



Full wwPDB EM Validation Report ⓘ

Mar 3, 2024 – 10:29 AM EST

PDB ID : 5VZL
EMDB ID : EMD-8749
Title : cryo-EM structure of the Cas9-sgRNA-AcrIIA4 anti-CRISPR complex
Authors : Jiang, F.; Liu, J.J.; Nogales, E.; Doudna, J.A.
Deposited on : 2017-05-29
Resolution : 3.90 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:

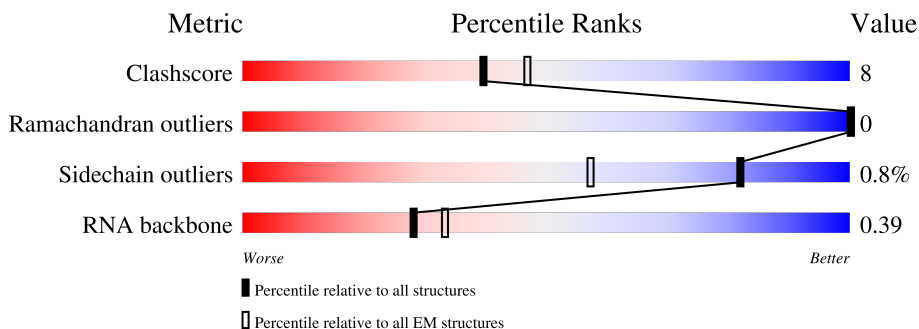
EMDB validation analysis : 0.0.1.dev70
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	B	118	
2	A	1369	
3	C	87	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 13915 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 RNA chain called single guide RNA (116-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	B	116	2494	1112	455	809	118	0	0

- Molecule 2 is a protein called CRISPR-associated endonuclease Cas9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	1364	10711	6813	1851	2024	23	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP A0A0C6FZC2

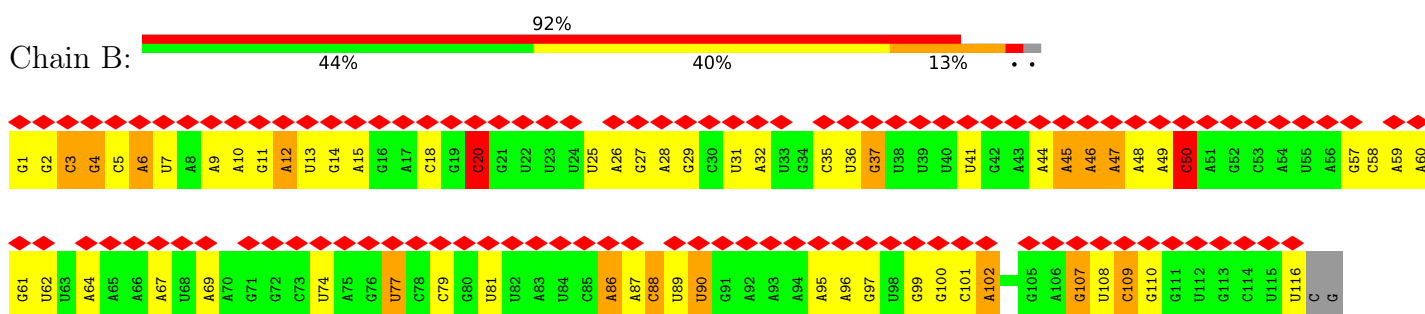
- Molecule 3 is a protein called phage anti-CRISPR AcrIIA4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	87	710	439	114	155	2	0	0

