



Full wwPDB EM Validation Report ⓘ

Nov 29, 2022 – 12:29 AM JST

PDB ID : 7VGQ
EMDB ID : EMD-31975
Title : Cryo-EM structure of Machupo virus polymerase L in complex with matrix protein Z
Authors : Zhang, X.; Ma, J.; Zhang, S.
Deposited on : 2021-09-18
Resolution : 4.00 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.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

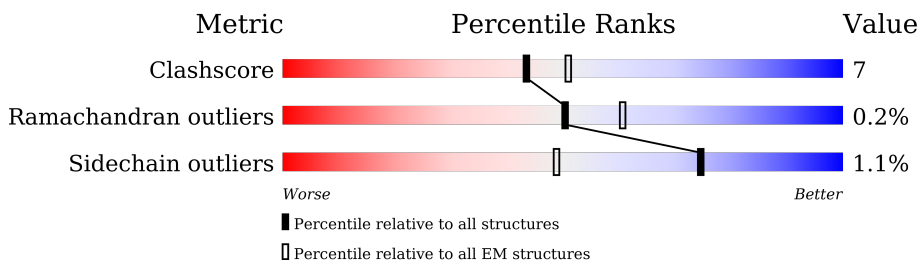
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.00 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	2238	
2	B	496	

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 13156 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 RNA-directed RNA polymerase L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1612	12749	8144	2129	2389	87	0	0

There are 29 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2210	TRP	-	expression tag	UNP Q6IUF8
A	2211	SER	-	expression tag	UNP Q6IUF8
A	2212	HIS	-	expression tag	UNP Q6IUF8
A	2213	PRO	-	expression tag	UNP Q6IUF8
A	2214	GLN	-	expression tag	UNP Q6IUF8
A	2215	PHE	-	expression tag	UNP Q6IUF8
A	2216	GLU	-	expression tag	UNP Q6IUF8
A	2217	LYS	-	expression tag	UNP Q6IUF8
A	2218	GLY	-	expression tag	UNP Q6IUF8
A	2219	GLY	-	expression tag	UNP Q6IUF8
A	2220	GLY	-	expression tag	UNP Q6IUF8
A	2221	SER	-	expression tag	UNP Q6IUF8
A	2222	GLY	-	expression tag	UNP Q6IUF8
A	2223	GLY	-	expression tag	UNP Q6IUF8
A	2224	GLY	-	expression tag	UNP Q6IUF8
A	2225	SER	-	expression tag	UNP Q6IUF8
A	2226	GLY	-	expression tag	UNP Q6IUF8
A	2227	GLY	-	expression tag	UNP Q6IUF8
A	2228	SER	-	expression tag	UNP Q6IUF8
A	2229	SER	-	expression tag	UNP Q6IUF8
A	2230	ALA	-	expression tag	UNP Q6IUF8
A	2231	TRP	-	expression tag	UNP Q6IUF8
A	2232	SER	-	expression tag	UNP Q6IUF8
A	2233	HIS	-	expression tag	UNP Q6IUF8
A	2234	PRO	-	expression tag	UNP Q6IUF8
A	2235	GLN	-	expression tag	UNP Q6IUF8
A	2236	PHE	-	expression tag	UNP Q6IUF8
A	2237	GLU	-	expression tag	UNP Q6IUF8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	2238	LYS	-	expression tag	UNP Q6IUF8

- Molecule 2 is a protein called Maltose/maltodextrin-binding periplasmic protein,RING finger protein Z.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	49	405	254	73	69	9	0	0

There are 37 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-401	MET	-	expression tag	UNP P0AEX9
B	-400	HIS	-	expression tag	UNP P0AEX9
B	-399	HIS	-	expression tag	UNP P0AEX9
B	-398	HIS	-	expression tag	UNP P0AEX9
B	-397	HIS	-	expression tag	UNP P0AEX9
B	-396	HIS	-	expression tag	UNP P0AEX9
B	-395	HIS	-	expression tag	UNP P0AEX9
B	-394	HIS	-	expression tag	UNP P0AEX9
B	-393	HIS	-	expression tag	UNP P0AEX9
B	-26	ASN	-	linker	UNP P0AEX9
B	-25	SER	-	linker	UNP P0AEX9
B	-24	SER	-	linker	UNP P0AEX9
B	-23	SER	-	linker	UNP P0AEX9
B	-22	ASN	-	linker	UNP P0AEX9
B	-21	ASN	-	linker	UNP P0AEX9
B	-20	ASN	-	linker	UNP P0AEX9
B	-19	ASN	-	linker	UNP P0AEX9
B	-18	ASN	-	linker	UNP P0AEX9
B	-17	ASN	-	linker	UNP P0AEX9
B	-16	ASN	-	linker	UNP P0AEX9
B	-15	ASN	-	linker	UNP P0AEX9
B	-14	ASN	-	linker	UNP P0AEX9
B	-13	ASN	-	linker	UNP P0AEX9
B	-12	LEU	-	linker	UNP P0AEX9
B	-11	GLY	-	linker	UNP P0AEX9
B	-10	ILE	-	linker	UNP P0AEX9
B	-9	GLU	-	linker	UNP P0AEX9
B	-8	LEU	-	linker	UNP P0AEX9
B	-7	GLU	-	linker	UNP P0AEX9
B	-6	VAL	-	linker	UNP P0AEX9

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-5	LEU	-	linker	UNP P0AEX9
B	-4	PHE	-	linker	UNP P0AEX9
B	-3	GLN	-	linker	UNP P0AEX9
B	-2	GLY	-	linker	UNP P0AEX9
B	-1	PRO	-	linker	UNP P0AEX9
B	0	GLY	-	linker	UNP P0AEX9
B	1	SER	-	linker	UNP P0AEX9

