WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

May 19, 2025 – 12:19 PM EDT

PDB ID	:	9ARJ / pdb_00009arj
EMDB ID	:	EMD-43784
Title	:	CryoEM structure of BoNT-NTNH-OrfX2 complex from Clostridium botulinum E1, major class
Authors	:	Gao, L.
Deposited on	:	2024-02-23
Resolution	:	3.40 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:

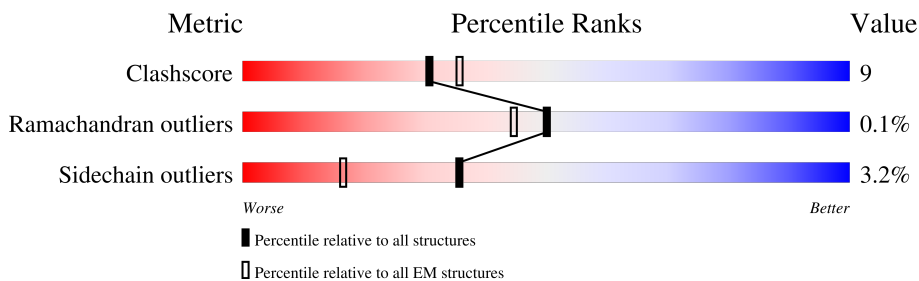|		
EMDB validation analysis	:	0.0.1.dev118
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (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 3.40 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	Percentile Ranks	Value
Clashscore		9
Ramachandran outliers		0.1%
Sidechain outliers		3.2%

Worse *Better*

▌ Percentile relative to all structures

⍿ Percentile relative to all EM structures

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 <=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	C	748	38% · 57% · 19% · 23%
2	A	1252	· 77% · 21% ··
3	B	1163	· 77% · 21% ·

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 24188 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 Toxin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	C	578	Total 4550	C 2917	N 749	O 877	S 7	0	0

- Molecule 2 is a protein called Botulinum neurotoxin.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	1241	Total 9965	C 6344	N 1658	O 1941	S 22	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	212	ALA	HIS	engineered mutation	UNP A8Y875
A	213	ALA	GLU	engineered mutation	UNP A8Y875
A	216	ALA	HIS	engineered mutation	UNP A8Y875

- Molecule 3 is a protein called Peptidase M27.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	1163	Total 9673	C 6242	N 1553	O 1853	S 25	0	0

3 Residue-property plots ⓘ

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

• Molecule 1: Toxin

P719 D720 N721 K725 I726 D727 F728 A729 K730 L731 Q732 Y735 L736 L737 N740 K743 I744 P745 GLU SER ASN

● Molecule 2: Botulinum neurotoxin

Chain A:

77% 21%

MET P2 Y20 I21 K22 P23 GLY GLY GLN E28 F29 Y30 K31 S32 N38 I42 P43 E44 T50 P57 P58 T59 N63 D70 L74 E79 K80 N92 N96 Y113 Q123 F124 H125 I126 G127 D128 A129 E133 I134 L144 N147 V148 I149

I150 E154 P155 D156 L157 T160 L167 R168 N169 P173 S180 T185 S191 F192 R193 E201 D205 I215 H219 T229 I233 T234 L240 N248 I249 E250 E251 F252 D253 T254 T258 D259 L260 L275 L276 K280 L286 V291 L296

N297 K306 A313 V319 F328 L331 Y332 L339 K342 L360 I368 Y369 N376 N379 L380 K381 N388 L391 I395 I396 T400 G403 L404 V405 V416 S417 V418 K419 G420 I421 I425 S439 E440 Y443 I448 N449 T450 P451 K452

E453 I454 D455 D456 THR VAL THR SER ASN N463 D467 L473 A480 P481 G482 L483 S484 D485 E486 K487 L488 N489 I492 Q493 N494 D495 A496 Y501 N504 D508 Q511 H512 D513 V519 F520 V528 V535 V567 Q568 A569 A570 W575 T584 Q589

Y605 L634 L641 I642 P643 L646 K651 S652 F653 L654 G655 S656 S657 D658 K660 N661 N669 A670 L671 K672 E673 F684 I685 V686 S687 N688 I693 R700 Q703 K716 E720 Y726 T727 L728 E729 E730 K731 N732 K737 Y738 D739 I740 K741 K750

K778 L782 L804 D817 T818 N821 Y830 T831 D832 D833 K834 I835 L836 I837 S838 Y839 F840 N841 K842 F843 F844 K845 S851 N854 M855 I872 N875 Y891 N892 L895 S896 E897 N903 I906 D909 N910 K911 Y912 K913 N914 I917 W920 V921

R922 E936 Y937 T938 N946 S953 L954 N955 E958 W961 T962 N966 K972 L973 A974 F975 N976 Y977 N988 K989 T994 I995 T996 N997 D998 R999 L1000 K1004 G1009 Q1014 N1035 C1036 R1040 Y1041 R1045 Y1046 F1047 N1048 I1049 E1053 L1054 D1055 I1059

E1066 P1067 K1073 D1074 F1075 W1076 Y1082 Y1086 L1089 I1098 R1101 T1105 L1106 S1107 R1112 S1113 L1117 R1120 L1121 Y1122 K1126 V1127 K1128 I1129 Q1130 R1131 V1132 N1133 T1137 D1146 N1151 F1152 V1153 A1154 S1155 K1156 T1157 H1158 L1159 F1160 P1161 A1164 T1168

T1169 N1170 I1175 S1178 N1182 Q1186 N1196 N1203 N1204 N1205 L1212 V1219 V1220 A1221 Y1225 M1229 R1230 D1231 H1232 T1233 N1234 S1235 M1236 G1237 C1238 F1239 W1240 N1241 F1242 I1243 E1246 W1249 Q1250 E1251 K1252

● Molecule 3: Peptidase M27

Chain B:

77% 21%

M1 K2 I3 L7 R22 S23 R24 K25 V28 F33 G62 D65 S66 N67 K84 Q87 R88 I89 N90 N91 N92 V93 S100 L101 I102 S103 T104 Y110 E111 N112 N113 T114 E115 D116 Y117 R118 N121 E129 T133 L136 V137 P141 I145 I146

K147 N148 Y153 M165 W169 F170 Q171 L174 L189 I190 L193 I194 P212 E226 M229 I251 Y254 F255 T258 I271 K272 I273 N276 I279 K284 I293 L301 N302 L303 S307 I312 M313 Y325 V332 I333 D334 K337

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	384801	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	2300	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.503	Depositor
Minimum map value	-0.251	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	403.456, 403.456, 403.456	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.788, 0.788, 0.788	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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	C	0.09	0/4638	0.25	0/6294
2	A	0.16	0/10163	0.30	0/13790
3	B	0.15	0/9888	0.29	2/13407 (0.0%)
All	All	0.14	0/24689	0.29	2/33491 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	406	ASN	N-CA-C	8.94	121.10	111.36
3	B	409	TYR	N-CA-C	5.71	122.97	110.80

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	C	4550	0	4548	88	0
2	A	9965	0	9712	184	0
3	B	9673	0	9516	159	0
All	All	24188	0	23776	418	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 9.