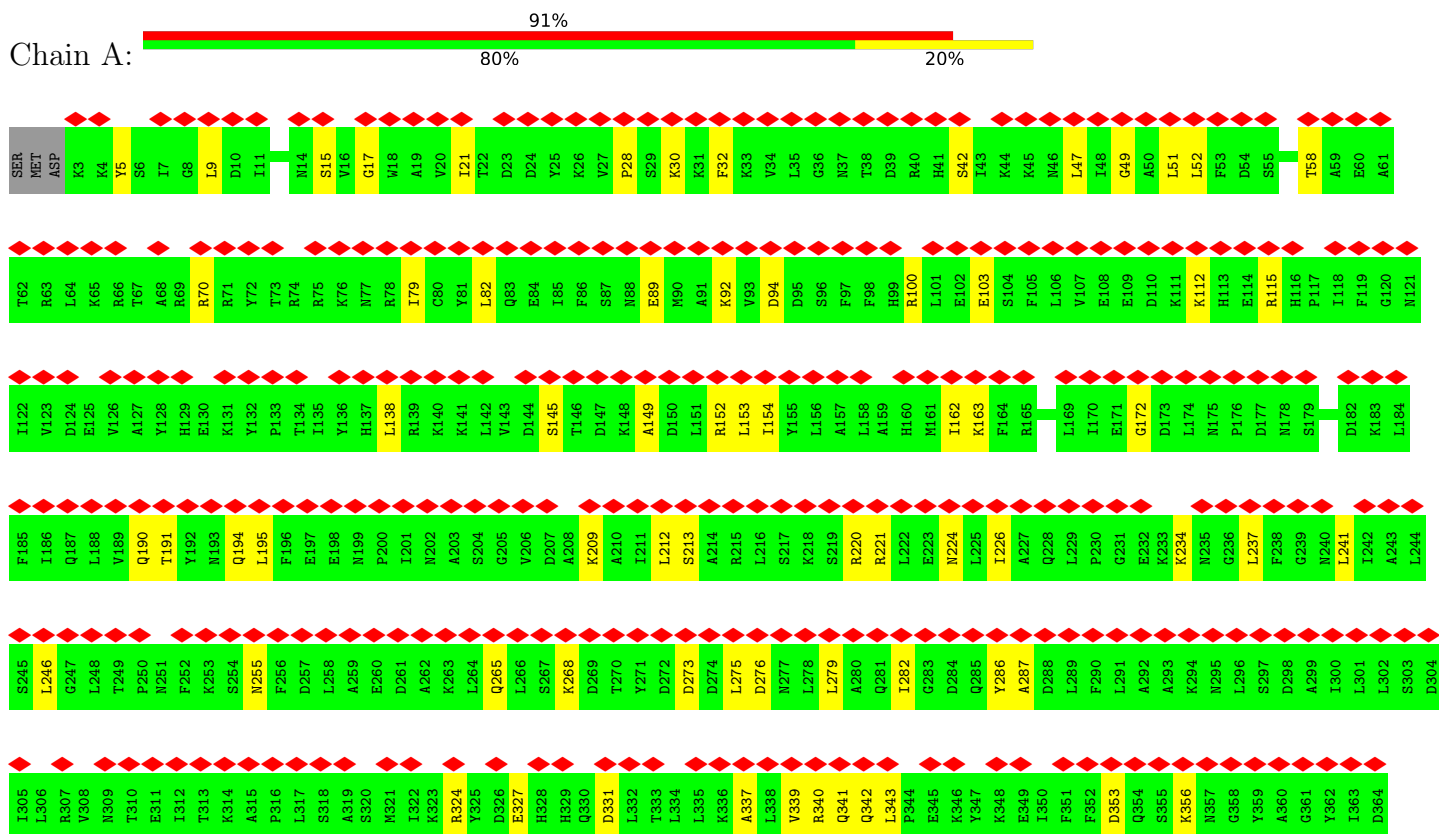
3 Residue-property plots

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: single guide RNA (116-MER)



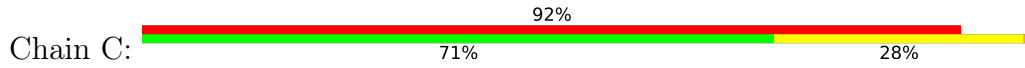
- Molecule 2: CRISPR-associated endonuclease Cas9



G365	F429	S490	D550	E610	I670	S730	E790	D850	E910	F970	K1031	Q1091
S368	Y430	F491	L551	E611	R671	P731	L791	S851	L911	Q971	A1032	V1092
Q369	P431	I492	L552	N612	D672	A732	G792	I852	D912	F972	T1033	M1093
E370	F432	E493	F553	E613	K673	I733	S793	D853	K913	Y973	A1034	I1094
E371	L433	R494	K554	D614	Q674	K734	Q794	K854	A914	K974	K1035	V1095
F372	K434	M495	T555	I615	S675	K735	I795	R855	G915	R975	Y1036	K1096
Y373	D435	T496	K556	L616	G676	G736	L796	W856	F916	R976	F1037	K1097
K374	M436	M497	R557	E617	K677	L737	E798	L857	I917	E977	F1038	L1098
F375	E438	F498	K558	D618	T678	L738	H799	T858	K918	I978	Y1039	V1100
I376	K439	D499	T560	I619	L680	T740	H800	R859	K919	N979	S1040	I1101
I379	I440	K500	V561	V620	L880	T740	F800	S860	Q920	N980	M1041	Q1101
L380	I441	N501	K562	L621	D681	K742	E802	D861	L921	Y981	I1042	T1102
E381	K442	L502	Q563	L623	F682	V743	N803	K862	V922	H982	M1043	G1103
K382	I443	N504	L564	T624	K684	V744	T804	R864	T924	H985	F1045	F1105
M383	L444	E505	K565	L625	S685	D745	Q805	G865	R925	D986	F1046	E1108
D384	T445	K506	E566	F626	D686	E746	L806	K866	Q926	A987	F1047	S1109
G385	F446	V507	D567	E627	G687	L747	Q807	S867	I927	Y988	T1048	I1110
T386	R447	L508	Y568	D628	F688	V748	N808	D868	T928	N989	E1049	L1111
E387	I448	P509	K570	R629	K749	K749	E909	R869	K929	A991	I1050	P1112
E388	P449	K510	K571	E630	N690	W750	R810	W870	H930	V992	T1051	K1113
L389	V452	H511	I572	M631	R691	M751	L811	P871	V931	V993	L1052	L1114
L390	G453	S512	E573	I632	N692	G752	T812	S872	A932	G994	A1053	M1115
V391	P454	L513	C574	E633	F693	R753	L813	E873	Q933	G995	M1054	S1116
K392	L455	L514	F575	E634	M694	H754	H814	W874	L934	A996	E1055	D1117
L393	A456	L515	R576	R635	Q695	K755	Y815	B875	L935	L997	G1056	K1118
N394	A457	Y516	D577	L636	L696	P756	L816	W876	D936	I998	E1057	L1119
R395	G458	F517	S577	L637	I697	E757	Q817	K877	S937	K999	R1058	I1120
E396	M459	F518	E579	T638	H698	N758	N818	R878	R938	K1000	K1059	R1122
D397	S460	T519	I580	Y639	D700	I760	G819	W879	N939	Y1001	R1060	K1123
L398	R461	V520	S581	E640	D700	I761	R820	R880	T941	P1002	P1061	K1124
R400	F462	Y521	G582	H641	L702	L642	D821	N881	K941	K1003	L1062	D1125
K401	A463	N522	V583	F643	T703	M763	H822	K883	K943	L1004	I1063	W1126
Q402	M465	L524	E584	D644	F704	A764	Y824	R884	D944	E1005	E1064	D1127
R403	T466	T525	D585	D645	F705	R765	D825	Q885	E945	E1007	M1066	F1128
DA06	R467	K226	R586	K646	E706	E766	Q826	L886	D947	F1008	G1067	K1129
M407	K468	V527	F587	Y647	D707	N767	E927	L887	D947	Y1009	E1068	K1130
I410	S469	K328	N588	M648	I708	Q768	L828	N888	K948	Y1010	T1069	Y1131
P411	E470	E529	A589	K649	Q709	T769	D829	R889	L949	G1011	G1070	G1132
H412	E471	V530	S590	Q650	K710	L770	R830	R890	Y950	G1012	E1071	G1133
Q413	T472	T531	L591	L651	A711	Q771	N831	K891	R951	Y1013	I1072	F1134
I414	I473	G533	T593	K652	Q712	K772	H832	T892	E952	K1014	Y1073	D1135
H415	T474	G533	Y594	R653	V713	G773	L833	T893	K953	V1015	F1074	S1136
L416	P475	M534	H595	G654	S714	Q774	L834	Q894	K954	Y1016	Y1075	P1137
L416	W476	R535	D596	R655	G715	K775	D835	R895	I955	I1016	D1076	T1138
G417	M477	K336	D596	Y656	Q716	N776	H836	K896	I956	D1017	K1076	V1139
E418	F478	V527	L597	T657	Q716	T777	Y837	R897	T957	V1018	G1077	A1140
L419	E479	K328	L598	G658	G717	R778	D837	F897	L958	R1019	D1078	Y1141
H420	E480	E529	K599	W659	D718	R778	N838	D898	L958	K1020	D1079	S1142
A421	E481	F539	I600	G660	S719	E779	D839	N899	K959	M1021	F1080	I1143
I422	V482	L540	I601	R661	L720	R780	H840	L900	S960	I1022	A1081	V1143
I423	W482	SS41	H721	L662	H721	M781	T841	T901	K961	A1023	T1082	L1144
L423	D483	G542	K602	S663	E722	K782	W842	A902	L962	A1024	K1084	V1145
R424	K484	E543	D603	R664	H723	R783	P843	A903	V963	K1024	R1085	V1146
R425	G485	Q544	K604	K665	I724	I784	Q844	E904	S964	S1025	K1086	A1147
Q426	A486	K545	D605	L666	I724	E785	S845	R905	D965	E1026	V1087	K1148
E427	S487	F606	F606	I667	N726	E786	F846	G906	F966	Q1027	L1087	V1149
E428	A488	L607	D608	N668	L727	G787	L847	G907	R967	S1088	S1088	E1150
D428	Q489	I548	N609	G669	A728	I788	R848	L908	S909	G1030	M1089	K1151
		V549			G729	K789	D849					