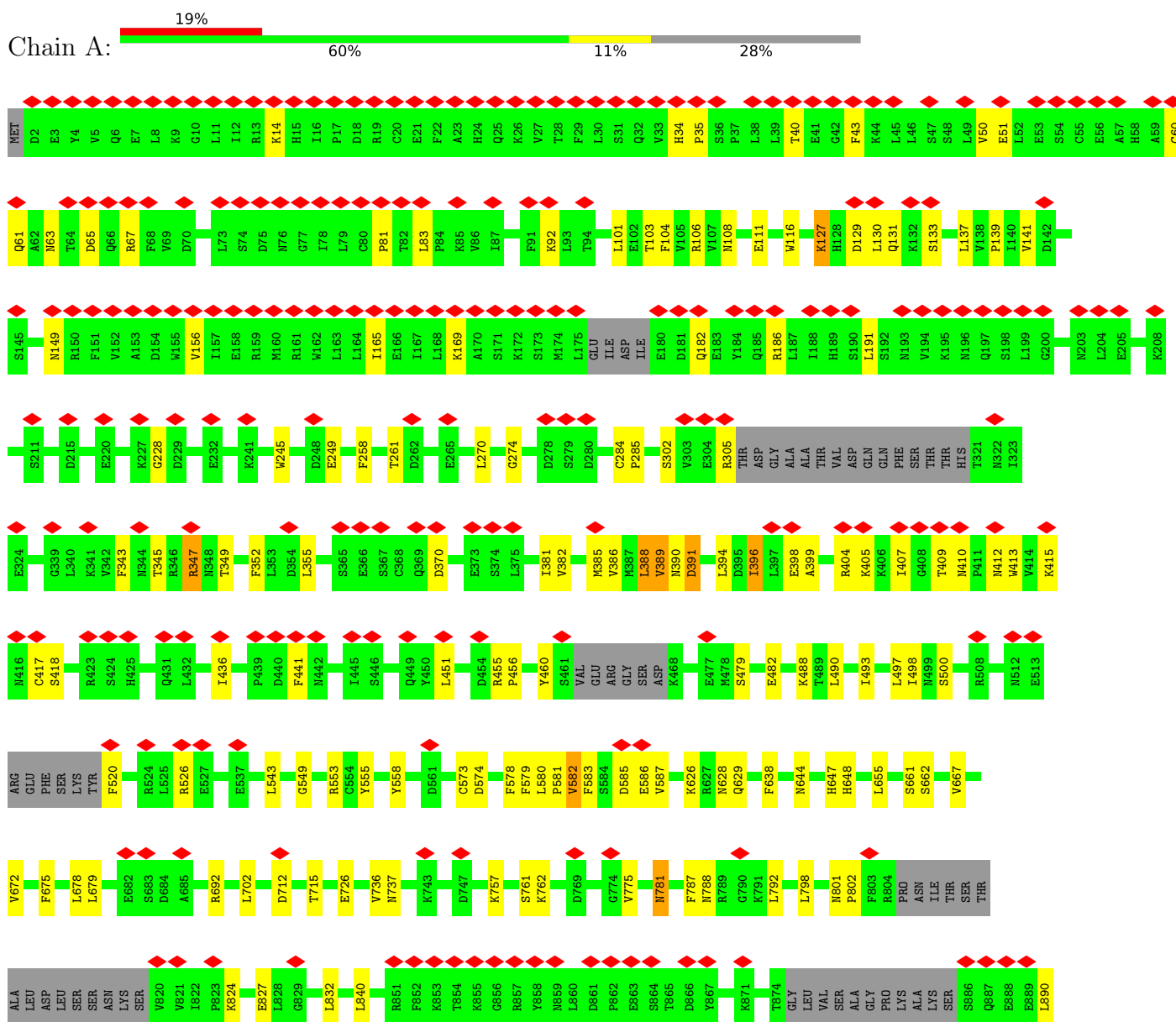
- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	AltConf
3	B	2	Total Zn 2 2	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: RNA-directed RNA polymerase L



S991	L892	M893	M894	E995	E903	I908	A917	M919	M922	SER	VAL	ASN	THR	ARG	ILE	LYS	ASN	GLY	ARG	ALA	ASP	ASN	VAL	S990	G953	V954	M955	K956	E957	I958	R959	A960	E961	V962	S963	L964	H965	E966	V967	K968										
D969	F970	D971	P972	P973	Y974	P976	S977	D978	Y979	Y980	K981	E982	L983	C984	Y987	E992	K993	C994	M995	F996	F997	L998	E999	E1000	V1001	L1002	D1003	V1004	C1005	L1009	L1010	L1011	K1012	M1013	T1016	E1022	E1023	Y1024	F1025	M1026	G1035	D1038	Q1039	LYS	LEU	GLY	TYR	HIS	LYS	
SER	ARG	SER	ARG	LEU	GLY	PHE	THR	GLU	THR	ARG	LEU	LYS	ASP	GLU	VAL	ARG	LEU	SER	ILE	A1078	D1079	K1080	L1081	L1082	K1083	S1084	Y1085	F1086	T1087	N1088	A1089	L1091	R1092	N1093	L1094	C1095	F1096	Y1097	S1098	E1099	D1100	S1101	N1111	N1114	Q1124					
V1125	R1129	V1145	E1146	L1147	F1148	S1149	E1150	A1151	V1152	M1176	A1177	G1181	D1182	L1183	D1188	H1189	W1192	Q1206	E1209	L1210	V1214	R1215	S1217	D1220	K1225	L1228	I1240	G1249	LYS	LEU	LYS	ARG	SER	LEU	GLY	MET	GLY	CYS	GLY	SER	THR	S1265	L1265							
S1286	E1287	Q1272	T1273	M1274	Q1275	L1276	S1277	Q1278	Q1279	V1287	L1288	D1289	M1290	G1291	Q1292	L1295	H1296	M1297	T1306	D1319	V1320	S1327	D1330	Q1331	I1332	T1333	P1338	S1339	LEU	ASP	ILE	GLU	GLY	SER	ASP	A1348	W1351	L1365	M1366	K1367	V1374	M1389	L1404	H1405						
E1417	V1431	S1432	R1438	I1439	S1440	V1443	Q1463	D1464	D1467	R1479	A1483	D1487	D1488	K1489	R1495	N1496	C1497	A1498	R1499	K1500	M1503	R1507	G1508	R1509	I1510	F1511	E1512	E1513	N1514	I1515	I1516	M1517	G1520	R1521	G1522	G1523	D1524	C1529	F1530	L1531	Q1532	G1535	C1536	S1537	E1538					
Q1539	E1540	V1541	N1542	R1543	R1548	M1551	L1552	S1553	F1555	G1556	D1557	L1558	R1559	L1560	V1561	LEU	ARG	THR	LYS	MET	THR	ARG	ARG	VAL	LEU	GLU	ARG	GLU	V1578	P1579	T1580	L1581	I1582	K1583	T1584	S1587	K1588	L1589	S1590	R1591	ASN	PHE	THR	LYS	VAL	LYS	ILE	ALA	GLU	
SER	ILE	ASN	LYS	SER	ALA	PHE	GLM	S1612	A1615	K1628	R1631	D1632	G1633	K1634	G1635	F1637	L1638	E1642	N1648	V1649	C1650	I1651	E1653	D1667	L1668	N1669	S1672	S1675	K1676	P1677	I1678	L1679	L1683	G1684	V1701	K1702	Q1705	LYS	PRO	LEU	VAL	L1710	M1711	W1717						
K1722	V1723	V1724	R1725	R1726	I1727	E1728	D1729	Q1730	L1731	G1732	M1733	H1735	V1736	L1737	R1741	R1742	M1743	Y1744	P1745	V1746	L1747	F1748	D1749	E1750	HIS	LEU	ALA	PRO	PHE	MET	ASN	GLN	VAL	VAL	V1770	D1774	A1778	M1781	E1784	I1789	S1790	H1791								
K1794	T1795	R1796	D1797	Q1805	A1811	H1812	I1813	R1814	Q1815	S1816	SER	THR	THR	ASP	TRP	GLU	LEU	GLY	PRO	GLN	ARG	ILE	ALA	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL			
VAL	LEU	GLU	LEU	GLU	GLY	ASP	ASP	SER	GLN	ILE	ASP	GLU	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	
GLN	LEU	PRO	PRO	LYS	VAL	GLU	VAL	VAL	VAL	VAL	PHE	THR	LYS	LYS	ALA	GLU	LEU	ASN	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	
GLN	ASN	LYS	GLY	VAL	ILE	LEU	LYS	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	
ASN	PHE	LEU	MET	LYS	ASN	VAL	THR	VAL	THR	LEU	PRO	PRO	GLN	ARG	ILE	ALA	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL
LEU	VAL	VAL	LYS	ALA	LEU	GLY	ALA	GLY	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	492364	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	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	0.541	Depositor
Minimum map value	-0.375	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.017	Depositor
Recommended contour level	0.067	Depositor
Map size (Å)	192.0, 192.0, 192.0	wwPDB
Map dimensions	120, 120, 120	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.6, 1.6, 1.6	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:
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	0.46	0/12967	0.69	5/17487 (0.0%)
2	B	0.43	0/417	0.58	0/566
All	All	0.46	0/13384	0.69	5/18053 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	396	ILE	N-CA-C	8.23	133.23	111.00
1	A	451	LEU	CA-CB-CG	6.45	130.14	115.30
1	A	1693	LEU	CA-CB-CG	5.21	127.27	115.30
1	A	1319	ASP	CB-CG-OD1	5.09	122.88	118.30
1	A	1558	LEU	CA-CB-CG	5.01	126.83	115.30