All (418) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:408:ASN:ND2	3:B:621:LYS:HD2	1.68	1.07
3:B:408:ASN:HD22	3:B:621:LYS:HD2	1.25	1.00
2:A:840:PHE:HB2	3:B:995:LEU:HD13	1.64	0.78
1:C:543:VAL:O	1:C:594:ALA:HB3	1.82	0.77
2:A:42:ILE:HG13	2:A:149:ILE:HD11	1.67	0.74
1:C:682:VAL:HG12	1:C:684:PRO:HD2	1.69	0.73
3:B:271:ILE:HG22	3:B:272:LYS:HG3	1.70	0.73
3:B:1120:ASN:N	3:B:1120:ASN:OD1	2.22	0.73
2:A:686:VAL:HG11	2:A:830:TYR:HB3	1.71	0.72
2:A:914:ASN:HB3	2:A:998:ASP:HA	1.70	0.72
2:A:1067:PRO:O	2:A:1073:LYS:NZ	2.24	0.71
2:A:922:ARG:NH2	2:A:1246:GLU:OE1	2.24	0.70
3:B:465:LEU:H	3:B:468:ASN:HD22	1.39	0.70
3:B:229:MET:HE2	3:B:255:PHE:HZ	1.55	0.70
1:C:358:THR:HG21	1:C:395:ASN:H	1.57	0.70
3:B:891:ASP:O	3:B:892:ASN:ND2	2.25	0.69
1:C:567:ILE:HG13	1:C:568:ILE:HG12	1.73	0.69
2:A:660:LYS:O	2:A:661:ASN:ND2	2.25	0.69
2:A:1156:LYS:HG2	2:A:1157:THR:HG23	1.75	0.68
1:C:218:TRP:HZ2	1:C:333:LYS:HZ2	1.41	0.67
2:A:1236:ASN:N	2:A:1236:ASN:OD1	2.27	0.67
3:B:1068:LYS:NZ	3:B:1070:TYR:O	2.27	0.67
1:C:176:GLU:HB3	1:C:420:ALA:HB3	1.75	0.67
3:B:484:SER:HB3	3:B:505:MET:HE1	1.76	0.67
3:B:583:ILE:O	3:B:586:LYS:NZ	2.28	0.67
2:A:1133:ASN:HA	3:B:1065:ASN:HD22	1.60	0.67
1:C:725:LYS:HE3	1:C:740:ASN:HB2	1.78	0.66
2:A:21:ILE:HG12	2:A:134:ILE:HG22	1.76	0.66
3:B:113:ASN:HB3	3:B:116:ASP:HB3	1.77	0.66
2:A:167:LEU:HD22	2:A:495:ASP:HB2	1.78	0.66
3:B:141:PRO:HB2	3:B:145:ILE:HA	1.77	0.66
1:C:449:SER:O	1:C:453:LEU:HA	1.96	0.66
2:A:379:ASN:OD1	2:A:903:ASN:ND2	2.29	0.66
2:A:22:LYS:HB3	2:A:133:GLU:HG3	1.78	0.65
2:A:234:THR:HG1	2:A:439:SER:HG	1.44	0.65
2:A:875:ASN:HB2	2:A:897:GLU:HG3	1.79	0.65
3:B:251:ILE:HB	3:B:404:PRO:HG3	1.77	0.65
3:B:554:ILE:HG13	3:B:710:ILE:HD13	1.78	0.64
2:A:92:ASN:O	2:A:96:ASN:ND2	2.31	0.64
2:A:1128:LYS:HD2	2:A:1159:LEU:HD21	1.79	0.64
3:B:1141:ASN:OD1	3:B:1141:ASN:N	2.31	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:879:ASN:ND2	3:B:975:ASN:OD1	2.31	0.63
1:C:662:ILE:HD12	1:C:665:LEU:HD21	1.79	0.63
3:B:803:LEU:HD13	3:B:824:THR:HG21	1.79	0.63
3:B:920:LEU:HD13	3:B:946:ILE:HD11	1.80	0.63
2:A:331:LEU:HD23	2:A:332:TYR:HE1	1.64	0.62
2:A:22:LYS:NZ	2:A:28:GLU:OE1	2.32	0.62
2:A:1175:ILE:HD12	2:A:1212:LEU:HD13	1.81	0.62
2:A:215:ILE:HD11	2:A:339:LEU:HD12	1.82	0.62
2:A:910:ASN:HD21	2:A:913:LYS:HG2	1.65	0.61
3:B:875:ASN:HA	3:B:977:VAL:HG12	1.81	0.61
3:B:596:ILE:HG21	3:B:741:ILE:HD11	1.82	0.61
2:A:1164:ALA:O	2:A:1186:GLN:NE2	2.26	0.61
3:B:557:ILE:HD11	3:B:710:ILE:HD12	1.83	0.61
2:A:778:LYS:HA	2:A:782:LEU:HB2	1.83	0.61
2:A:994:THR:HG21	2:A:1059:ILE:HD12	1.82	0.61
3:B:950:LEU:HD11	3:B:953:ASN:HB2	1.83	0.61
3:B:944:ILE:HB	3:B:952:ALA:HB3	1.81	0.61
2:A:63:ASN:O	2:A:504:ASN:ND2	2.32	0.60
2:A:1074:ASP:OD1	2:A:1075:PHE:N	2.33	0.60
2:A:1155:SER:OG	2:A:1158:HIS:ND1	2.32	0.60
1:C:454:VAL:HG22	1:C:483:LYS:HD2	1.82	0.60
3:B:366:PRO:HB3	3:B:384:ASN:HB3	1.84	0.60
3:B:408:ASN:HD22	3:B:621:LYS:CD	2.08	0.59
3:B:909:ILE:HG12	3:B:915:GLU:HG3	1.84	0.59
2:A:961:TRP:CE2	2:A:995:ILE:HG21	2.36	0.59
2:A:1196:ASN:HB3	2:A:1239:PHE:HB3	1.83	0.59
1:C:513:ARG:HB2	1:C:538:THR:HB	1.84	0.59
2:A:1004:LYS:NZ	2:A:1014:GLN:OE1	2.35	0.59
1:C:654:ARG:HH21	1:C:659:ARG:HH11	1.50	0.59
2:A:395:ILE:HG13	2:A:396:ILE:HG23	1.84	0.59
3:B:368:LEU:HD23	3:B:385:ILE:HD12	1.85	0.59
3:B:1025:ASN:ND2	3:B:1157:LEU:O	2.36	0.59
2:A:128:ASP:OD2	2:A:496:ALA:N	2.36	0.59
2:A:467:ASP:N	2:A:467:ASP:OD1	2.35	0.58
2:A:988:ASN:ND2	2:A:988:ASN:O	2.35	0.58
3:B:121:ASN:HA	3:B:165:MET:HE2	1.85	0.58
2:A:1117:LEU:HD11	3:B:412:SER:HB2	1.85	0.58
2:A:1168:THR:HG22	2:A:1170:ASN:H	1.67	0.58
3:B:276:ASN:O	3:B:284:LYS:NZ	2.33	0.58
2:A:160:THR:HA	2:A:185:THR:O	2.04	0.58
3:B:325:TYR:O	3:B:654:LYS:NZ	2.35	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1230:ARG:NH2	3:B:804:SER:OG	2.36	0.58
1:C:692:ASN:HA	1:C:695:ILE:HG12	1.85	0.57
2:A:126:ILE:O	2:A:493:GLN:NE2	2.36	0.57
1:C:317:VAL:HG21	3:B:22:ARG:HH22	1.68	0.57
1:C:636:SER:OG	1:C:638:ASN:OD1	2.21	0.57
2:A:909:ASP:O	2:A:910:ASN:ND2	2.36	0.57
3:B:824:THR:HA	3:B:855:THR:O	2.04	0.57
1:C:413:SER:HA	1:C:730:LYS:HE2	1.86	0.57
1:C:362:TYR:HB2	1:C:387:PHE:HE1	1.70	0.57
2:A:448:ILE:HD11	2:A:643:PRO:HG2	1.85	0.57
1:C:400:ARG:NH1	1:C:401:PRO:O	2.38	0.57
2:A:450:THR:HA	2:A:646:LEU:HD11	1.87	0.57
2:A:584:THR:OG1	2:A:750:LYS:NZ	2.30	0.57
3:B:1:MET:O	3:B:90:ASN:ND2	2.32	0.56
1:C:250:LYS:O	1:C:253:ASN:ND2	2.25	0.56
3:B:842:ALA:HB2	3:B:980:GLU:HB2	1.86	0.56
2:A:989:LYS:HG3	2:A:1076:TRP:HD1	1.69	0.56
3:B:1031:ILE:HD12	3:B:1046:ILE:HD12	1.87	0.56
3:B:1044:LEU:HD13	3:B:1098:ILE:HG22	1.87	0.56
2:A:1101:ARG:NH1	2:A:1105:THR:OG1	2.39	0.56
1:C:284:LEU:HD13	1:C:339:SER:HB3	1.87	0.56
1:C:348:LYS:H	1:C:348:LYS:HD3	1.71	0.56
2:A:1175:ILE:HD11	2:A:1221:ALA:HB2	1.86	0.56
1:C:449:SER:O	1:C:453:LEU:CA	2.54	0.56
1:C:230:ARG:NE	1:C:258:GLN:OE1	2.36	0.55
2:A:855:MET:HE2	2:A:1047:PHE:HB3	1.88	0.55
2:A:1098:ILE:HA	2:A:1107:SER:O	2.06	0.55
3:B:332:VAL:HG22	3:B:354:PRO:HG2	1.88	0.55
3:B:810:GLU:N	3:B:813:ASN:O	2.39	0.55
3:B:1083:ASP:C	3:B:1085:THR:H	2.14	0.55
2:A:855:MET:HG3	2:A:872:ILE:HD13	1.89	0.55
3:B:112:ASN:ND2	3:B:116:ASP:OD2	2.37	0.55
1:C:181:TYR:HD1	1:C:185:ASN:HD21	1.54	0.55
2:A:1230:ARG:HH21	3:B:820:SER:HA	1.72	0.55
1:C:601:LYS:H	1:C:601:LYS:HD3	1.71	0.55
3:B:910:ASP:OD1	3:B:914:ASN:N	2.40	0.55
1:C:392:MET:HB3	1:C:396:HIS:HB2	1.89	0.55
1:C:688:LYS:O	1:C:692:ASN:ND2	2.40	0.55
3:B:113:ASN:OD1	3:B:114:THR:N	2.40	0.55
1:C:683:LEU:HD22	1:C:686:ILE:HD11	1.89	0.54
2:A:730:GLU:OE1	2:A:730:GLU:N	2.36	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:102:ILE:HD11	3:B:193:LEU:HB3	1.90	0.54
3:B:1132:TYR:HB3	3:B:1156:TYR:HD1	1.71	0.54
2:A:836:LEU:HD23	2:A:836:LEU:H	1.72	0.54
2:A:895:LEU:HD23	2:A:895:LEU:H	1.72	0.54
1:C:215:PHE:CE1	1:C:233:CYS:HB3	2.42	0.54
1:C:426:PHE:HA	1:C:429:HIS:HD2	1.72	0.54
2:A:488:LEU:HD13	2:A:488:LEU:H	1.71	0.54
1:C:306:ASP:OD1	1:C:307:VAL:N	2.41	0.54
1:C:702:LEU:HD12	1:C:703:PRO:HD2	1.89	0.54
2:A:914:ASN:OD1	2:A:914:ASN:N	2.40	0.54
1:C:689:ASP:HA	1:C:692:ASN:HD21	1.73	0.53
2:A:726:TYR:HB3	2:A:730:GLU:HB2	1.90	0.53
2:A:817:ASP:O	2:A:821:ASN:ND2	2.41	0.53
2:A:1106:LEU:HB2	2:A:1219:VAL:HB	1.90	0.53
3:B:313:MET:HE1	3:B:349:ILE:HG13	1.90	0.53
2:A:193:ARG:HD2	2:A:201:GLU:HB3	1.90	0.53
2:A:331:LEU:HD23	2:A:332:TYR:CE1	2.43	0.53