G1152	K1153	S1154	K1155	K1156	L1157	K1158	S1159	V1160	K1161	E1162	L1163	L1164	G1165	I1166	T1167	I1168	M1169	E1170	R1171	S1172	S1173	F1174	E1175	K1176	N1177	P1178	I1179	D1180	F1181	L1182	E1183	A1184	K1185	G1186	K1187	K1188	E1189	V1190	K1191	K1192	D1193	L1194	I1195	L1196	K1197	L1198	P1199	K1200	V1201	S1202	L1203	F1204	E1205	L1206	E1207	M1208	G1209	R1210	K1211
R1212	M1213	L1214	A1215	S1216	A1217	G1218	E1219	L1220	Q1221	K1222	G1223	N1224	E1225	L1226	A1227	L1228	P1229	S1230	K1231	Y1232	V1233	N1234	F1235	L1236	Y1237	L1238	A1239	S1240	H1241	Y1242	E1243	K1244	L1245	K1246	G1247	S1248	P1249	E1250	D1251	N1252	E1253	Q1254	K1255	Q1256	L1257	F1258	V1259	E1260	Q1261	H1262	K1263	H1264	Y1265	L1266	D1267	E1268	I1269	I1270	E1271
Q1272	I1273	S1274	E1275	F1276	S1277	K1278	R1279	V1280	I1281	L1282	A1283	D1284	A1285	M1286	L1287	D1288	K1289	V1290	L1291	S1292	A1293	Y1294	M1295	K1296	H1297	R1298	D1299	K1300	P1301	I1302	R1303	E1304	Q1305	A1306	E1307	M1308	I1309	I1310	H1311	L1312	F1313	T1314	L1315	T1316	M1317	L1318	G1319	A1320	P1321	A1322	A1323	F1324	K1325	Y1326	F1327	D1328	T1329	T1330	I1331
D1332	R1333	K1334	R1335	Y1336	T1337	S1338	T1339	K1340	E1341	V1342	L1343	D1344	A1345	T1346	L1347	I1348	S1351	I1352	T1353	G1354	L1355	Y1356	E1357	T1358	R1359	I1360	D1361	L1362	S1363	Q1364	L1365	G1366	GLY	ASP																									