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	12749	0	12784	179	0
2	B	405	0	378	6	0
3	B	2	0	0	0	0
All	All	13156	0	13162	184	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 (184) 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:975:LEU:HD12	1:A:976:PRO:CD	1.69	1.23
1:A:394:LEU:CD1	1:A:399:ALA:HB2	1.67	1.23
1:A:975:LEU:HD12	1:A:976:PRO:HD2	1.24	1.13
1:A:389:VAL:HG12	1:A:390:ASN:H	1.07	1.12
1:A:975:LEU:CD1	1:A:976:PRO:HD2	1.83	1.08
1:A:969:ASP:OD2	1:A:976:PRO:HD3	1.50	1.07
1:A:394:LEU:HD13	1:A:399:ALA:HB2	1.37	1.01
1:A:975:LEU:HD12	1:A:976:PRO:N	1.76	0.99
1:A:389:VAL:HG12	1:A:390:ASN:N	1.71	0.95
1:A:394:LEU:CD1	1:A:399:ALA:CB	2.47	0.93
1:A:580:LEU:O	1:A:580:LEU:HD13	1.78	0.82
1:A:394:LEU:HD11	1:A:399:ALA:HB2	1.60	0.81
1:A:969:ASP:OD2	1:A:976:PRO:CD	2.32	0.75
1:A:389:VAL:CG1	1:A:390:ASN:N	2.47	0.74
1:A:382:VAL:H	1:A:385:MET:HE3	1.51	0.73
1:A:479:SER:N	1:A:482:GLU:OE2	2.21	0.73
1:A:958:ILE:O	1:A:960:ALA:N	2.22	0.73
1:A:1711:ASN:HD22	1:A:1805:GLN:HG2	1.56	0.71
1:A:892:LEU:HD21	1:A:1559:ARG:HH22	1.56	0.69
1:A:394:LEU:HD11	1:A:399:ALA:CB	2.18	0.68
1:A:390:ASN:O	1:A:391:ASP:CG	2.33	0.67
1:A:958:ILE:CG2	1:A:963:SER:OG	2.45	0.64
1:A:788:ASN:ND2	1:A:1209:GLU:OE1	2.29	0.64
1:A:954:VAL:HG13	1:A:957:GLU:HA	1.80	0.64
1:A:398:GLU:OE1	1:A:398:GLU:HA	1.98	0.64
1:A:628:ASN:HD22	1:A:667:VAL:HG11	1.63	0.63
2:B:36:ARG:NH2	2:B:38:ASN:OD1	2.32	0.63
2:B:41:CYS:SG	2:B:42:CYS:N	2.73	0.62
1:A:405:LYS:O	1:A:409:THR:HG23	2.00	0.62
1:A:106:ARG:NH1	1:A:111:GLU:O	2.33	0.62
1:A:1389:MET:SD	2:B:36:ARG:NH1	2.70	0.61
2:B:72:CYS:SG	2:B:73:HIS:N	2.74	0.61
1:A:775:VAL:HG23	1:A:1365:LEU:HA	1.83	0.60
1:A:553:ARG:NH1	1:A:555:TYR:OH	2.32	0.60
1:A:580:LEU:HD13	1:A:580:LEU:C	2.22	0.60
1:A:1678:ILE:HG13	1:A:1679:LEU:HD22	1.84	0.60
1:A:228:GLY:H	1:A:781:ASN:HD21	1.50	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:975:LEU:HD13	1:A:976:PRO:HD2	1.76	0.59
1:A:954:VAL:HG12	1:A:954:VAL:O	2.03	0.59
1:A:962:VAL:HG23	1:A:980:TYR:OH	2.02	0.59
1:A:840:LEU:HD11	1:A:908:ILE:HD13	1.84	0.58
1:A:1556:GLY:HA3	1:A:1631:ARG:HD2	1.84	0.58
1:A:1559:ARG:HB2	1:A:1631:ARG:HH11	1.68	0.58
2:B:52:CYS:SG	2:B:53:ASN:N	2.74	0.58
1:A:955:MET:CE	1:A:987:VAL:HG22	2.34	0.57
1:A:1440:SER:HA	1:A:1443:VAL:HG12	1.87	0.57
1:A:40:THR:HG21	1:A:1084:SER:HB3	1.87	0.56
1:A:14:LYS:HD2	1:A:156:VAL:HG11	1.88	0.56
1:A:971:ASP:N	1:A:971:ASP:OD1	2.38	0.56
1:A:890:LEU:O	1:A:894:TYR:N	2.39	0.56
1:A:678:LEU:O	1:A:692:ARG:NH1	2.39	0.55
1:A:343:PHE:HB2	1:A:349:THR:HB	1.89	0.55
1:A:1554:SER:OG	1:A:1555:PHE:N	2.40	0.55
1:A:587:VAL:HG11	1:A:1404:LEU:HD21	1.89	0.55
1:A:81:PRO:HB3	1:A:133:SER:HB2	1.88	0.54
1:A:1087:THR:H	1:A:1090:ALA:HB3	1.72	0.54
1:A:404:ARG:HH21	1:A:441:PHE:HB3	1.72	0.54
1:A:726:GLU:OE2	1:A:1265:LEU:HB3	2.08	0.54
1:A:966:GLU:O	1:A:970:PHE:N	2.41	0.54
1:A:586:GLU:HB2	1:A:1438:ARG:HD3	1.91	0.53
1:A:1320:VAL:HG12	1:A:1338:PRO:HD3	1.91	0.53
1:A:579:PHE:HB2	1:A:1615:ALA:HB2	1.90	0.52
1:A:1129:ARG:NH2	1:A:1292:GLN:OE1	2.42	0.52
1:A:413:TRP:O	1:A:417:CYS:SG	2.68	0.52
1:A:998:LEU:HD23	1:A:1012:LYS:HZ2	1.75	0.52
1:A:580:LEU:HD23	1:A:1405:HIS:CE1	2.45	0.51
1:A:381:ILE:HG22	1:A:386:VAL:HA	1.93	0.51
1:A:798:LEU:HD13	1:A:1210:LEU:HB3	1.92	0.51
1:A:626:LYS:O	1:A:629:GLN:HB3	2.10	0.51
1:A:984:CYS:HA	1:A:987:VAL:HG12	1.91	0.51
1:A:81:PRO:HG2	1:A:83:LEU:HG	1.93	0.50
1:A:1183:LEU:HD13	1:A:1351:TRP:HE1	1.75	0.50
1:A:1192:TRP:HZ3	1:A:1367:LYS:HG2	1.76	0.50
1:A:51:GLU:HA	1:A:103:THR:HG21	1.93	0.50
1:A:83:LEU:HD23	1:A:129:ASP:OD2	2.11	0.50
1:A:261:THR:HA	1:A:647:HIS:CE1	2.47	0.49
1:A:1464:ASP:OD1	1:A:1464:ASP:N	2.46	0.49
1:A:1536:CYS:SG	1:A:1537:SER:N	2.82	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:345:THR:HG23	1:A:347:ARG:H	1.78	0.49
1:A:958:ILE:HG22	1:A:963:SER:OG	2.11	0.49
1:A:1330:ASP:OD1	1:A:1331:GLN:N	2.45	0.49
1:A:580:LEU:HD23	1:A:1405:HIS:NE2	2.27	0.49
1:A:1431:VAL:HG23	1:A:1432:SER:H	1.78	0.49
1:A:245:TRP:O	1:A:249:GLU:HB3	2.13	0.48
1:A:1287:VAL:HB	1:A:1288:LEU:HD23	1.95	0.48
1:A:1094:LEU:HB2	1:A:1097:TYR:HB2	1.95	0.48
1:A:1548:ARG:HB3	1:A:1675:SER:HB2	1.94	0.48
1:A:573:CYS:SG	1:A:574:ASP:N	2.79	0.48
1:A:137:LEU:HG	1:A:139:PRO:HD3	1.95	0.48
1:A:955:MET:HE3	1:A:987:VAL:HG22	1.95	0.48