3:B:615:LEU:HD11	3:B:749:ILE:HD11	1.90	0.53
3:B:408:ASN:ND2	3:B:621:LYS:CD	2.59	0.53
2:A:368:ILE:HG23	2:A:395:ILE:HG22	1.90	0.53
2:A:1112:ARG:NH1	2:A:1120:ARG:O	2.42	0.53
2:A:634:LEU:HD21	2:A:693:ILE:HG23	1.91	0.53
3:B:1035:LYS:HB2	3:B:1042:ILE:HD11	1.91	0.53
2:A:219:HIS:ND1	2:A:250:GLU:OE2	2.41	0.52
2:A:962:THR:OG1	2:A:972:LYS:NZ	2.38	0.52
3:B:603:MET:HE2	3:B:614:ASN:HD22	1.75	0.52
2:A:129:ALA:HB2	2:A:167:LEU:HD21	1.92	0.52
2:A:568:GLN:O	2:A:570:ALA:N	2.42	0.52
3:B:871:PHE:HB3	3:B:982:LEU:HA	1.92	0.52
2:A:417:SER:HB2	2:A:421:ILE:HG23	1.90	0.52
2:A:920:TRP:HB2	2:A:1045:ARG:HG2	1.90	0.52
3:B:1148:ASN:ND2	3:B:1150:ASP:OD1	2.43	0.52
3:B:1146:ASP:OD1	3:B:1147:LEU:N	2.42	0.52
2:A:1203:ASN:OD1	2:A:1205:ASN:ND2	2.43	0.52
1:C:393:VAL:HG12	1:C:394:GLU:H	1.75	0.51
3:B:307:SER:OG	3:B:312:ILE:O	2.25	0.51
1:C:483:LYS:HB2	1:C:494:GLU:HG2	1.92	0.51
3:B:948:ASN:ND2	3:B:995:LEU:HD23	2.26	0.51
1:C:469:GLN:OE1	1:C:471:ARG:NE	2.42	0.51
2:A:30:TYR:HB3	2:A:44:GLU:HG3	1.93	0.51
3:B:809:GLN:HA	3:B:814:ASN:HA	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:263:TYR:HB3	1:C:282:PHE:CE1	2.46	0.51
3:B:1132:TYR:HB3	3:B:1156:TYR:CD1	2.46	0.50
1:C:241:LYS:NZ	1:C:243:ASN:O	2.44	0.50
2:A:376:ASN:HB3	2:A:381:LYS:HA	1.92	0.50
2:A:961:TRP:CD2	2:A:995:ILE:HG21	2.46	0.50
2:A:1249:TRP:CD1	2:A:1251:GLU:HG3	2.47	0.50
3:B:110:TYR:HB3	3:B:118:ARG:HB2	1.94	0.50
2:A:168:ARG:H	2:A:168:ARG:HD2	1.76	0.50
1:C:534:SER:OG	1:C:536:ASP:OD2	2.23	0.50
2:A:134:ILE:HD13	2:A:144:LEU:HB2	1.93	0.50
2:A:1035:ASN:O	2:A:1035:ASN:ND2	2.45	0.50
3:B:402:ILE:HD12	3:B:402:ILE:N	2.27	0.50
3:B:1042:ILE:HG13	3:B:1100:LEU:HD13	1.94	0.50
3:B:1082:LEU:HD13	3:B:1084:GLY:H	1.77	0.50
3:B:1090:ASP:HA	3:B:1108:GLN:HG2	1.94	0.50
1:C:265:ASP:OD1	1:C:280:GLN:NE2	2.44	0.49
2:A:671:LEU:HD13	2:A:818:THR:HG21	1.94	0.49
3:B:189:LEU:O	3:B:193:LEU:HG	2.12	0.49
2:A:728:LEU:O	2:A:732:ASN:ND2	2.45	0.49
2:A:154:GLU:HB2	2:A:155:PRO:HD2	1.93	0.49
3:B:480:ILE:HD11	3:B:665:LYS:HE2	1.94	0.49
2:A:205:ASP:OD1	2:A:369:TYR:OH	2.25	0.49
3:B:148:ASN:HA	3:B:169:TRP:O	2.12	0.49
3:B:971:LEU:HD12	3:B:972:SER:H	1.78	0.49
3:B:1006:TYR:HE1	3:B:1070:TYR:HB3	1.77	0.49
2:A:1121:LEU:HB3	2:A:1243:ILE:HD13	1.95	0.49
3:B:493:LYS:H	3:B:493:LYS:HD2	1.77	0.49
2:A:508:ASP:OD1	2:A:508:ASP:N	2.46	0.49
1:C:189:LYS:NZ	1:C:218:TRP:O	2.46	0.48
2:A:740:ILE:HD12	2:A:740:ILE:H	1.78	0.48
2:A:1086:TYR:CG	2:A:1242:PHE:HB3	2.48	0.48
2:A:1086:TYR:HE2	2:A:1129:ILE:HD11	1.78	0.48
3:B:88:ARG:HE	3:B:343:GLY:HA2	1.78	0.48
1:C:509:HIS:HB2	1:C:542:MET:O	2.13	0.48
1:C:727:ASP:OD1	1:C:727:ASP:N	2.46	0.48
3:B:340:ASN:HD22	3:B:342:ASN:H	1.62	0.48
3:B:409:TYR:CD1	3:B:409:TYR:N	2.75	0.48
3:B:911:SER:HB2	3:B:961:ASN:HD22	1.78	0.48
2:A:124:PHE:HD2	2:A:296:LEU:HD21	1.79	0.48
3:B:273:ILE:HG23	3:B:279:ILE:HD13	1.95	0.48
2:A:418:VAL:O	2:A:421:ILE:HG22	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:829:PRO:HG3	3:B:850:GLN:HB3	1.95	0.48
3:B:852:ILE:HB	3:B:970:LEU:HB3	1.94	0.48
3:B:884:LYS:HB2	3:B:971:LEU:HD11	1.94	0.48
2:A:569:ALA:HB2	2:A:730:GLU:HG2	1.95	0.48
2:A:1055:ASP:O	2:A:1059:ILE:HG12	2.14	0.48
1:C:207:ASN:OD1	3:B:118:ARG:NH1	2.47	0.48
2:A:716:LYS:HG3	2:A:738:TYR:CE1	2.48	0.48
1:C:383:ASP:OD1	1:C:383:ASP:N	2.44	0.47
2:A:892:ASN:HD22	2:A:1036:CYS:HB3	1.79	0.47
3:B:730:PHE:O	3:B:734:MET:HG2	2.13	0.47
1:C:624:ASN:O	1:C:627:ILE:HG13	2.14	0.47
2:A:851:SER:OG	2:A:854:ASN:OD1	2.28	0.47
3:B:845:LEU:HD22	3:B:972:SER:HB2	1.95	0.47
2:A:653:PHE:O	2:A:659:ASN:ND2	2.47	0.47
2:A:996:THR:HG22	2:A:1053:GLU:HG3	1.96	0.47
3:B:1042:ILE:HG23	3:B:1100:LEU:HB2	1.96	0.47
2:A:1089:LEU:HD23	2:A:1112:ARG:HH21	1.79	0.47
1:C:560:VAL:HA	1:C:563:VAL:HG22	1.96	0.47
2:A:495:ASP:OD1	2:A:495:ASP:N	2.47	0.47
3:B:1:MET:HE1	3:B:100:SER:HA	1.95	0.47
3:B:916:LYS:HB2	3:B:959:ILE:HD11	1.97	0.47
2:A:126:ILE:HD13	2:A:489:ASN:HD21	1.80	0.47
2:A:443:TYR:HD2	2:A:684:PHE:HZ	1.62	0.47
2:A:1231:ASP:OD1	2:A:1232:HIS:N	2.42	0.47
3:B:752:CYS:O	3:B:760:LYS:NZ	2.40	0.47
3:B:974:ASN:ND2	3:B:974:ASN:O	2.48	0.47
1:C:482:PHE:HA	1:C:495:ILE:HG13	1.97	0.47
2:A:173:PRO:HG2	2:A:180:SER:OG	2.15	0.47
3:B:334:ASP:HB3	3:B:337:LYS:HB3	1.97	0.47
1:C:215:PHE:HE1	1:C:233:CYS:HB3	1.80	0.46
2:A:240:LEU:HD22	2:A:520:PHE:HE2	1.79	0.46
2:A:917:ILE:HG13	2:A:1049:ILE:HG12	1.97	0.46
2:A:946:ASN:ND2	2:A:966:ASN:OD1	2.48	0.46
1:C:449:SER:O	1:C:453:LEU:N	2.48	0.46
3:B:171:GLN:HE21	3:B:174:LEU:HG	1.80	0.46
3:B:485:ASP:HB3	3:B:488:LYS:HB2	1.96	0.46
3:B:1063:ASN:HD22	3:B:1068:LYS:HD3	1.80	0.46
1:C:264:PHE:CE2	1:C:266:SER:HB3	2.51	0.46
3:B:65:ASP:OD1	3:B:67:ASN:N	2.49	0.46
2:A:1126:LYS:HB3	2:A:1153:VAL:HG23	1.98	0.46
3:B:904:LEU:HD11	3:B:931:ILE:HD13	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:684:PRO:O	1:C:688:LYS:HG2	2.16	0.46
3:B:62:GLY:HA2	3:B:146:ILE:HD11	1.98	0.46
1:C:567:ILE:HB	1:C:607:ILE:HD11	1.96	0.46
3:B:313:MET:HB3	3:B:790:THR:HG23	1.98	0.46
1:C:201:TYR:HE1	1:C:208:GLU:HB3	1.81	0.45
1:C:230:ARG:HG2	1:C:256:ILE:HD11	1.98	0.45
1:C:175:ILE:HG23	1:C:419:PHE:HE1	1.82	0.45
2:A:20:TYR:O	2:A:134:ILE:HA	2.15	0.45
2:A:938:THR:HA	2:A:953:SER:HA	1.99	0.45
2:A:1098:ILE:HD11	2:A:1240:TRP:HZ3	1.81	0.45
2:A:1161:PRO:HG2	2:A:1178:SER:HB3	1.98	0.45
2:A:1229:MET:O	2:A:1233:THR:OG1	2.26	0.45
2:A:891:TYR:CD1	2:A:1041:TYR:HB3	2.52	0.45
3:B:971:LEU:HD12	3:B:972:SER:N	2.32	0.45
1:C:214:GLU:HG3	1:C:236:LYS:HB2	1.97	0.45
2:A:669:ASN:O	2:A:673:GLU:HG2	2.17	0.45
2:A:567:VAL:HG11	2:A:575:TRP:CG	2.52	0.45
3:B:535:SER:O	3:B:539:THR:OG1	2.27	0.45
2:A:280:LYS:HG2	2:A:319:VAL:HG11	1.99	0.45
3:B:1118:ILE:HG12	3:B:1157:LEU:HD13	1.99	0.45
2:A:913:LYS:O	2:A:913:LYS:HG3	2.16	0.44
2:A:1082:TYR:OH	2:A:1146:ASP:OD2	2.34	0.44
3:B:735:GLU:O	3:B:738:ILE:HG13	2.17	0.44
1:C:603:ILE:HA	1:C:606:VAL:HG12	1.99	0.44
1:C:647:ALA:O	1:C:651:ASN:ND2	2.43	0.44
2:A:70:ASP:HB3	2:A:157:LEU:HD11	1.99	0.44
2:A:233:ILE:HD12	2:A:252:PHE:HE2	1.82	0.44
2:A:684:PHE:O	2:A:688:ASN:ND2	2.33	0.44
3:B:7:LEU:HD13	3:B:33:PHE:HB3	2.00	0.44
3:B:407:LEU:CD2	3:B:409:TYR:CE2	3.01	0.44
1:C:730:LYS:NZ	1:C:732:GLN:HE21	2.16	0.44
2:A:128:ASP:OD2	2:A:495:ASP:N	2.50	0.44
3:B:254:TYR:O	3:B:258:THR:OG1	2.27	0.44
3:B:423:ILE:O	3:B:427:GLU:HG2	2.18	0.44
3:B:903:GLY:HA2	3:B:923:ILE:HB	1.99	0.44
1:C:185:ASN:ND2	1:C:219:GLN:HE22	2.15	0.44
2:A:74:LEU:N	2:A:79:GLU:OE1	2.50	0.44