● Molecule 3: phage anti-CRISPR AcrIIA4



M1	N2	I3	M4	D5	L6	I7	R8	E9	I10	K11	M12	K13	D14	Y15	T16	V17	K18	L19	S20	G21	T22	D23	S24	N25	S26	I27	T28	Q29	L30	I31	I32	R33	V34	N35	N36	D37	G38	N39	E40	Y41	V42	I43	S44	F45	S46	F47	N48	F49	S50	I51	V52	E53	K54	F55	I56	S57	A58	F59	K60
M61	G62	M63	M64	Q65	E66	Y67	E68	D69	E70	E71	E72	F73	Y74	N75	D76	M77	Q78	T79	I80	L82	K83	S84	E85	L86	N87																																		

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	185000	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 ($e^-/\text{\AA}^2$)	46	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.216	Depositor
Minimum map value	-0.136	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	273.92, 273.92, 273.92	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	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: GTP

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	B	0.65	0/2758	1.19	24/4297 (0.6%)
2	A	0.34	0/10903	0.54	0/14739
3	C	0.37	0/718	0.65	0/969
All	All	0.42	0/14379	0.74	24/20005 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	A	0	2
3	C	0	2
All	All	0	4

There are no bond length outliers.

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	4	G	C4-N9-C1'	7.85	136.70	126.50
1	B	4	G	N3-C4-N9	7.76	130.66	126.00
1	B	4	G	N3-C4-C5	-7.58	124.81	128.60
1	B	88	C	C2-N1-C1'	7.06	126.56	118.80
1	B	20	C	N1-C2-O2	6.97	123.08	118.90
1	B	47	A	O4'-C1'-N9	-6.77	102.78	108.20
1	B	4	G	C8-N9-C1'	-6.53	118.52	127.00
1	B	47	A	P-O3'-C3'	6.28	127.23	119.70
1	B	90	U	C2-N1-C1'	6.28	125.23	117.70
1	B	20	C	N3-C2-O2	-6.06	117.66	121.90
1	B	18	C	N1-C2-O2	6.02	122.51	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	47	A	OP1-P-O3'	6.01	118.42	105.20
1	B	6	A	C2-N3-C4	5.74	113.47	110.60
1	B	86	A	P-O3'-C3'	5.70	126.54	119.70
1	B	77	U	N3-C2-O2	-5.53	118.33	122.20
1	B	90	U	N1-C2-O2	5.52	126.67	122.80
1	B	58	C	C2-N1-C1'	5.51	124.87	118.80
1	B	58	C	N1-C2-O2	5.48	122.19	118.90
1	B	50	C	O4'-C1'-N1	5.44	112.55	108.20
1	B	18	C	N3-C2-O2	-5.40	118.12	121.90
1	B	88	C	C6-N1-C2	-5.35	118.16	120.30
1	B	4	G	C2-N3-C4	5.19	114.49	111.90
1	B	77	U	N1-C2-O2	5.07	126.35	122.80
1	B	20	C	C2-N1-C1'	5.01	124.31	118.80

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	A	1316	THR	Peptide
2	A	1326	TYR	Peptide
3	C	46	SER	Peptide
3	C	63	TRP	Peptide

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	B	2494	0	1248	26	0
2	A	10711	0	10460	170	0
3	C	710	0	668	16	0
All	All	13915	0	12376	200	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