1:A:1467:ASP:N	1:A:1467:ASP:OD1	2.47	0.48
1:A:352:PHE:HA	1:A:413:TRP:HH2	1.79	0.48
1:A:460:TYR:HD2	1:A:520:PHE:HB2	1.79	0.48
1:A:407:ILE:O	1:A:410:ASN:O	2.31	0.48
1:A:245:TRP:O	1:A:249:GLU:CB	2.62	0.47
1:A:580:LEU:N	1:A:581:PRO:CD	2.76	0.47
1:A:958:ILE:HG21	1:A:963:SER:OG	2.13	0.47
1:A:388:LEU:HD12	1:A:388:LEU:O	2.14	0.47
1:A:998:LEU:H	1:A:1016:THR:HG21	1.79	0.47
1:A:1306:THR:OG1	1:A:1367:LYS:NZ	2.35	0.47
1:A:50:VAL:HA	1:A:149:ASN:HD21	1.79	0.47
1:A:1177:ALA:HB1	1:A:1182:ASP:OD2	2.15	0.47
1:A:644:ASN:HD22	1:A:1374:VAL:HG12	1.79	0.47
1:A:1717:TRP:NE1	1:A:1805:GLN:OE1	2.48	0.46
1:A:456:PRO:HB3	1:A:558:TYR:HE2	1.80	0.46
1:A:798:LEU:HD11	1:A:1152:VAL:HG22	1.96	0.46
1:A:1091:LEU:HD13	1:A:1099:GLU:OE2	2.15	0.46
1:A:455:ARG:HH12	1:A:526:ARG:HG2	1.81	0.46
1:A:917:ALA:HB1	1:A:1011:LEU:HG	1.98	0.46
1:A:638:PHE:HB2	1:A:655:LEU:HD21	1.97	0.46
1:A:824:LYS:HD3	1:A:827:GLU:OE2	2.16	0.46
1:A:182:GLN:OE1	1:A:186:ARG:NH1	2.49	0.46
1:A:972:PRO:HD3	1:A:1038:ASP:OD1	2.16	0.46
1:A:104:PHE:HA	1:A:1095:CYS:HB2	1.98	0.46
1:A:1206:GLN:HA	1:A:1225:LYS:HZ3	1.80	0.46
1:A:958:ILE:O	1:A:959:ARG:C	2.55	0.45
1:A:60:CYS:SG	1:A:61:GLN:N	2.90	0.45
1:A:497:LEU:O	1:A:500:SER:OG	2.27	0.45
1:A:418:SER:HB2	1:A:436:ILE:HG22	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:LYS:O	1:A:131:GLN:N	2.47	0.45
1:A:498:ILE:HD13	1:A:498:ILE:HA	1.79	0.45
1:A:1327:SER:O	1:A:1327:SER:OG	2.31	0.45
1:A:579:PHE:O	1:A:579:PHE:CD2	2.70	0.45
1:A:355:LEU:HD13	1:A:413:TRP:HZ3	1.81	0.45
1:A:1290:MET:HG3	1:A:1295:LEU:HB2	1.99	0.45
2:B:69:SER:OG	2:B:70:GLU:N	2.49	0.44
1:A:629:GLN:HE21	1:A:1125:VAL:HG13	1.81	0.44
1:A:116:TRP:CD1	1:A:141:VAL:HG21	2.52	0.44
1:A:1628:LYS:HE3	1:A:1638:LEU:HA	1.99	0.44
1:A:761:SER:OG	1:A:762:LYS:N	2.45	0.44
1:A:971:ASP:HA	1:A:972:PRO:HD3	1.77	0.44
1:A:1701:VAL:HG22	1:A:1814:ARG:HD2	2.00	0.44
1:A:65:ASP:OD2	1:A:67:ARG:HD3	2.17	0.44
1:A:1551:ASN:OD1	1:A:1552:LEU:N	2.51	0.44
1:A:396:ILE:O	1:A:396:ILE:CG2	2.65	0.43
1:A:412:ASN:HB3	1:A:415:LYS:HD3	1.99	0.43
1:A:736:VAL:HG12	1:A:737:ASN:H	1.83	0.43
1:A:108:ASN:OD1	1:A:108:ASN:N	2.50	0.43
1:A:83:LEU:HD11	1:A:130:LEU:HD13	1.99	0.43
1:A:827:GLU:HB3	1:A:1240:ILE:HG22	2.01	0.43
1:A:60:CYS:HB2	1:A:101:LEU:HD21	2.00	0.43
1:A:712:ASP:HB3	1:A:715:THR:HG22	1.99	0.42
1:A:1650:CYS:HB2	1:A:1667:SER:HB3	1.99	0.42
1:A:1725:ARG:HG2	1:A:1727:ILE:HG12	2.01	0.42
1:A:165:ILE:O	1:A:169:LYS:NZ	2.45	0.42
1:A:661:SER:OG	1:A:662:SER:N	2.51	0.42
1:A:43:PHE:HZ	1:A:191:LEU:HD21	1.83	0.42
1:A:274:GLY:HA3	1:A:672:VAL:HG21	2.01	0.42
1:A:787:PHE:HD1	1:A:792:LEU:HD12	1.83	0.42
1:A:1124:GLN:HG2	1:A:1125:VAL:H	1.84	0.42
1:A:1333:THR:OG1	1:A:1333:THR:O	2.38	0.42
1:A:582:VAL:CG1	1:A:583:PHE:N	2.82	0.42
1:A:1668:LEU:O	1:A:1672:SER:OG	2.28	0.42
1:A:580:LEU:C	1:A:580:LEU:CD1	2.88	0.42
1:A:34:HIS:HD2	1:A:35:PRO:HD2	1.84	0.42
1:A:488:LYS:HG2	1:A:585:ASP:OD2	2.19	0.42
1:A:675:PHE:HB3	1:A:679:LEU:HD12	2.02	0.42
1:A:1098:SER:HG	1:A:1101:SER:HG	1.58	0.42
1:A:573:CYS:HG	1:A:578:PHE:HE2	1.68	0.41
1:A:490:LEU:HA	1:A:493:ILE:HG22	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:580:LEU:HB3	1:A:581:PRO:HD3	2.00	0.41
1:A:1479:ARG:HH12	1:A:1812:HIS:CD2	2.37	0.41
1:A:1530:PHE:HD1	1:A:1530:PHE:HA	1.77	0.41
1:A:1676:LYS:HE2	1:A:1676:LYS:HB2	1.92	0.41
1:A:1679:LEU:HD13	1:A:1679:LEU:HA	1.90	0.41
1:A:388:LEU:HD12	1:A:388:LEU:C	2.41	0.41
1:A:582:VAL:HG13	1:A:583:PHE:CD2	2.56	0.41
1:A:302:SER:O	1:A:305:ARG:NE	2.43	0.41
1:A:801:ASN:HA	1:A:802:PRO:HD3	1.90	0.41
1:A:958:ILE:C	1:A:960:ALA:N	2.73	0.41
1:A:1479:ARG:HH22	1:A:1812:HIS:CE1	2.38	0.41
1:A:60:CYS:HA	1:A:92:LYS:HB2	2.03	0.41
1:A:258:PHE:HE1	1:A:648:HIS:HD2	1.68	0.41
1:A:258:PHE:HE1	1:A:648:HIS:CD2	2.39	0.41
1:A:284:CYS:HA	1:A:285:PRO:HD3	1.84	0.41
1:A:488:LYS:HD2	1:A:488:LYS:HA	1.85	0.41
1:A:549:GLY:N	1:A:553:ARG:HH21	2.19	0.41
1:A:1149:SER:OG	1:A:1297:ASN:O	2.34	0.41
1:A:1188:ASP:OD1	1:A:1189:HIS:N	2.49	0.41
1:A:579:PHE:O	1:A:579:PHE:CG	2.74	0.41
1:A:582:VAL:HG13	1:A:583:PHE:HD2	1.86	0.40
1:A:832:LEU:HD23	1:A:832:LEU:HA	1.92	0.40
1:A:270:LEU:HG	1:A:672:VAL:HG13	2.03	0.40
1:A:1145:VAL:HG11	1:A:1228:LEU:HD21	2.03	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	1582/2238 (71%)	1364 (86%)	215 (14%)	3 (0%)	47 79

