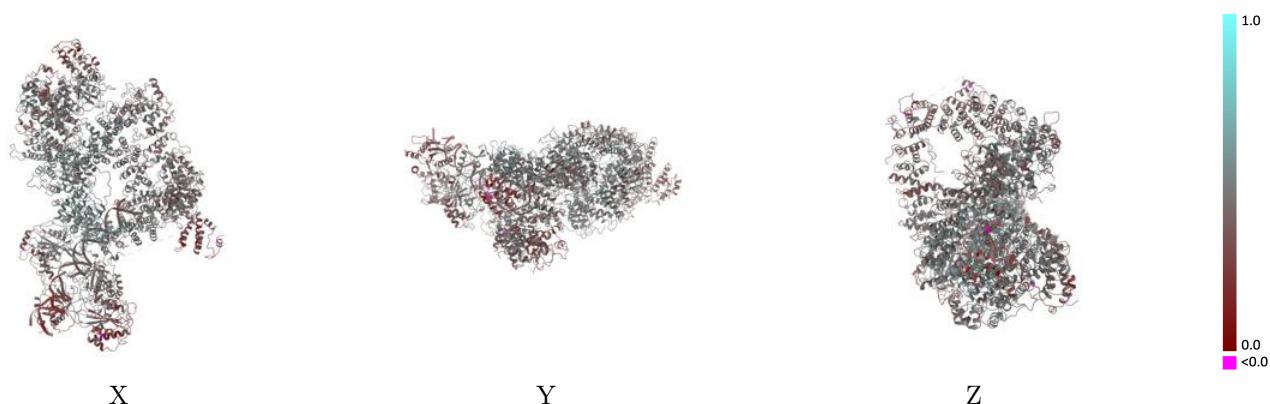
This section contains information regarding the fit between EMDB map EMD-22618 and PDB model 7K0Y. Per-residue inclusion information can be found in [section 3](#) on [page 4](#).

9.1 Map-model overlay [i](#)



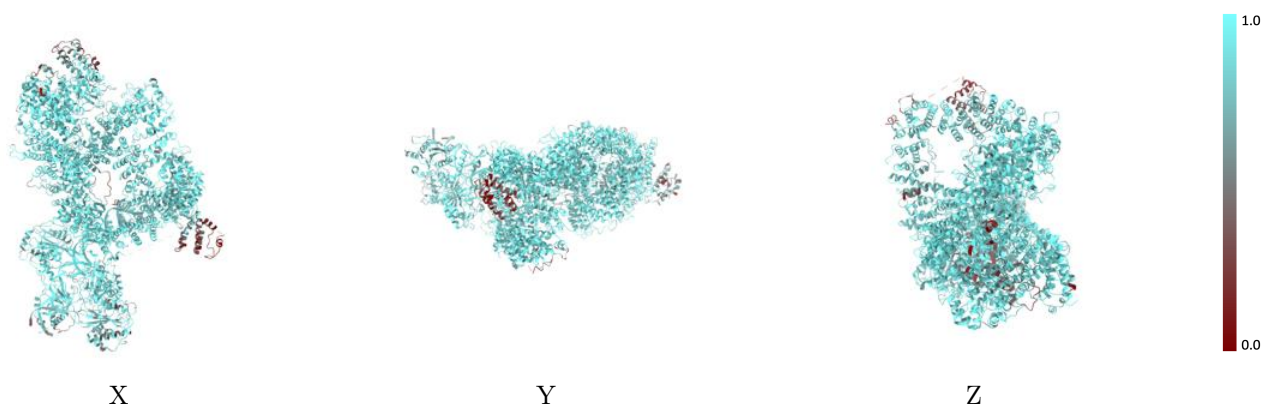
The images above show the 3D surface view of the map at the recommended contour level 0.012 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