All (200) 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:A:32:PHE:O	2:A:42:SER:HA	1.77	0.83
2:A:760:VAL:HA	2:A:956:ILE:O	1.82	0.80
2:A:15:SER:HA	2:A:51:LEU:O	1.82	0.77
2:A:1251:ASP:O	2:A:1255:LYS:HB2	1.90	0.71
2:A:562:LYS:O	2:A:566:GLU:HB3	1.90	0.71
2:A:484:LYS:O	2:A:488:ALA:HB3	1.91	0.71
2:A:191:THR:O	2:A:195:LEU:HB2	1.91	0.70
3:C:70:GLU:O	3:C:73:PHE:HB3	1.92	0.70
2:A:414:ILE:O	2:A:418:GLU:HB2	1.93	0.68
2:A:785:GLU:O	2:A:789:LYS:HB2	1.92	0.68
2:A:1251:ASP:HA	2:A:1254:GLN:HB3	1.76	0.67
2:A:237:LEU:O	2:A:241:LEU:HB2	1.95	0.66
2:A:1205:GLU:HB3	2:A:1346:THR:HB	1.78	0.64
2:A:743:VAL:O	2:A:747:LEU:HB2	1.98	0.63
2:A:1283:ALA:HB1	2:A:1286:ASN:HD22	1.63	0.63
2:A:28:PRO:HB2	2:A:47:LEU:HD12	1.83	0.61
2:A:654:ARG:NH1	2:A:655:ARG:O	2.34	0.60
2:A:212:LEU:HA	2:A:221:ARG:HD3	1.83	0.60
2:A:841:ILE:HG21	2:A:899:ASN:HB3	1.83	0.60
2:A:1045:PHE:HB2	2:A:1064:GLU:HG3	1.84	0.60
1:B:79:C:OP1	2:A:70:ARG:NH2	2.36	0.59
2:A:540:LEU:O	2:A:690:ASN:ND2	2.34	0.59
2:A:777:SER:O	2:A:781:MET:HB2	2.03	0.58
2:A:327:GLU:O	2:A:331:ASP:HB2	2.04	0.58
2:A:783:ARG:NH1	2:A:891:LEU:O	2.36	0.58
2:A:1280:VAL:HG23	2:A:1281:ILE:HD12	1.85	0.58
1:B:20:C:OP1	2:A:407:ASN:ND2	2.37	0.58
2:A:705:LYS:O	2:A:709:GLN:HB2	2.04	0.57
2:A:974:LYS:HE3	2:A:976:ARG:HE	1.69	0.57
2:A:813:LEU:HD23	2:A:816:LEU:HD12	1.86	0.57
2:A:420:HIS:ND1	2:A:441:GLU:OE2	2.37	0.57
2:A:530:VAL:HB	2:A:579:GLU:HB2	1.86	0.57
2:A:353:ASP:OD2	2:A:356:LYS:N	2.37	0.56
2:A:212:LEU:HD22	2:A:246:LEU:HD21	1.87	0.56
2:A:662:LEU:HD22	2:A:666:LEU:HD23	1.88	0.56
2:A:849:ASP:HB3	2:A:854:ASN:HD22	1.70	0.56
2:A:145:SER:O	2:A:425:ARG:NH1	2.38	0.56
2:A:209:LYS:O	2:A:213:SER:CB	2.54	0.56
1:B:15:A:H5''	2:A:70:ARG:HH12	1.71	0.56
1:B:26:A:OP1	2:A:115:ARG:NH2	2.38	0.56
2:A:190:GLN:O	2:A:194:GLN:HB3	2.07	0.55
2:A:1064:GLU:HB2	2:A:1074:TRP:HB3	1.87	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1295:ASN:OD1	2:A:1298:ARG:NH2	2.40	0.55
3:C:7:ILE:O	3:C:11:LYS:HB2	2.07	0.54
2:A:209:LYS:O	2:A:213:SER:HB2	2.07	0.54
2:A:1018:VAL:HA	2:A:1021:MET:HB2	1.89	0.54
2:A:1139:VAL:HA	2:A:1166:ILE:O	2.07	0.54
3:C:4:ASN:HA	3:C:7:ILE:HB	1.89	0.54
2:A:484:LYS:O	2:A:488:ALA:CB	2.56	0.54
2:A:1101:GLN:HB2	2:A:1140:ALA:HA	1.89	0.54
2:A:190:GLN:O	2:A:194:GLN:CB	2.56	0.54
2:A:1272:GLN:O	2:A:1276:PHE:HB3	2.08	0.54
2:A:772:LYS:O	2:A:776:ASN:ND2	2.40	0.53
2:A:502:LEU:HB2	2:A:666:LEU:HD13	1.89	0.53
2:A:777:SER:O	2:A:781:MET:CB	2.56	0.53
2:A:612:ASN:HA	2:A:615:ILE:HD13	1.91	0.53
2:A:5:TYR:OH	2:A:754:HIS:O	2.26	0.53
2:A:827:GLU:O	2:A:859:ARG:NH2	2.36	0.52
2:A:864:ARG:NH1	2:A:867:SER:O	2.43	0.52
2:A:979:ASN:ND2	2:A:1226:LEU:O	2.43	0.52
2:A:932:ALA:O	2:A:936:ASP:HB2	2.09	0.52
2:A:1148:LYS:HE2	2:A:1159:SER:HB2	1.90	0.52
2:A:680:LEU:HG	2:A:684:LYS:HE2	1.91	0.52
2:A:342:GLN:HE22	2:A:385:GLY:H	1.57	0.52
2:A:1148:LYS:HG2	2:A:1159:SER:HA	1.92	0.52
2:A:850:ASP:HA	2:A:855:LYS:HE3	1.92	0.51
2:A:220:ARG:O	2:A:224:ASN:ND2	2.44	0.51
2:A:1144:LEU:HB3	2:A:1196:ILE:HB	1.91	0.51
2:A:1161:LYS:NZ	2:A:1362:LEU:O	2.42	0.51
2:A:485:GLY:O	2:A:489:GLN:HB2	2.10	0.51
2:A:337:ALA:O	2:A:341:GLN:HB2	2.10	0.51
2:A:920:GLN:HE22	2:A:1041:ASN:HA	1.75	0.51
2:A:563:GLN:O	2:A:567:ASP:HB2	2.11	0.51
2:A:893:THR:HG23	2:A:896:LYS:H	1.76	0.51
2:A:672:ASP:HB3	2:A:675:SER:HB2	1.92	0.51
2:A:1091:GLN:NE2	2:A:1093:ASN:OD1	2.40	0.51
2:A:562:LYS:O	2:A:566:GLU:CB	2.57	0.50
2:A:1138:THR:OG1	3:C:36:ASN:ND2	2.43	0.50
1:B:15:A:H4'	2:A:454:PRO:HD3	1.93	0.50
2:A:629:ARG:O	2:A:632:ILE:HB	2.12	0.50
2:A:49:GLY:HA3	2:A:1093:ASN:HB2	1.94	0.50
2:A:508:LEU:HD21	2:A:664:ARG:HB2	1.94	0.50
2:A:987:ALA:HA	2:A:990:ASN:HD22	1.76	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:138:LEU:HD11	2:A:153:LEU:HD21	1.93	0.50
2:A:273:ASP:O	2:A:276:ASP:HB2	2.11	0.50
2:A:400:ARG:NH2	2:A:406:ASP:OD2	2.44	0.50
2:A:474:THR:OG1	2:A:477:ASN:OD1	2.27	0.50
2:A:645:ASP:HA	2:A:648:MET:HB2	1.94	0.50
2:A:988:TYR:HE2	2:A:1083:VAL:HG13	1.76	0.49
2:A:1222:LYS:HE2	2:A:1321:PRO:HG3	1.94	0.49
2:A:282:ILE:HD12	2:A:286:TYR:HD2	1.77	0.49
2:A:627:GLU:OE1	2:A:655:ARG:NE	2.45	0.49
2:A:456:ALA:O	2:A:467:ARG:NH2	2.45	0.49
1:B:31:U:H2'	1:B:32:A:H8	1.78	0.49
2:A:686:ASP:HB3	2:A:690:ASN:HA	1.95	0.49
2:A:1215:ALA:HB2	2:A:1221:GLN:HG3	1.95	0.49
3:C:33:ARG:HA	3:C:40:GLU:HA	1.95	0.49
2:A:103:GLU:OE2	2:A:112:LYS:NZ	2.40	0.49
2:A:275:LEU:O	2:A:279:LEU:N	2.44	0.49
3:C:30:LEU:HD22	3:C:51:ILE:HD11	1.94	0.49
2:A:1052:LEU:HB2	2:A:1056:GLU:HB2	1.95	0.48