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	47/496 (10%)	36 (77%)	11 (23%)	0	100	100
All	All	1629/2734 (60%)	1400 (86%)	226 (14%)	3 (0%)	50	79

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	391	ASP
1	A	959	ARG
1	A	389	VAL

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	1441/2026 (71%)	1425 (99%)	16 (1%)	73	85
2	B	47/412 (11%)	47 (100%)	0	100	100
All	All	1488/2438 (61%)	1472 (99%)	16 (1%)	74	85

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	63	ASN
1	A	127	LYS
1	A	347	ARG
1	A	370	ASP
1	A	388	LEU
1	A	543	LEU
1	A	582	VAL
1	A	702	LEU
1	A	757	LYS
1	A	781	ASN
1	A	971	ASP
1	A	974	VAL
1	A	1026	MET

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Mol	Chain	Res	Type
1	A	1111	ASN
1	A	1114	ASN
1	A	1288	LEU

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	34	HIS
1	A	63	ASN
1	A	146	ASN
1	A	148	ASN
1	A	369	GLN
1	A	390	ASN
1	A	412	ASN
1	A	522	ASN
1	A	644	ASN
1	A	781	ASN
1	A	1034	GLN
1	A	1111	ASN
1	A	1114	ASN
1	A	1206	GLN
1	A	1297	ASN
1	A	1308	GLN
1	A	1586	GLN
1	A	1689	ASN
1	A	1785	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 monosaccharides in this entry.

5.6 Ligand geometry

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.

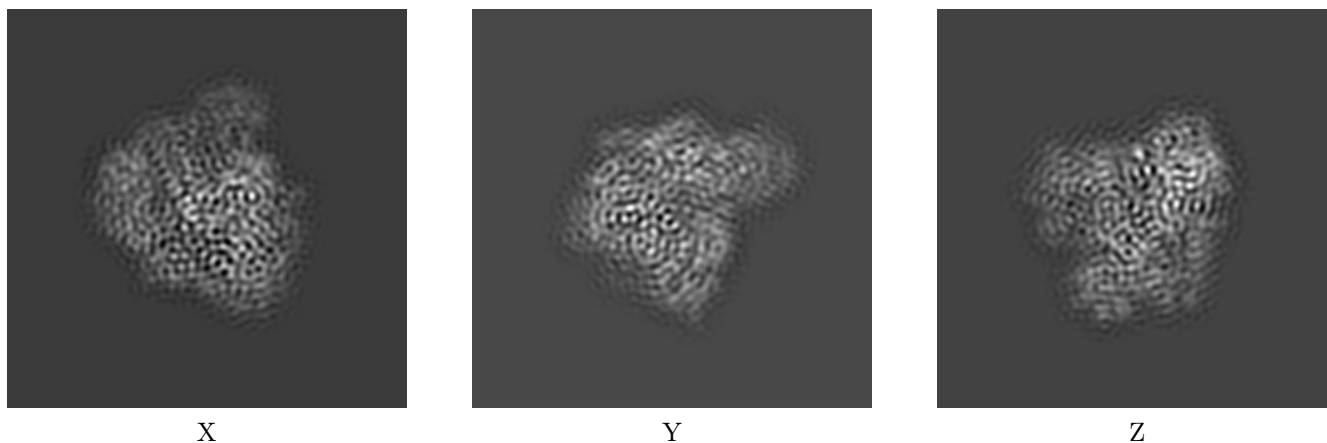
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-31975. 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](#)

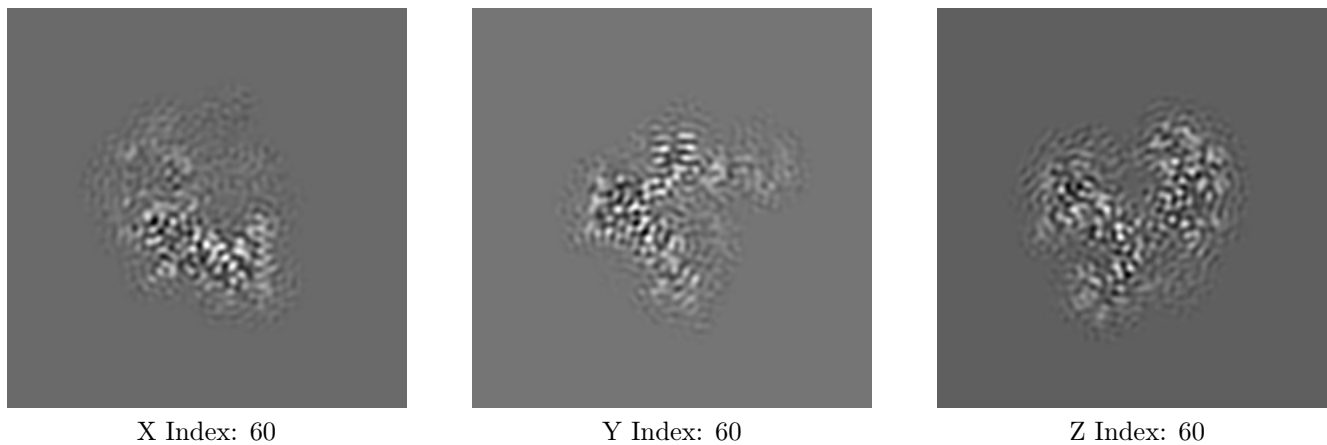
6.1.1 Primary map



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

6.2 Central slices [i](#)

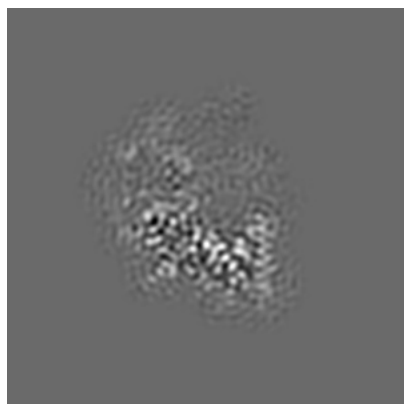
6.2.1 Primary map



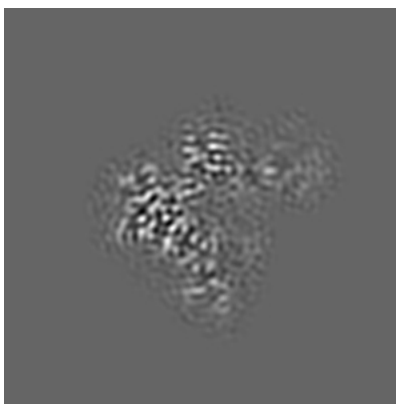
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 60