2:A:448:ILE:HA	2:A:646:LEU:HD22	2.00	0.44
3:B:928:TRP:HE1	3:B:1013:GLU:CD	2.25	0.44
1:C:191:ASP:OD1	1:C:192:ASN:N	2.51	0.44
2:A:452:LYS:HD2	2:A:452:LYS:HA	1.80	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:342:LYS:HE2	2:A:342:LYS:HB2	1.83	0.44
2:A:388:ASN:HB3	2:A:391:LEU:HB2	2.00	0.44
2:A:448:ILE:HG23	2:A:646:LEU:HB3	1.99	0.44
3:B:88:ARG:HE	3:B:343:GLY:CA	2.30	0.44
3:B:617:ASN:O	3:B:621:LYS:HG2	2.18	0.44
1:C:631:GLU:HG3	1:C:632:VAL:HG23	1.99	0.44
2:A:113:TYR:HE1	2:A:286:LEU:HD13	1.83	0.44
2:A:1131:ARG:NH1	2:A:1137:THR:OG1	2.49	0.44
1:C:229:ILE:HG13	1:C:259:VAL:O	2.18	0.44
2:A:124:PHE:CD2	2:A:296:LEU:HD21	2.53	0.44
2:A:275:LEU:HD23	2:A:328:PHE:CD2	2.52	0.44
2:A:1182:ASN:HD22	2:A:1182:ASN:H	1.65	0.44
3:B:92:ASN:OD1	3:B:93:VAL:N	2.51	0.44
3:B:528:LYS:HG3	3:B:864:THR:HG22	2.00	0.44
2:A:1098:ILE:HD11	2:A:1240:TRP:CZ3	2.52	0.43
2:A:454:ILE:H	2:A:651:LYS:HE3	1.83	0.43
2:A:1009:GLY:HA2	2:A:1059:ILE:HG22	1.99	0.43
3:B:762:HIS:HA	3:B:765:MET:HE2	1.99	0.43
3:B:1131:ILE:O	3:B:1158:TRP:NE1	2.48	0.43
3:B:1049:GLU:H	3:B:1049:GLU:HG3	1.55	0.43
1:C:211:ILE:HD13	1:C:322:VAL:HG13	2.00	0.43
1:C:576:SER:HB2	1:C:578:LYS:HE3	2.00	0.43
2:A:38:ASN:HD22	2:A:147:ASN:ND2	2.15	0.43
3:B:645:TYR:OH	3:B:721:VAL:HG21	2.18	0.43
1:C:204:VAL:HB	1:C:209:TYR:HE1	1.83	0.43
3:B:373:ILE:HD13	3:B:460:ASN:HB3	2.00	0.43
3:B:604:LEU:HD13	3:B:604:LEU:HA	1.91	0.43
1:C:480:ASN:HA	1:C:483:LYS:NZ	2.34	0.43
2:A:511:GLN:NE2	2:A:513:ASP:OD1	2.40	0.43
2:A:922:ARG:HH21	2:A:988:ASN:HD21	1.66	0.43
3:B:121:ASN:OD1	3:B:121:ASN:N	2.51	0.43
1:C:295:ASN:OD1	1:C:295:ASN:N	2.51	0.43
2:A:473:LEU:HD12	3:B:1027:VAL:HG21	2.00	0.43
1:C:563:VAL:O	1:C:567:ILE:HG12	2.19	0.43
2:A:972:LYS:HE3	3:B:772:LEU:HD22	1.99	0.43
2:A:1113:SER:OG	2:A:1120:ARG:NH1	2.52	0.43
2:A:20:TYR:HB3	2:A:29:PHE:HB3	1.99	0.43
2:A:276:LEU:HD22	2:A:280:LYS:HE3	2.00	0.43
3:B:651:MET:HA	3:B:654:LYS:HE3	2.00	0.43
3:B:838:ILE:O	3:B:1004:ASN:ND2	2.49	0.43
3:B:101:LEU:HA	3:B:104:THR:HG22	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:810:GLU:HG3	3:B:811:GLN:H	1.84	0.42
2:A:155:PRO:HG2	2:A:501:TYR:CZ	2.54	0.42
3:B:408:ASN:HB3	3:B:624:PHE:HB2	2.02	0.42
2:A:229:THR:HA	2:A:248:ASN:HD21	1.85	0.42
3:B:3:ILE:CD1	3:B:87:GLN:HG3	2.49	0.42
3:B:534:TYR:CD1	3:B:663:ILE:HG13	2.55	0.42
2:A:258:THR:HG21	2:A:832:ASP:HB3	2.01	0.42
2:A:331:LEU:HB3	2:A:332:TYR:HD1	1.84	0.42
3:B:84:LYS:HE2	3:B:84:LYS:HB2	1.85	0.42
2:A:920:TRP:HB2	2:A:1045:ARG:CG	2.50	0.42
3:B:778:ASP:HB3	3:B:781:ASN:HB2	2.01	0.42
3:B:1142:TRP:HB2	3:B:1144:ILE:HG13	2.02	0.42
1:C:564:VAL:HG11	1:C:572:PHE:HB2	2.02	0.42
1:C:683:LEU:HB3	1:C:684:PRO:HD3	2.00	0.42
3:B:153:TYR:CD2	3:B:444:ALA:HB2	2.54	0.42
1:C:261:LEU:HD13	1:C:284:LEU:HB3	2.02	0.42
2:A:589:GLN:HE21	2:A:605:TYR:HD2	1.67	0.42
3:B:749:ILE:HD13	3:B:749:ILE:HA	1.94	0.42
1:C:621:LYS:HD3	1:C:621:LYS:HA	1.90	0.42
2:A:388:ASN:ND2	2:A:391:LEU:HD23	2.34	0.42
2:A:450:THR:OG1	2:A:451:PRO:HD3	2.19	0.42
3:B:301:LEU:HD11	3:B:418:LEU:HD21	2.00	0.42
3:B:1055:LYS:HZ3	3:B:1056:PRO:HD2	1.84	0.42
1:C:512:TYR:HE1	1:C:539:ILE:HG23	1.85	0.42
2:A:922:ARG:NH2	2:A:988:ASN:HD21	2.18	0.42
3:B:25:LYS:HG3	3:B:28:VAL:HG22	2.00	0.42
2:A:191:SER:HB2	2:A:360:LEU:HD11	2.02	0.42
2:A:251:GLU:HA	2:A:254:THR:HG22	2.01	0.42
2:A:841:ASN:O	2:A:845:LYS:N	2.47	0.42
2:A:1151:ASN:HA	2:A:1161:PRO:HA	2.01	0.41
3:B:872:TRP:HB2	3:B:980:GLU:HB3	2.01	0.41
2:A:44:GLU:OE1	2:A:80:LYS:NZ	2.53	0.41
2:A:440:GLU:H	2:A:440:GLU:CD	2.28	0.41
2:A:1117:LEU:HD12	2:A:1117:LEU:HA	1.89	0.41
1:C:454:VAL:HG13	1:C:483:LYS:NZ	2.35	0.41
2:A:700:ARG:NH1	2:A:703:GLN:OE1	2.54	0.41
2:A:920:TRP:NE1	2:A:1066:GLU:OE1	2.33	0.41
3:B:706:ALA:O	3:B:710:ILE:HG12	2.20	0.41
1:C:627:ILE:O	1:C:630:GLU:HG3	2.19	0.41
2:A:253:LEU:HD12	2:A:253:LEU:HA	1.89	0.41
2:A:720:GLU:HG2	2:A:738:TYR:CE2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:629:ILE:HD12	3:B:734:MET:HE1	2.02	0.41
2:A:836:LEU:HD21	3:B:949:ILE:HA	2.02	0.41
2:A:1225:TYR:CD2	2:A:1238:CYS:HB3	2.55	0.41
2:A:989:LYS:HG3	2:A:1076:TRP:CD1	2.52	0.41
3:B:303:LEU:HD12	3:B:303:LEU:HA	1.91	0.41
3:B:845:LEU:HD13	3:B:972:SER:OG	2.21	0.41
2:A:660:LYS:NZ	2:A:804:LEU:O	2.48	0.41
2:A:750:LYS:HZ2	2:A:1000:LEU:HD12	1.86	0.41
2:A:975:PHE:CZ	2:A:977:TYR:HB3	2.56	0.41
1:C:446:PHE:HB3	1:C:455:ILE:HD11	2.01	0.41
1:C:654:ARG:HH21	1:C:659:ARG:NH1	2.17	0.41
2:A:123:GLN:HA	2:A:291:VAL:HG12	2.02	0.41
2:A:955:ASN:HB3	2:A:958:GLU:HB3	2.02	0.41
3:B:805:LEU:HD21	3:B:854:PHE:HE1	1.86	0.41
1:C:192:ASN:ND2	1:C:192:ASN:O	2.54	0.41
1:C:357:PRO:HA	1:C:393:VAL:HG22	2.02	0.41
1:C:406:ASP:OD1	1:C:406:ASP:N	2.53	0.41
1:C:726:ILE:HG12	1:C:737:LEU:HD21	2.03	0.41
2:A:974:ALA:HB2	3:B:772:LEU:HD21	2.03	0.41
3:B:190:ILE:O	3:B:194:ILE:HG13	2.21	0.41
3:B:906:PHE:HZ	3:B:935:ILE:HD11	1.86	0.41
1:C:493:VAL:HB	1:C:514:GLN:HG3	2.03	0.41
2:A:57:PRO:HG3	2:A:403:GLY:HA2	2.02	0.41
3:B:405:TYR:O	3:B:405:TYR:CD2	2.74	0.41
3:B:844:HIS:NE2	3:B:976:ASN:OD1	2.45	0.41
3:B:910:ASP:HA	3:B:962:ILE:HG22	2.03	0.41
2:A:169:ASN:ND2	2:A:169:ASN:O	2.53	0.40
3:B:1124:LEU:O	3:B:1131:ILE:HG12	2.21	0.40
3:B:1135:ILE:H	3:B:1135:ILE:HG13	1.69	0.40
1:C:245:ASP:N	1:C:245:ASP:OD1	2.54	0.40
2:A:50:THR:HG22	2:A:501:TYR:CG	2.55	0.40
2:A:306:LYS:HE3	2:A:306:LYS:HB2	1.97	0.40
2:A:737:LYS:HB3	2:A:737:LYS:HE3	1.87	0.40
2:A:821:ASN:ND2	3:B:900:GLU:OE2	2.54	0.40
3:B:622:ASN:O	3:B:626:LEU:HG	2.21	0.40
3:B:637:TRP:CD1	3:B:722:PHE:HB2	2.57	0.40
1:C:205:ARG:NH1	3:B:434:ASP:O	2.53	0.40
1:C:435:LEU:HG	1:C:440:ILE:HD11	2.03	0.40
2:A:493:GLN:OE1	2:A:493:GLN:N	2.39	0.40
2:A:1055:ASP:OD1	2:A:1055:ASP:N	2.46	0.40
2:A:1122:TYR:OH	2:A:1249:TRP:HB3	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:212:PRO:HA	3:B:226:GLU:HG2	2.03	0.40
3:B:632:ASN:O	3:B:636:GLN:HG3	2.22	0.40
3:B:1031:ILE:H	3:B:1031:ILE:HG13	1.71	0.40
1:C:342:LEU:O	1:C:356:LYS:NZ	2.55	0.40
2:A:32:SER:OG	2:A:42:ILE:HG12	2.21	0.40
2:A:936:GLU:OE2	2:A:953:SER:OG	2.34	0.40
3:B:566:THR:HG22	3:B:567:ASN:H	1.87	0.40
3:B:626:LEU:HD22	3:B:734:MET:HE3	2.04	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	C	576/748 (77%)	560 (97%)	16 (3%)	0	100	100
2	A	1235/1252 (99%)	1150 (93%)	84 (7%)	1 (0%)	48	78
3	B	1161/1163 (100%)	1108 (95%)	51 (4%)	2 (0%)	44	72
All	All	2972/3163 (94%)	2818 (95%)	151 (5%)	3 (0%)	50	78