2:A:1306:ALA:HA	2:A:1309:ILE:HD12	1.94	0.48
2:A:9:LEU:HA	2:A:17:GLY:O	2.13	0.48
2:A:1065:THR:HG22	2:A:1072:ILE:HA	1.94	0.48
3:C:53:GLU:O	3:C:57:SER:HB3	2.13	0.48
2:A:1108:GLU:N	3:C:14:ASP:OD2	2.47	0.48
2:A:1148:LYS:HD3	2:A:1157:LEU:HB3	1.97	0.47
2:A:629:ARG:HA	2:A:632:ILE:HD12	1.96	0.47
2:A:960:SER:O	2:A:964:SER:CB	2.61	0.47
2:A:777:SER:HB2	2:A:806:LEU:HD23	1.96	0.47
2:A:1211:LYS:N	2:A:1224:ASN:OD1	2.42	0.47
1:B:45:A:H3'	1:B:46:A:C8	2.50	0.47
2:A:1245:LEU:HD13	2:A:1252:ASN:HA	1.97	0.47
2:A:1252:ASN:O	2:A:1256:GLN:CB	2.63	0.47
1:B:1:GTP:O1G	2:A:976:ARG:NH2	2.41	0.47
2:A:1206:LEU:HB2	2:A:1210:ARG:HB3	1.97	0.47
2:A:1250:GLU:O	2:A:1254:GLN:CB	2.63	0.46
2:A:1115:ASN:HA	2:A:1129:LYS:HG2	1.97	0.46
2:A:94:ASP:OD2	2:A:100:ARG:NH2	2.48	0.46
2:A:1237:TYR:O	2:A:1240:SER:OG	2.33	0.46
1:B:25:U:H2'	1:B:26:A:H8	1.79	0.46
1:B:3:C:H4'	1:B:4:G:H5'	1.97	0.46
2:A:1307:GLU:O	2:A:1311:HIS:ND1	2.43	0.46
3:C:10:ILE:HD11	3:C:80:ILE:HG21	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:79:ILE:HD11	2:A:163:LYS:HG3	1.97	0.46
2:A:540:LEU:HB2	2:A:545:LYS:HE3	1.98	0.45
2:A:1272:GLN:O	2:A:1276:PHE:CB	2.64	0.45
1:B:1:GTP:H2'	1:B:2:G:C8	2.52	0.45
2:A:149:ALA:HB3	2:A:154:ILE:HD11	1.99	0.45
2:A:521:TYR:HB3	2:A:683:LEU:HB3	1.98	0.45
2:A:89:GLU:O	2:A:92:LYS:HB3	2.17	0.45
2:A:1179:ILE:HG22	2:A:1190:VAL:HG11	1.99	0.45
2:A:369:GLN:HE22	2:A:400:ARG:HH11	1.65	0.44
2:A:1198:LEU:HD13	2:A:1204:PHE:HZ	1.83	0.44
2:A:1250:GLU:O	2:A:1254:GLN:HB2	2.17	0.44
2:A:833:LEU:HD23	2:A:836:TYR:HD2	1.82	0.44
1:B:96:A:H2'	1:B:97:G:H8	1.82	0.44
2:A:265:GLN:HG2	2:A:268:LYS:H	1.83	0.44
2:A:560:THR:HG23	2:A:563:GLN:H	1.83	0.44
1:B:67:A:N3	2:A:1122:ARG:NH2	2.61	0.44
2:A:172:GLY:O	2:A:413:GLN:NE2	2.49	0.44
2:A:920:GLN:NE2	2:A:1040:SER:O	2.50	0.44
3:C:71:GLU:HA	3:C:74:TYR:HD2	1.83	0.44
2:A:1074:TRP:HE1	2:A:1076:LYS:HD3	1.82	0.44
1:B:101:C:H2'	1:B:102:A:C8	2.53	0.44
1:B:107:G:N1	2:A:1272:GLN:OE1	2.47	0.44
2:A:58:THR:HA	2:A:731:PRO:HG2	1.99	0.44
2:A:337:ALA:O	2:A:341:GLN:CB	2.66	0.44
3:C:7:ILE:O	3:C:11:LYS:CB	2.65	0.44
1:B:2:G:O2'	1:B:4:G:O4'	2.36	0.44
1:B:101:C:H2'	1:B:102:A:H8	1.83	0.43
3:C:63:TRP:O	3:C:65:GLN:N	2.49	0.43
2:A:327:GLU:O	2:A:331:ASP:CB	2.66	0.43
2:A:866:LYS:O	2:A:1054:ASN:ND2	2.48	0.43
2:A:1249:PRO:HA	2:A:1252:ASN:HB2	1.99	0.43
2:A:777:SER:HB3	2:A:807:GLN:HE21	1.83	0.43
1:B:25:U:H2'	1:B:26:A:C8	2.54	0.43
2:A:909:SER:OG	2:A:910:GLU:N	2.51	0.43
2:A:339:VAL:O	2:A:343:LEU:N	2.44	0.43
2:A:194:GLN:NE2	2:A:557:ARG:HH12	2.17	0.43
2:A:761:ILE:HD11	2:A:935:LEU:HD12	2.00	0.43
2:A:1221:GLN:NE2	3:C:40:GLU:OE2	2.43	0.43
2:A:1347:LEU:HD23	2:A:1360:ILE:HB	2.00	0.43
2:A:391:VAL:O	2:A:395:ARG:CB	2.66	0.43
2:A:693:PHE:HA	2:A:696:LEU:HB2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:53:GLU:O	3:C:57:SER:CB	2.67	0.42
2:A:677:LYS:NZ	2:A:685:SER:O	2.38	0.42
3:C:15:TYR:OH	3:C:76:ASP:OD2	2.30	0.42
1:B:109:C:H2'	1:B:110:G:H8	1.85	0.42
2:A:191:THR:O	2:A:195:LEU:CB	2.65	0.42
2:A:212:LEU:HD23	2:A:221:ARG:HD3	2.02	0.42
2:A:279:LEU:HD11	2:A:287:ALA:HB2	2.00	0.42
2:A:785:GLU:O	2:A:789:LYS:CB	2.63	0.42
1:B:59:A:OP1	2:A:340:ARG:NH2	2.47	0.42
2:A:15:SER:HB3	2:A:52:LEU:HD23	2.02	0.42
2:A:194:GLN:HE22	2:A:557:ARG:HH12	1.66	0.42
2:A:490:SER:O	2:A:494:ARG:N	2.42	0.42
2:A:516:GLU:HA	2:A:519:THR:HG22	2.01	0.42
1:B:31:U:H2'	1:B:32:A:C8	2.54	0.42
2:A:389:LEU:HD13	2:A:389:LEU:HA	1.88	0.42
1:B:1:GTP:H2'	1:B:2:G:H8	1.85	0.42
3:C:80:ILE:HA	3:C:80:ILE:HD12	1.80	0.42
2:A:560:THR:OG1	2:A:585:ASP:OD1	2.30	0.41
2:A:324:ARG:HH21	2:A:400:ARG:HG2	1.84	0.41
1:B:109:C:H2'	1:B:110:G:C8	2.55	0.41
1:B:11:G:H1'	1:B:12:A:C8	2.55	0.41
2:A:138:LEU:HD21	2:A:153:LEU:HG	2.03	0.41
2:A:226:ILE:HD13	2:A:234:LYS:HA	2.02	0.41
2:A:548:ILE:HG23	2:A:552:LEU:HD12	2.01	0.41
2:A:30:LYS:HE2	2:A:32:PHE:HE1	1.85	0.41
2:A:82:LEU:HD22	2:A:162:ILE:HD12	2.03	0.41
2:A:21:ILE:HD11	2:A:995:THR:HG21	2.03	0.40
2:A:960:SER:O	2:A:964:SER:HB3	2.20	0.40
2:A:1004:LEU:HD11	2:A:1021:MET:HG3	2.03	0.40
2:A:801:VAL:HG11	2:A:811:LEU:HD21	2.03	0.40
1:B:37:G:N2	1:B:50:C:H41	2.19	0.40
2:A:1328:ASP:OD1	2:A:1328:ASP:N	2.54	0.40
1:B:88:C:H2'	1:B:89:U:H6	1.86	0.40
2:A:419:LEU:HD21	2:A:440:ILE:HG22	2.03	0.40
2:A:704:PHE:HA	2:A:707:ASP:HB2	2.04	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	A	1362/1369 (100%)	1256 (92%)	106 (8%)	0	100	100
3	C	85/87 (98%)	70 (82%)	15 (18%)	0	100	100
All	All	1447/1456 (99%)	1326 (92%)	121 (8%)	0	100	100