Y Index: 61

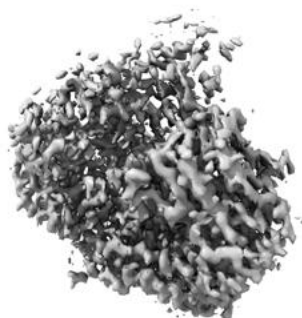


Z Index: 56

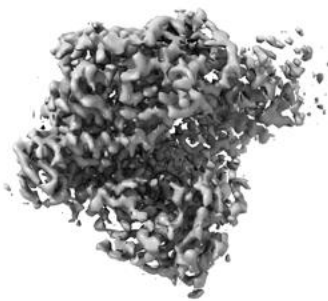
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.067. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

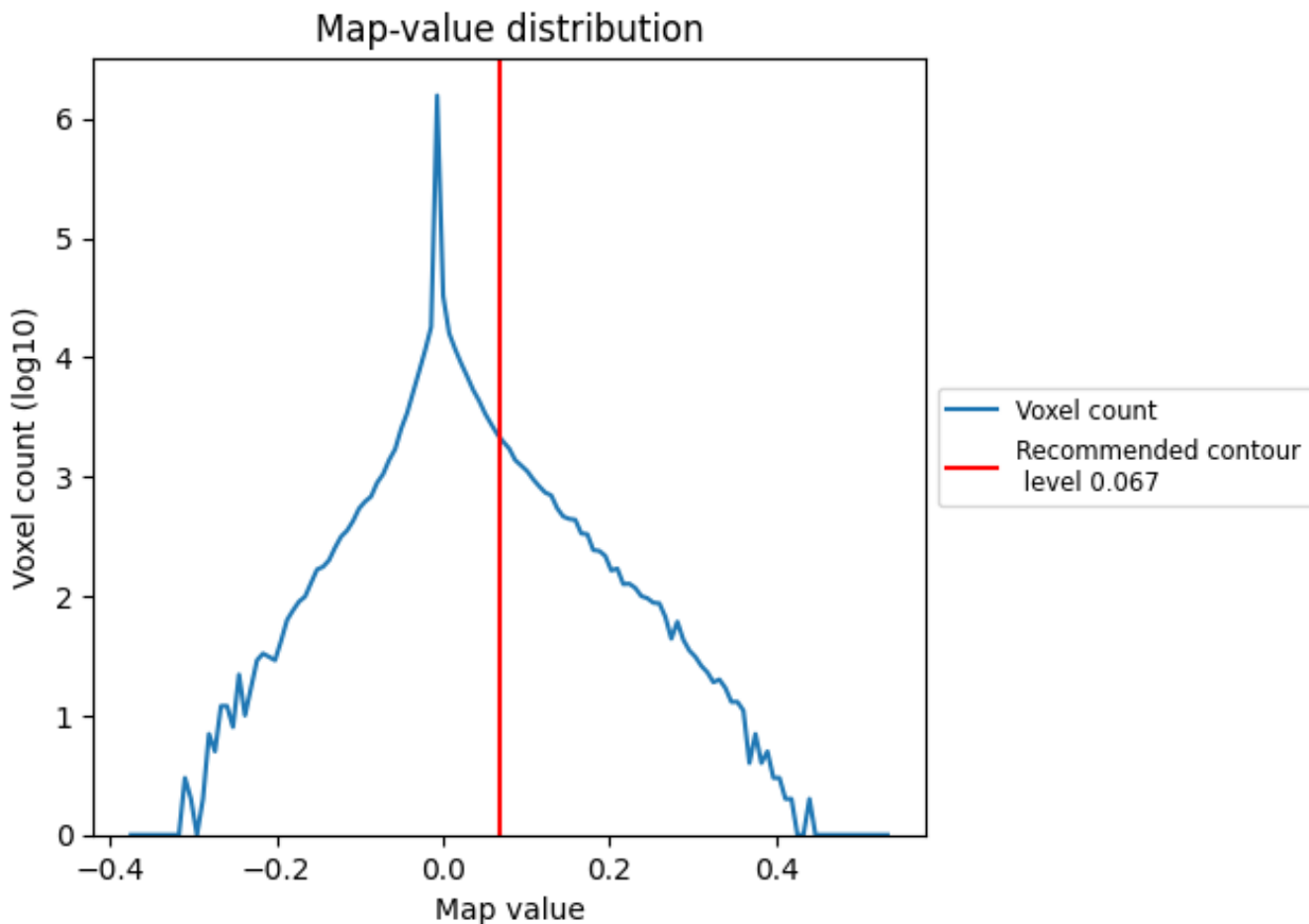
6.5 Mask visualisation

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

7 Map analysis [i](#)

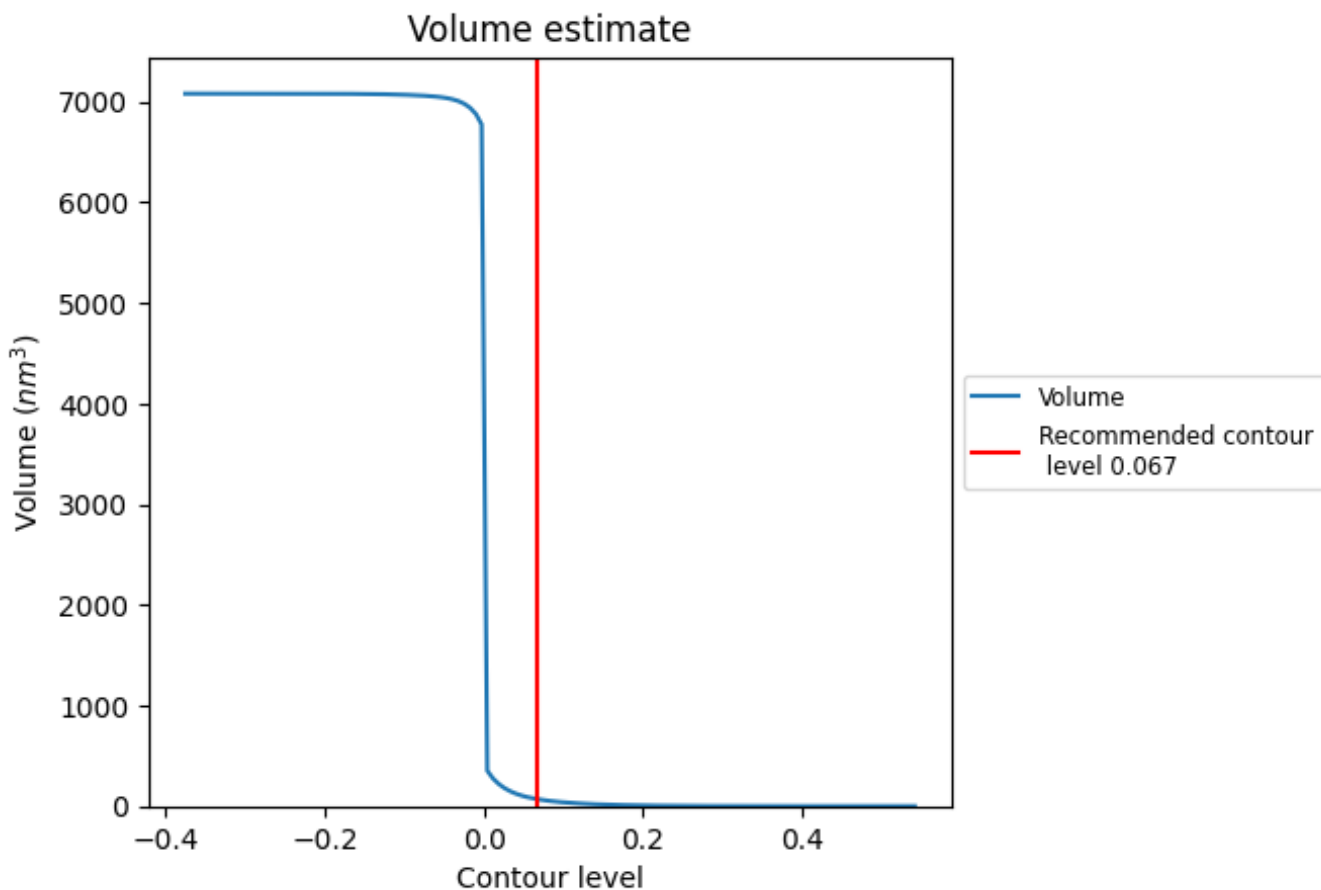
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