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	569	ALA
3	B	409	TYR
3	B	24	ARG

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	C	507/677 (75%)	486 (96%)	21 (4%)	26	51
2	A	1118/1150 (97%)	1083 (97%)	35 (3%)	35	60
3	B	1102/1103 (100%)	1071 (97%)	31 (3%)	38	62
All	All	2727/2930 (93%)	2640 (97%)	87 (3%)	36	59

All (87) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	171	LEU
1	C	179	VAL
1	C	242	ILE
1	C	245	ASP
1	C	282	PHE
1	C	295	ASN
1	C	303	ARG
1	C	304	ILE
1	C	305	THR
1	C	319	LEU
1	C	343	LEU
1	C	368	THR
1	C	378	GLU
1	C	382	LEU
1	C	412	LEU
1	C	429	HIS
1	C	430	PHE
1	C	506	VAL
1	C	662	ILE
1	C	683	LEU
1	C	716	ILE
2	A	59	THR
2	A	144	LEU
2	A	150	ILE
2	A	253	LEU
2	A	258	THR
2	A	260	LEU
2	A	276	LEU
2	A	291	VAL
2	A	297	ASN

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Mol	Chain	Res	Type
2	A	319	VAL
2	A	405	VAL
2	A	416	VAL
2	A	425	ILE
2	A	467	ASP
2	A	488	LEU
2	A	495	ASP
2	A	519	VAL
2	A	528	VAL
2	A	535	VAL
2	A	641	LEU
2	A	646	LEU
2	A	728	LEU
2	A	738	TYR
2	A	782	LEU
2	A	906	ILE
2	A	911	LYS
2	A	914	ASN
2	A	917	ILE
2	A	988	ASN
2	A	1040	ARG
2	A	1126	LYS
2	A	1127	VAL
2	A	1129	ILE
2	A	1153	VAL
2	A	1236	ASN
3	B	3	ILE
3	B	93	VAL
3	B	115	GLU
3	B	129	GLU
3	B	133	THR
3	B	136	LEU
3	B	137	VAL
3	B	293	ILE
3	B	332	VAL
3	B	421	VAL
3	B	490	ILE
3	B	518	ASP
3	B	566	THR
3	B	687	LEU
3	B	782	MET
3	B	792	LEU

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Mol	Chain	Res	Type
3	B	811	GLN
3	B	815	VAL
3	B	819	THR
3	B	869	ILE
3	B	892	ASN
3	B	950	LEU
3	B	971	LEU
3	B	1009	ASN
3	B	1031	ILE
3	B	1036	ILE
3	B	1049	GLU
3	B	1082	LEU
3	B	1109	ILE
3	B	1120	ASN
3	B	1141	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (46) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	185	ASN
1	C	192	ASN
1	C	344	ASN
1	C	381	ASN
1	C	470	ASN
1	C	637	GLN
1	C	692	ASN
1	C	732	GLN
2	A	147	ASN
2	A	164	ASN
2	A	290	GLN
2	A	390	ASN
2	A	561	ASN
2	A	589	GLN
2	A	736	ASN
2	A	780	ASN
2	A	808	GLN
2	A	821	ASN
2	A	956	HIS
2	A	1022	ASN
2	A	1095	ASN
2	A	1151	ASN
2	A	1182	ASN

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Mol	Chain	Res	Type
3	B	54	ASN
3	B	135	ASN
3	B	311	GLN
3	B	400	ASN
3	B	408	ASN
3	B	452	ASN
3	B	460	ASN
3	B	481	ASN
3	B	568	ASN
3	B	614	ASN
3	B	623	ASN
3	B	736	GLN
3	B	762	HIS
3	B	823	ASN
3	B	878	GLN
3	B	879	ASN
3	B	901	ASN
3	B	948	ASN
3	B	1047	ASN
3	B	1048	ASN
3	B	1065	ASN
3	B	1127	ASN
3	B	1148	ASN

5.3.3　RNA ⓘ

There are no RNA molecules in this entry.

5.4　Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5　Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6　Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-43784. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

6.1.1 Primary map
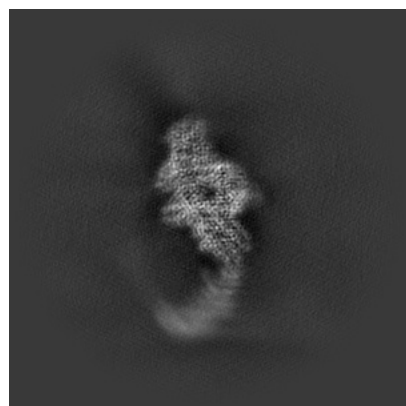
X
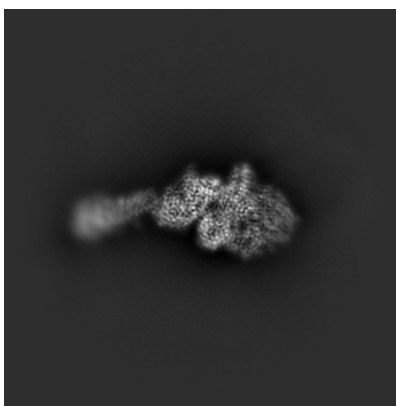
Y
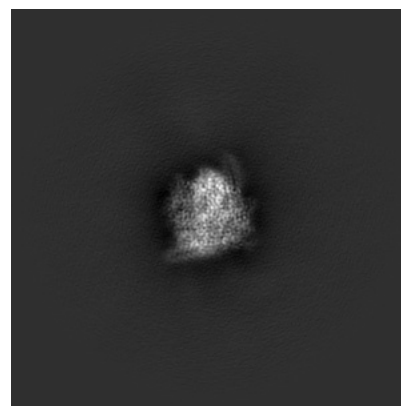
Z

6.1.2 Raw map

X

Y

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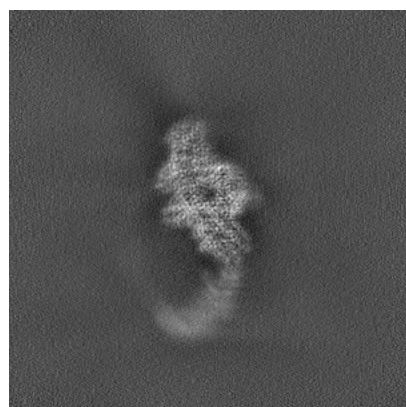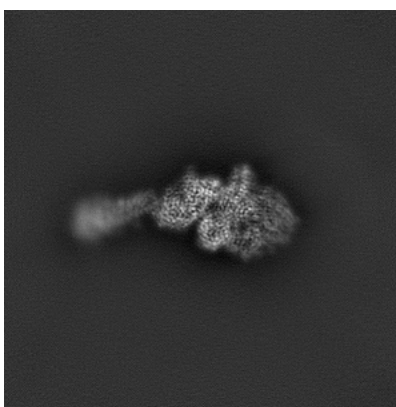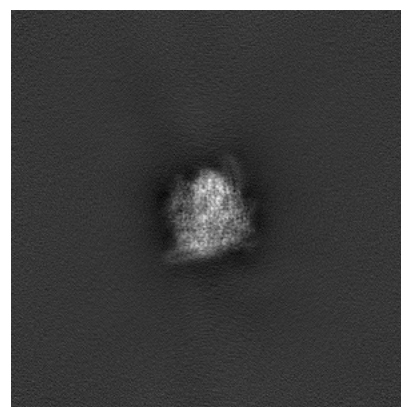
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
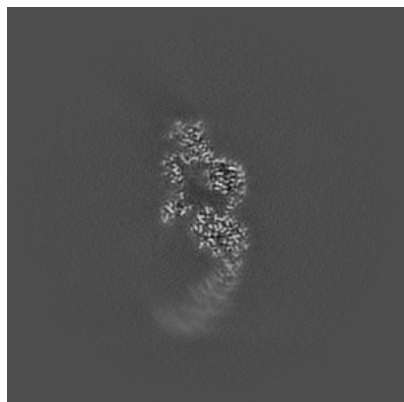
6.2.1 Primary map
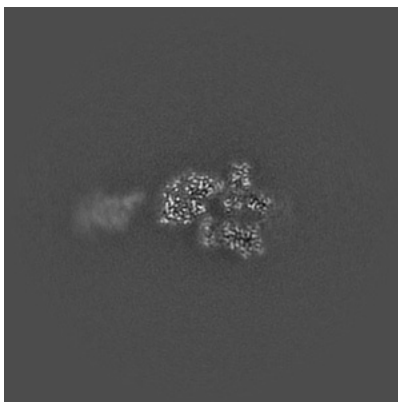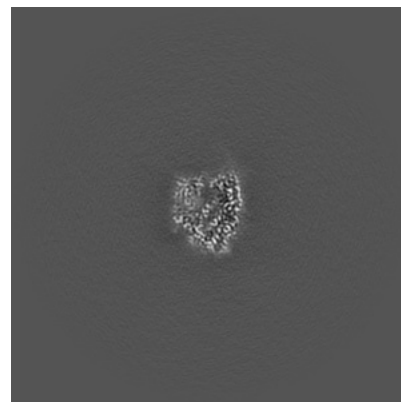
X Index: 256   Y Index: 256   Z Index: 256

6.2.2 Raw map
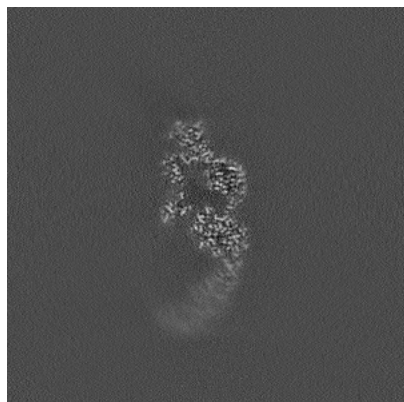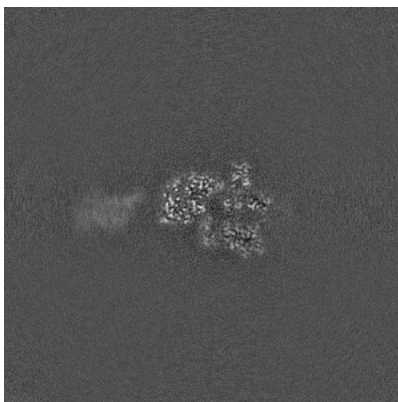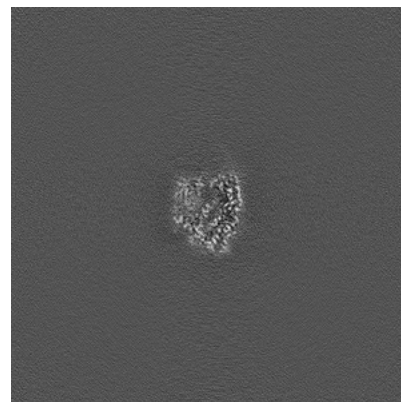
X Index: 256   Y Index: 256   Z Index: 256