There are no Ramachandran outliers to report.

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	
2	A	1118/1228 (91%)	1112 (100%)	6 (0%)	88	93
3	C	82/83 (99%)	79 (96%)	3 (4%)	34	60
All	All	1200/1311 (92%)	1191 (99%)	9 (1%)	82	89

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	152	ARG
2	A	255	ASN
2	A	437	ARG
2	A	522	ASN
2	A	664	ARG
2	A	767	ASN
3	C	2	ASN
3	C	12	ASN

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Mol	Chain	Res	Type
3	C	25	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	99	HIS
2	A	137	HIS
2	A	194	GLN
2	A	224	ASN
2	A	522	ASN
2	A	595	HIS
2	A	767	ASN
2	A	863	ASN
2	A	899	ASN
2	A	1286	ASN
2	A	1317	ASN
3	C	2	ASN
3	C	12	ASN
3	C	25	ASN
3	C	75	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	B	114/118 (96%)	43 (37%)	4 (3%)

All (43) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	B	3	C
1	B	5	C
1	B	6	A
1	B	7	U
1	B	9	A
1	B	10	A
1	B	12	A
1	B	13	U
1	B	14	G
1	B	20	C
1	B	27	G

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Mol	Chain	Res	Type
1	B	28	A
1	B	29	G
1	B	36	U
1	B	37	G
1	B	41	U
1	B	44	A
1	B	45	A
1	B	46	A
1	B	47	A
1	B	48	A
1	B	49	A
1	B	50	C
1	B	57	G
1	B	60	A
1	B	61	G
1	B	62	U
1	B	64	A
1	B	69	A
1	B	74	U
1	B	77	U
1	B	81	U
1	B	86	A
1	B	87	A
1	B	90	U
1	B	95	A
1	B	99	G
1	B	100	G
1	B	102	A
1	B	107	G
1	B	108	U
1	B	109	C
1	B	116	U

All (4) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	B	27	G
1	B	35	C
1	B	47	A
1	B	86	A

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

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.