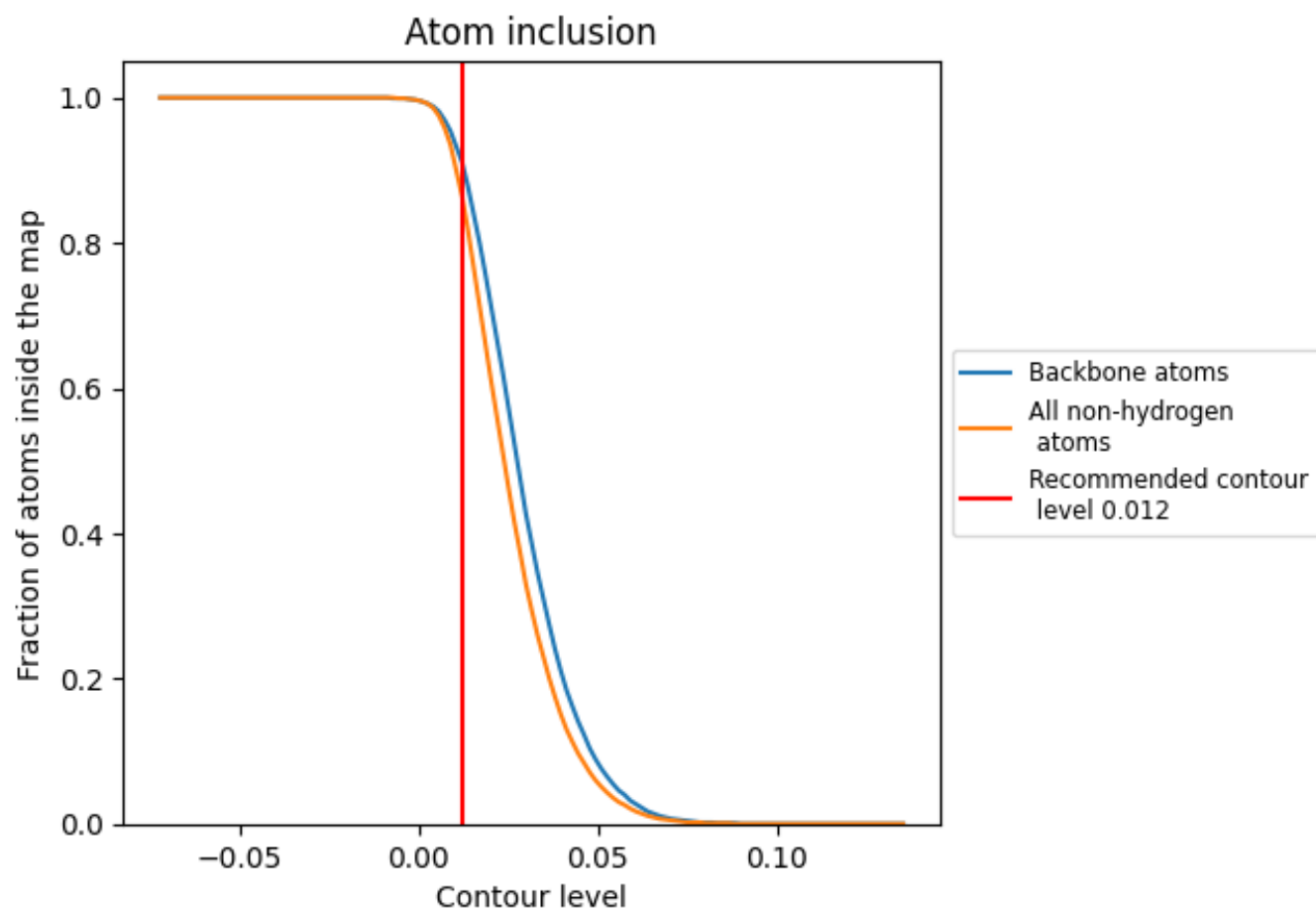
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.012).

9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 87% 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 (0.012) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8680	0.4410
A	0.8900	0.4600
B	0.8650	0.4240
C	0.7390	0.3700
D	0.9360	0.4050
E	0.7810	0.2720
F	0.8960	0.3270
G	0.9580	0.4090

1.0

0.0

<0.0