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

6.3　Largest variance slices ⓘ

6.3.1　Primary map
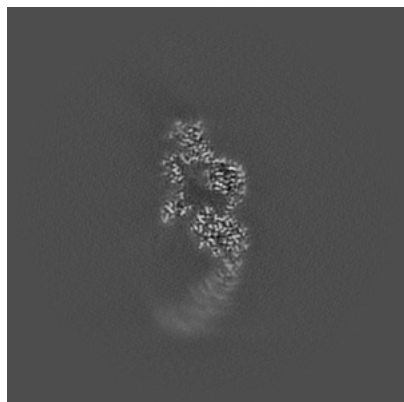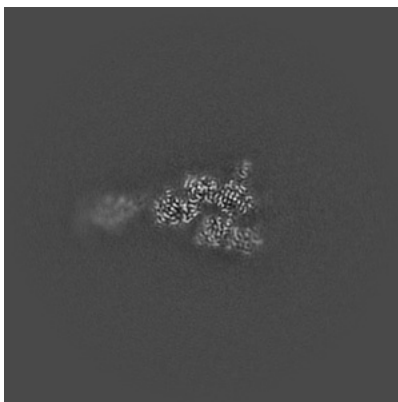
X Index: 256	Y Index: 266	Z Index: 259
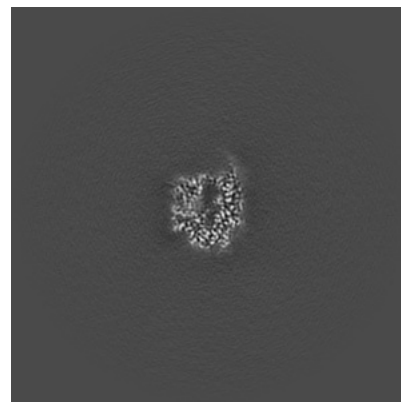
6.3.2　Raw map
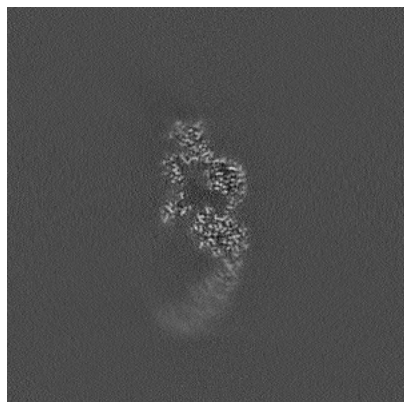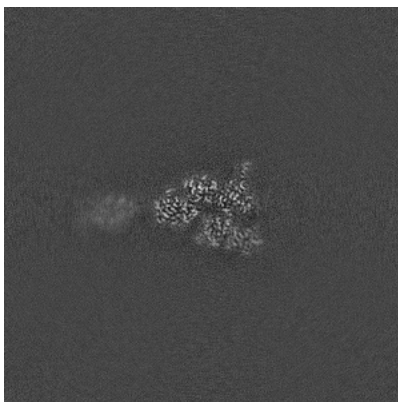
X Index: 256	Y Index: 265	Z Index: 259
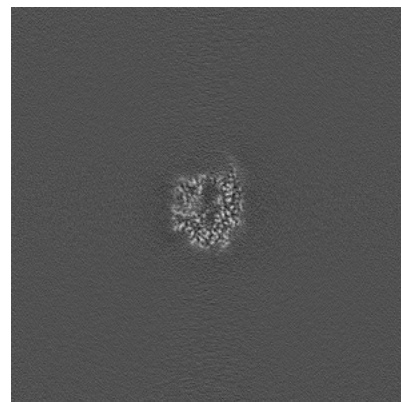
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map
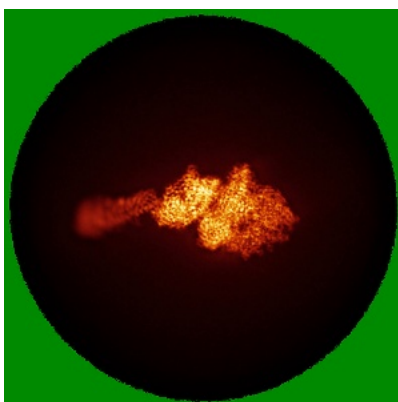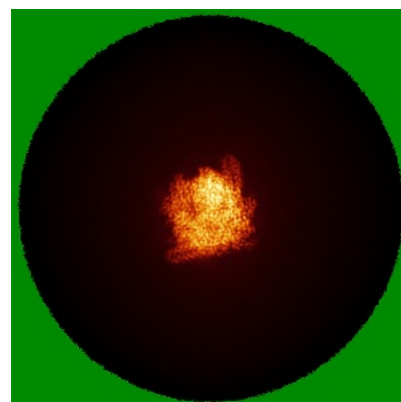
X Y Z

6.4.2 Raw map

X Y Z
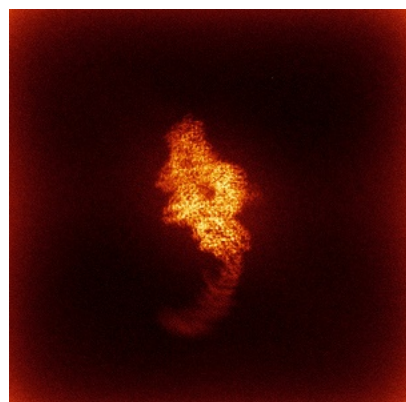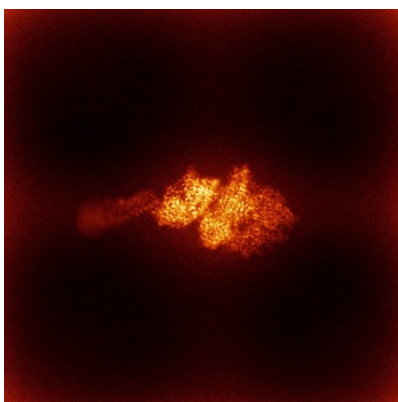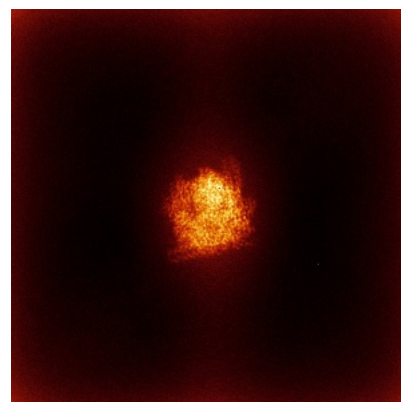
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

| X | Y | Z |
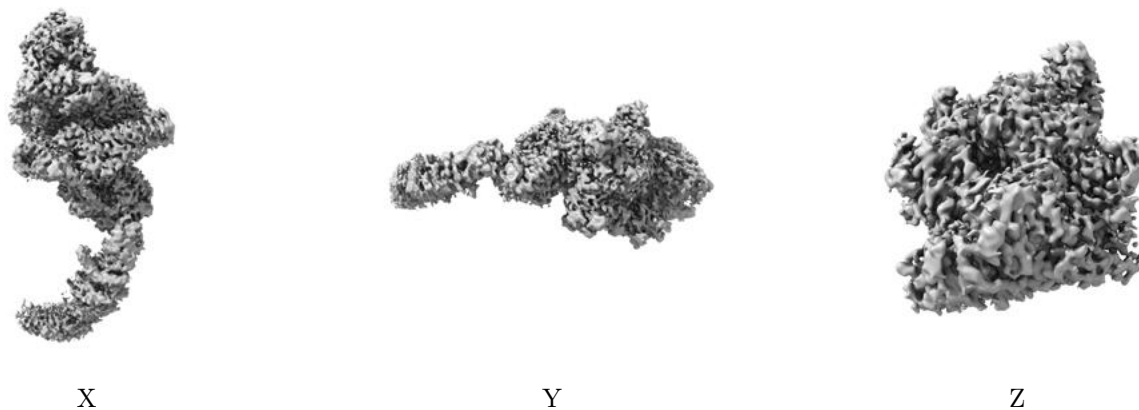
The images above show the 3D surface view of the map at the recommended contour level 0.05. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

| X | Y | Z |
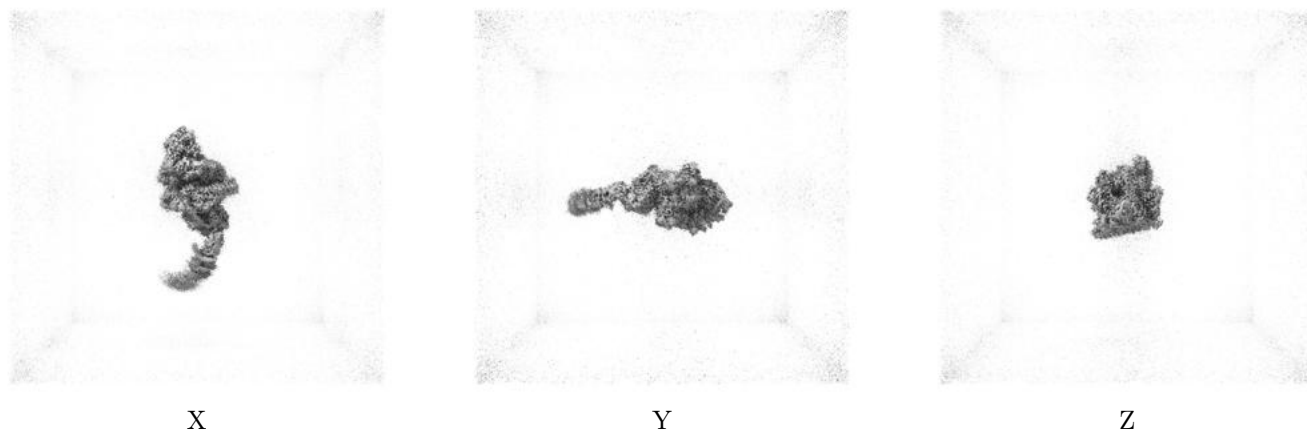
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation ⓘ