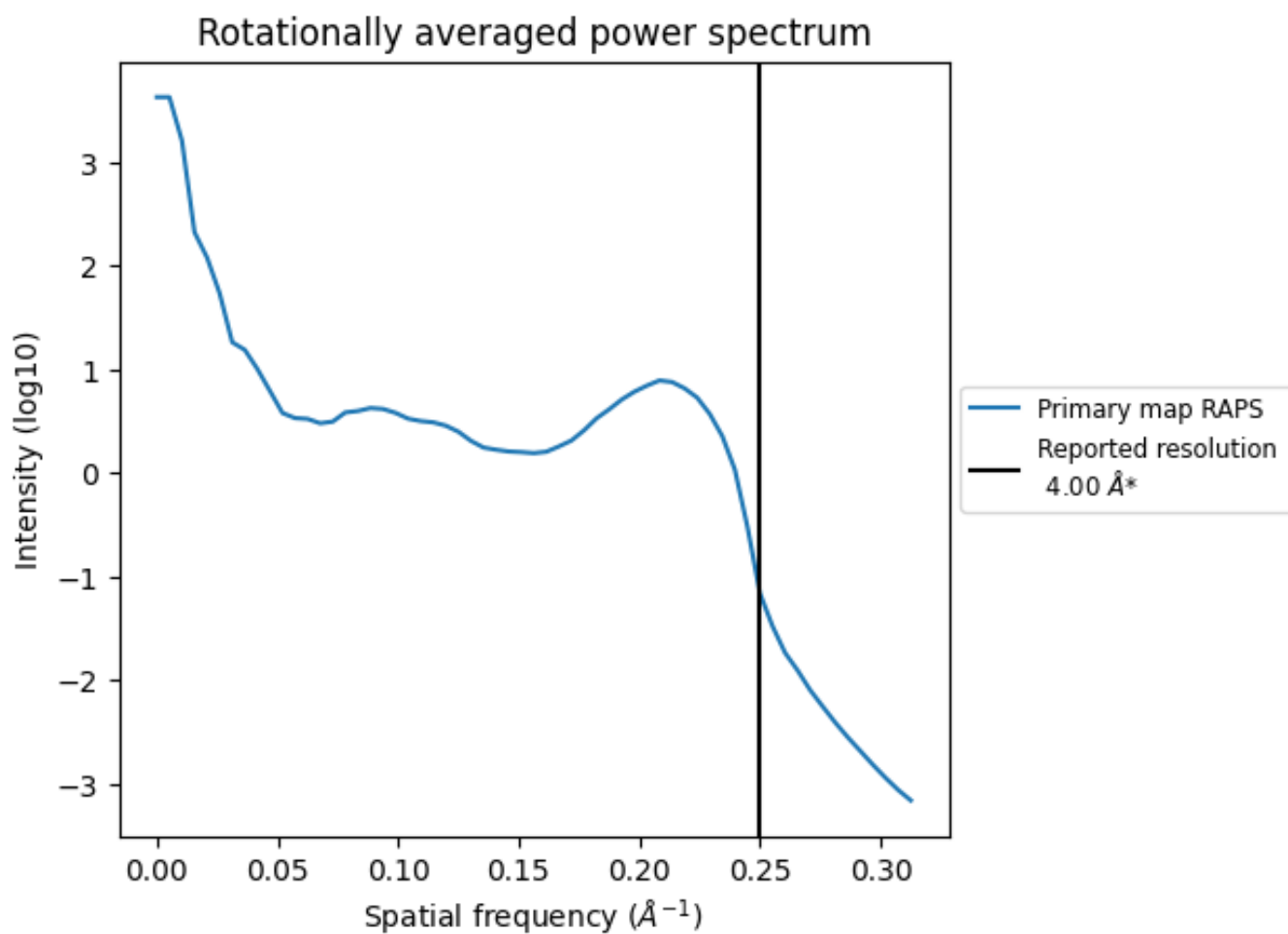
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 70 nm³; this corresponds to an approximate mass of 63 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 0.250 Å⁻¹

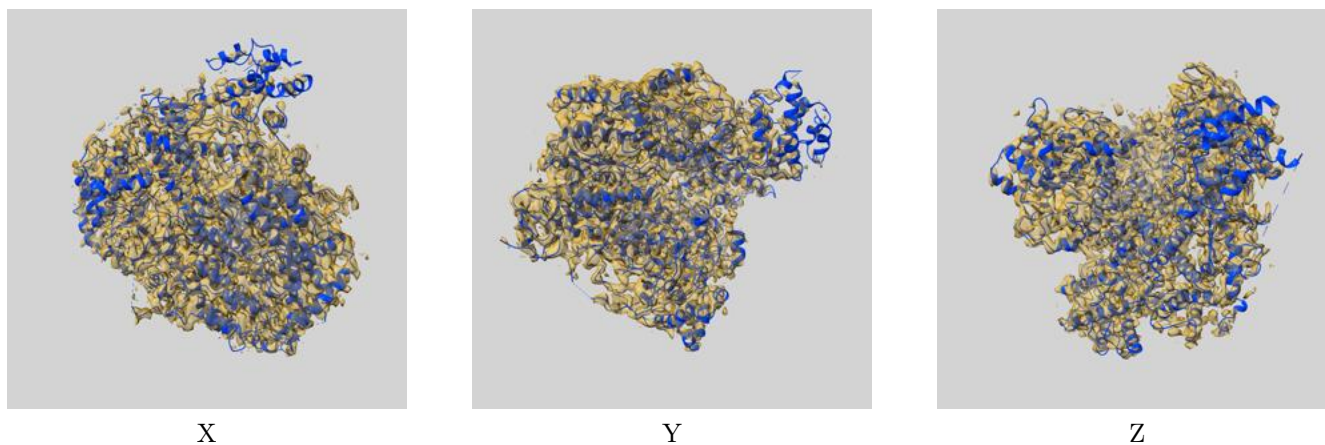
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