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

7 Map analysis ⓘ

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

7.1 Map-value distribution ⓘ
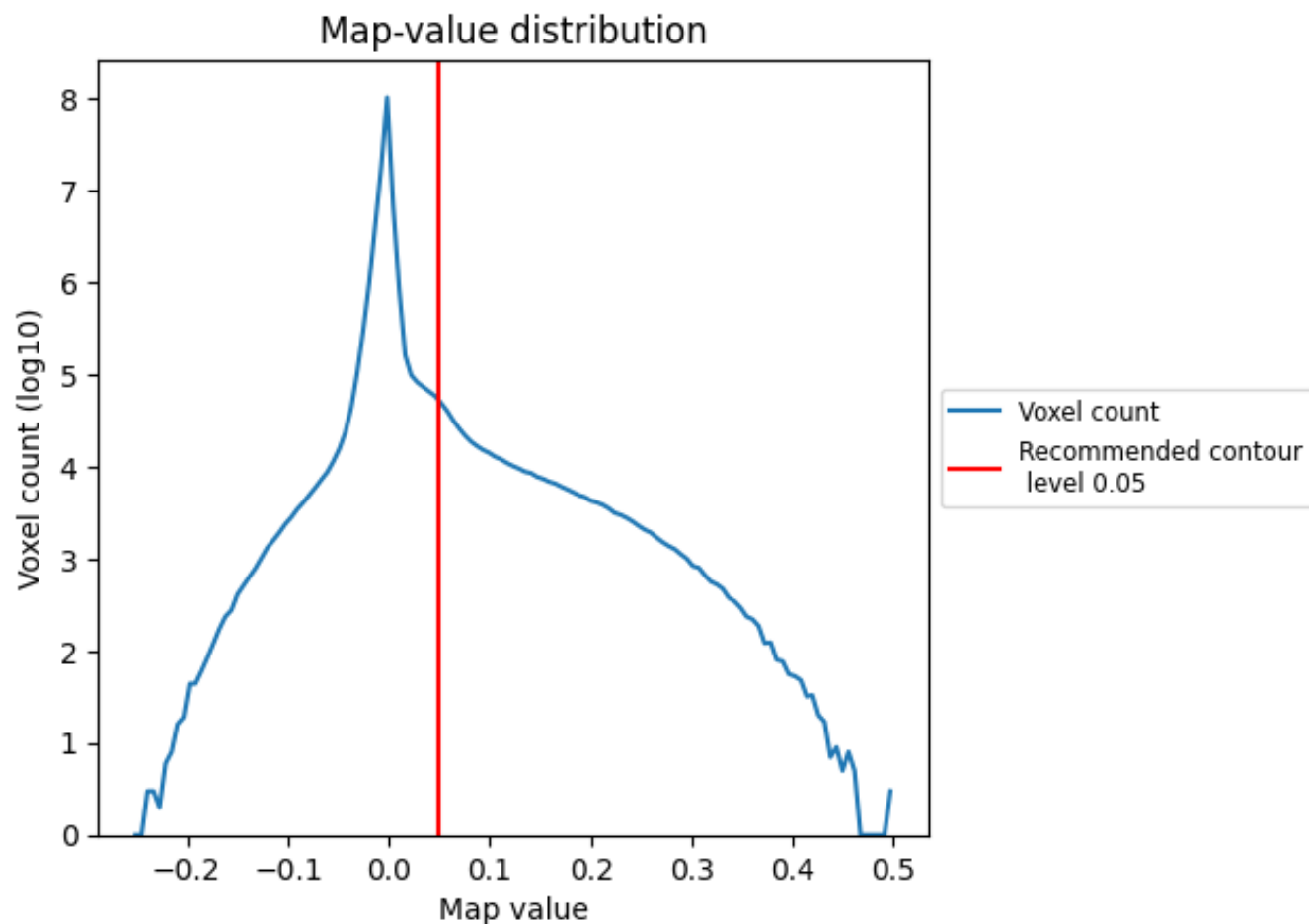
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
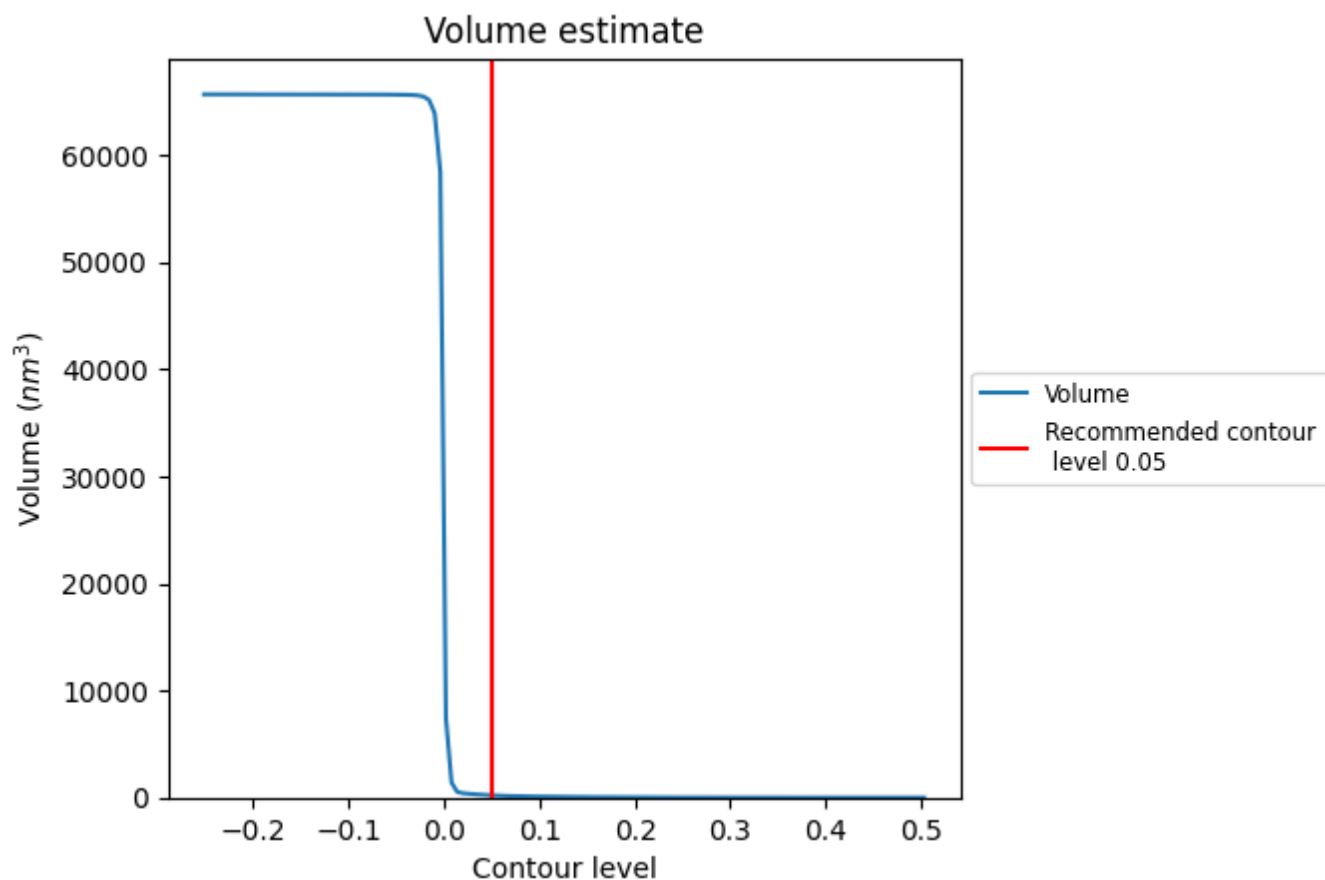
The volume at the recommended contour level is 208 nm^3; this corresponds to an approximate mass of 188 kDa.

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 ⓘ
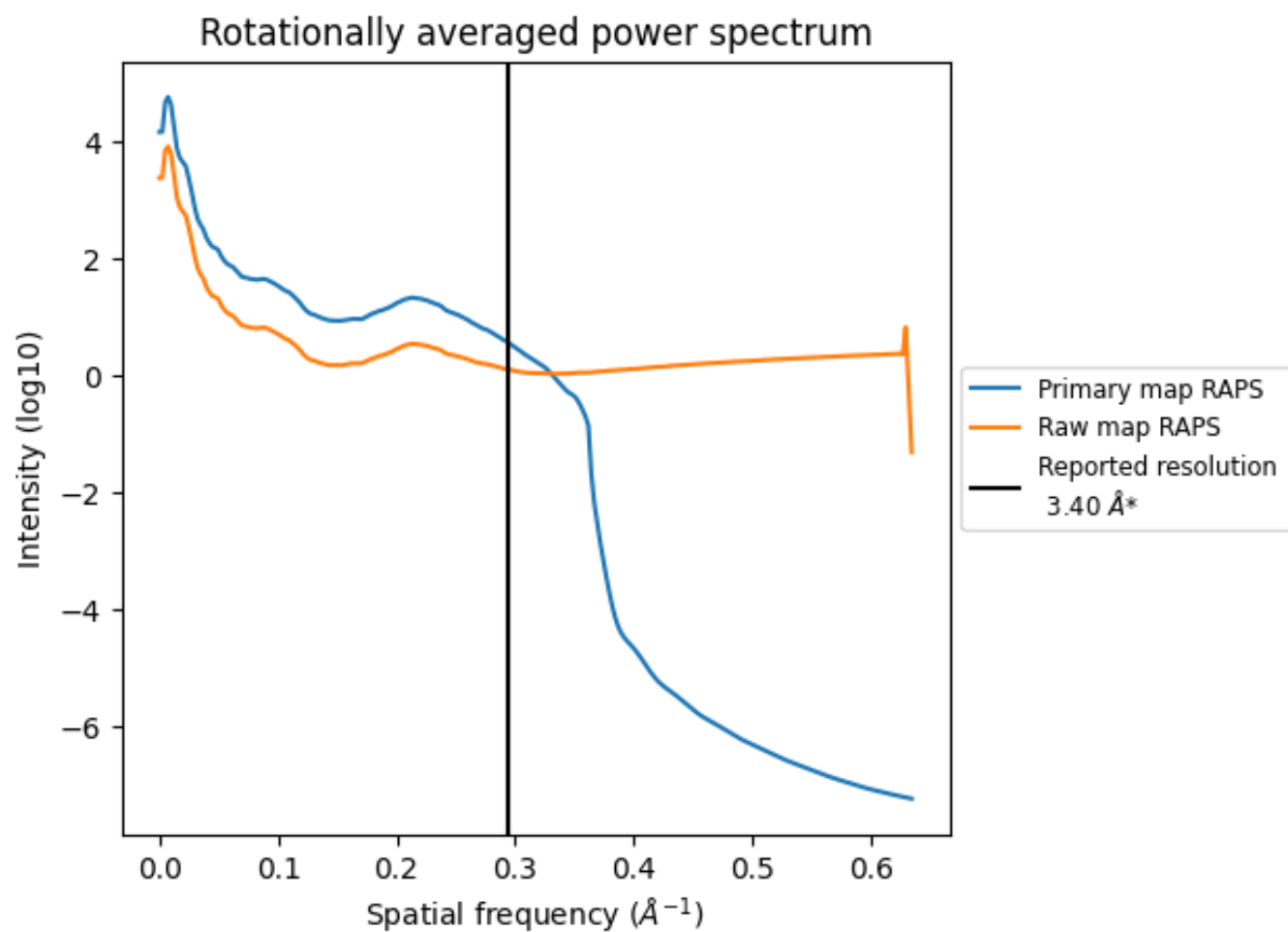
*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation ⓘ

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC ⓘ
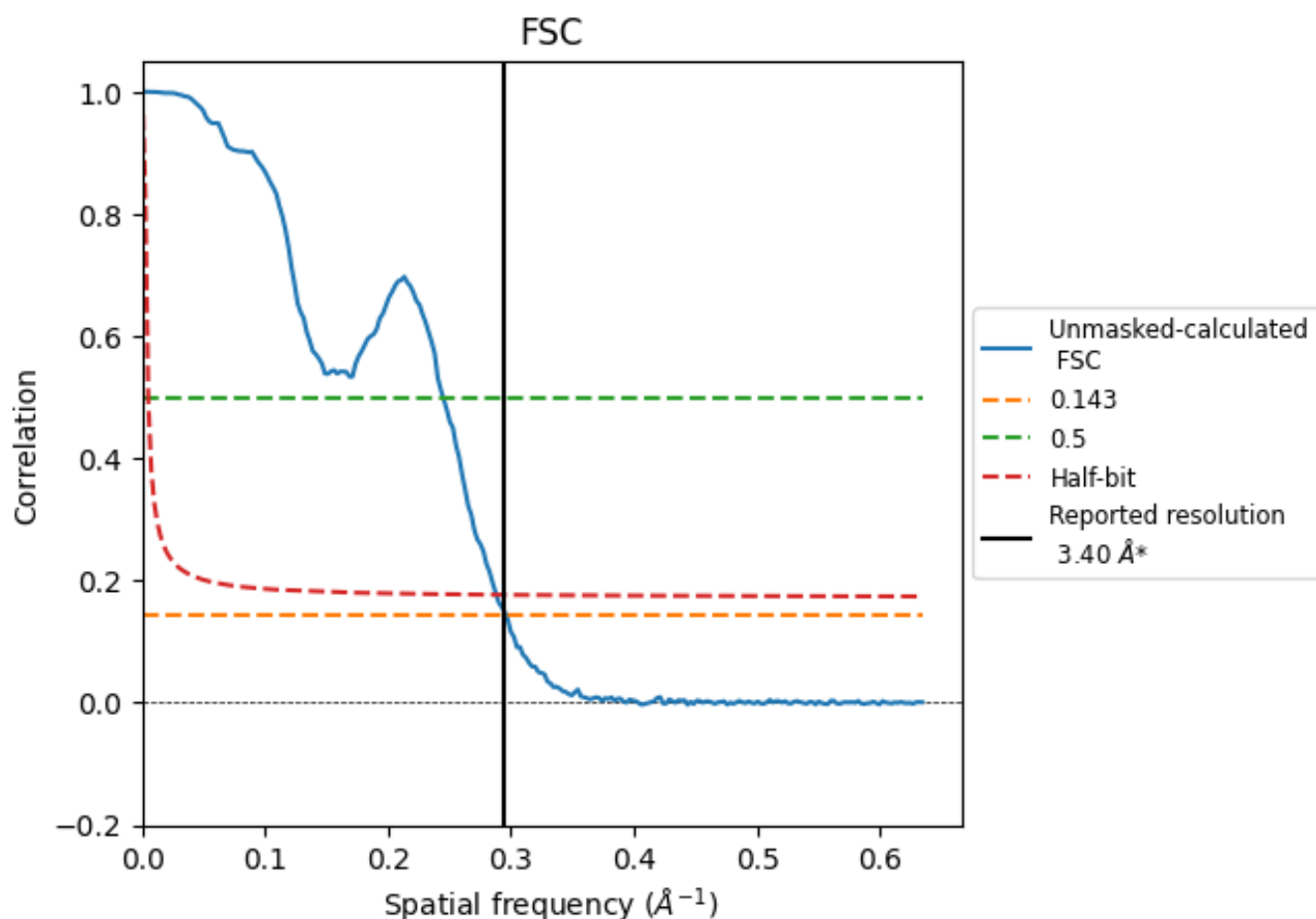
*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.38	4.09	3.47

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

9　Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-43784 and PDB model 9ARJ. Per-residue inclusion information can be found in section 3 on page 4.

## 9.1　Map-model overlay ⓘ

X　　　　　　　　　　Y　　　　　　　　　　Z
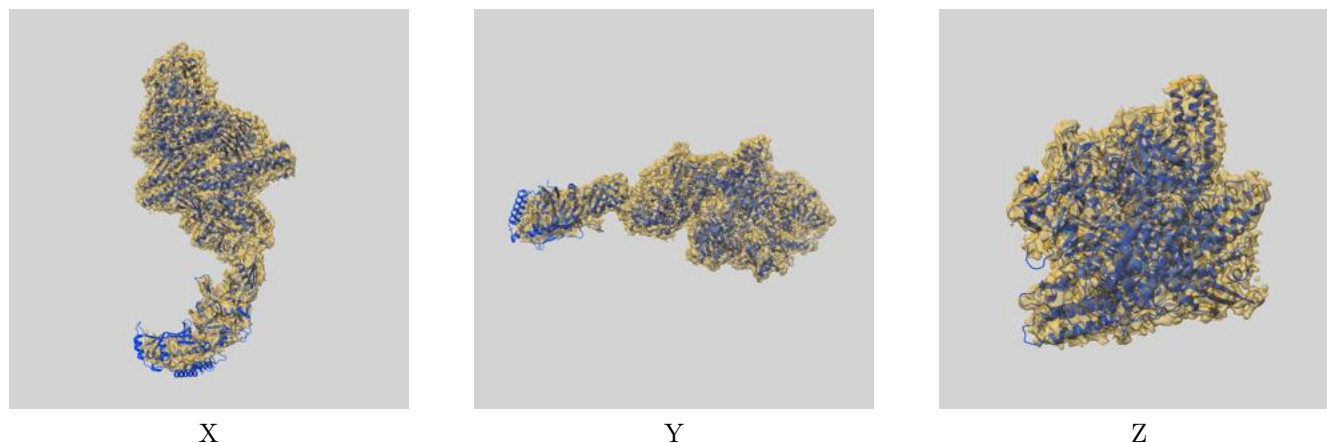
The images above show the 3D surface view of the map at the recommended contour level 0.05 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

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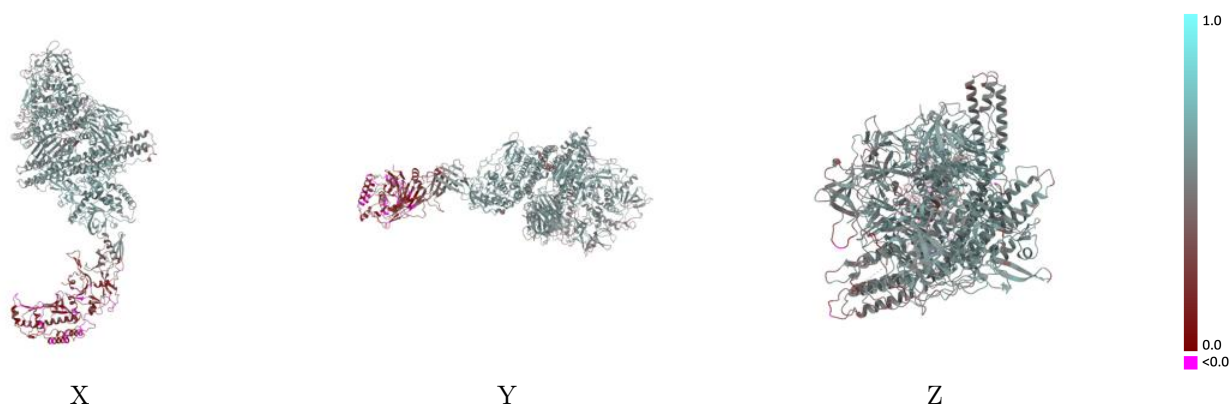
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model ⓘ

X   Y   Z
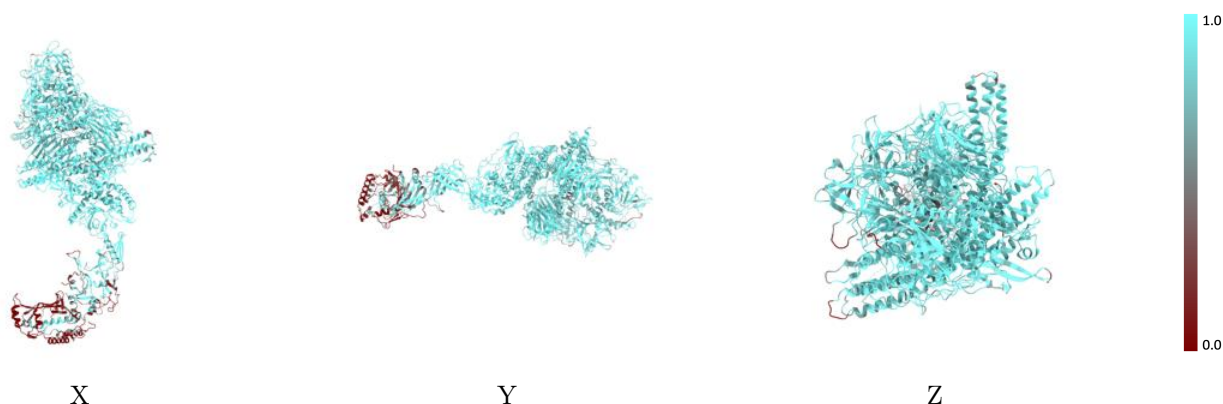
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.05).

9.4　Atom inclusion　ⓘ
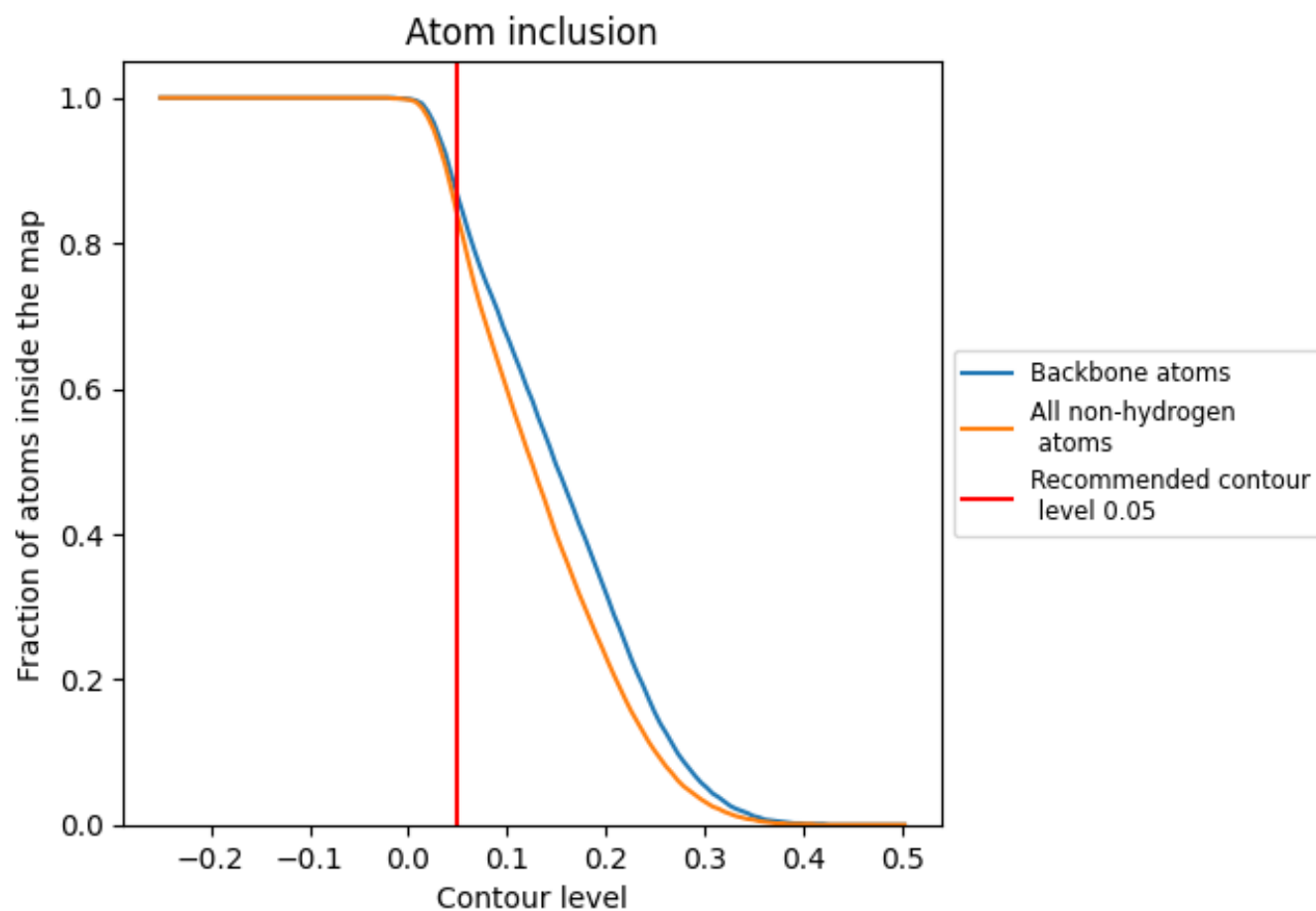
At the recommended contour level, 86% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

9.5　Map-model fit summary　ⓘ

The table lists the average atom inclusion at the recommended contour level (0.05) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8370	0.4770
A	0.9080	0.5300
B	0.9390	0.5500
C	0.4690	0.2080

1.0

0.0
<0.0