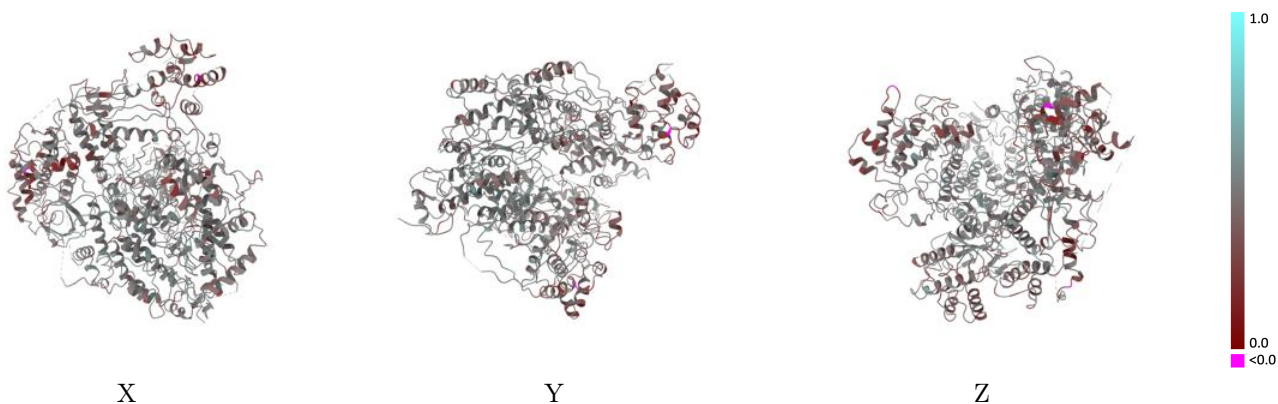
This section contains information regarding the fit between EMDB map EMD-31975 and PDB model 7VGQ. Per-residue inclusion information can be found in section [3](#) on page [6](#).

9.1 Map-model overlay [i](#)



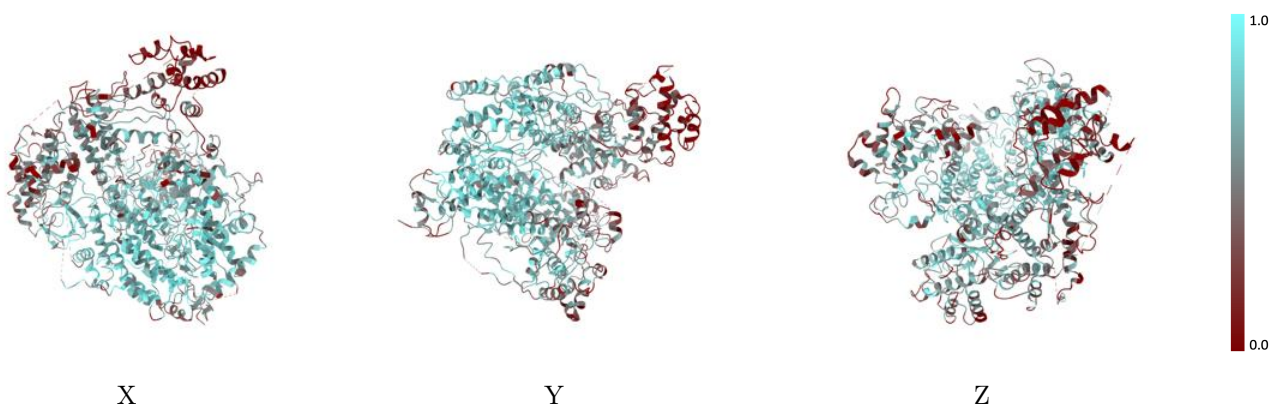
The images above show the 3D surface view of the map at the recommended contour level 0.067 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



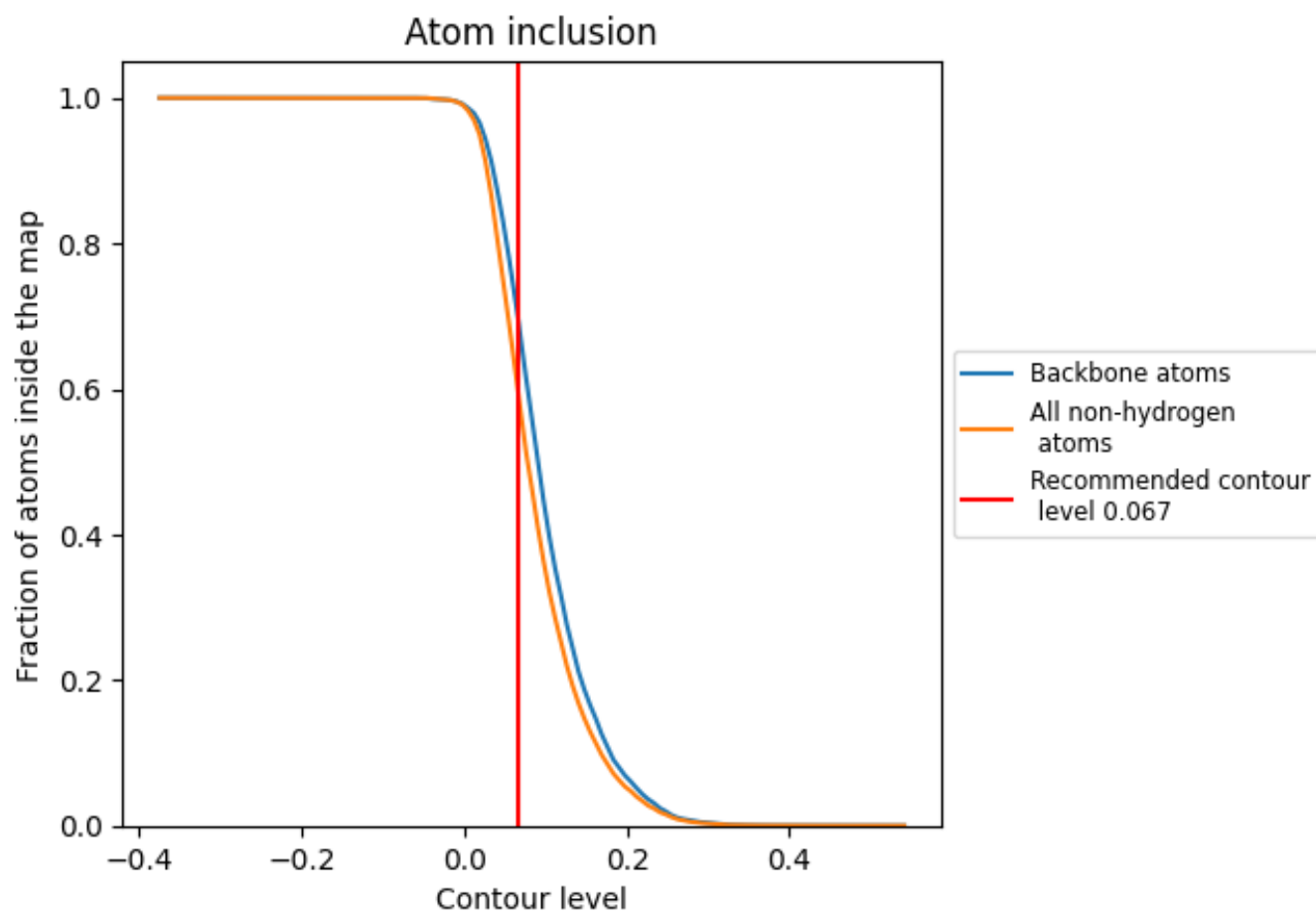
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.067).







9.4 Atom inclusion [i](#)



At the recommended contour level, 69% of all backbone atoms, 59% 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 (0.067) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5879	 0.4400
A	 0.5898	 0.4400
B	 0.5278	 0.4580