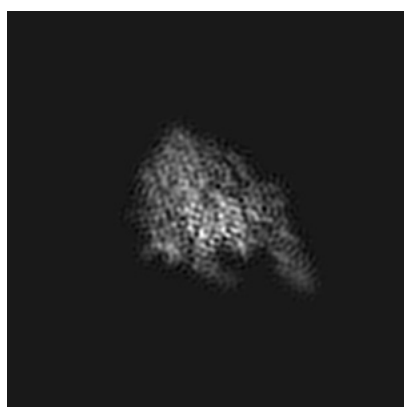
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-8749. These allow visual inspection of the internal detail of the map and identification of artifacts.

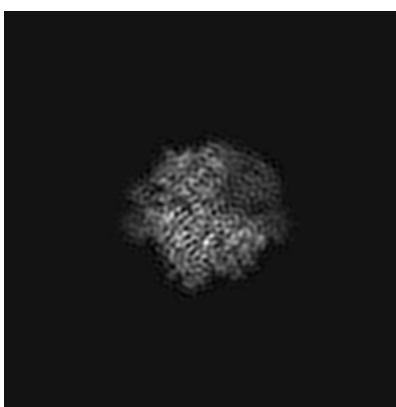
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

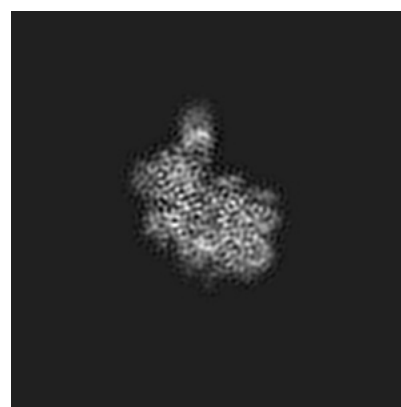
6.1.1 Primary map



X



Y

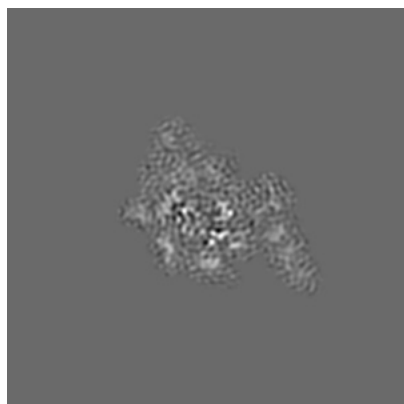


Z

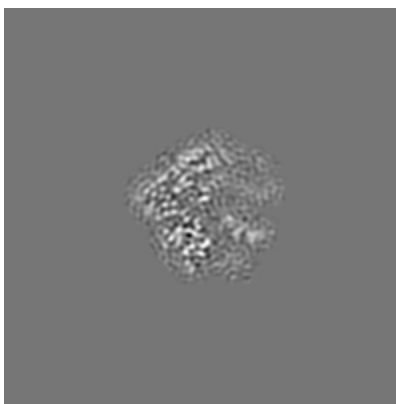
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

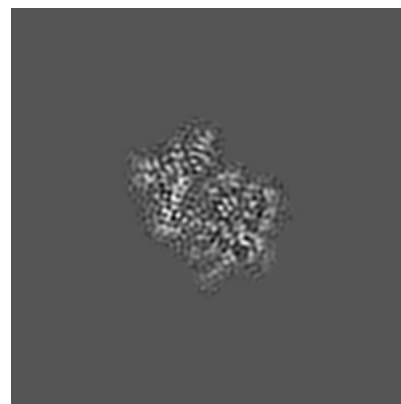
6.2.1 Primary map



X Index: 128



Y Index: 128

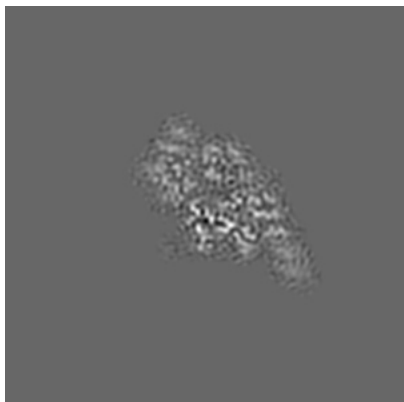


Z Index: 128

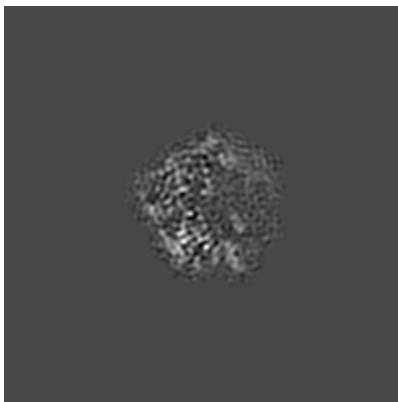
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

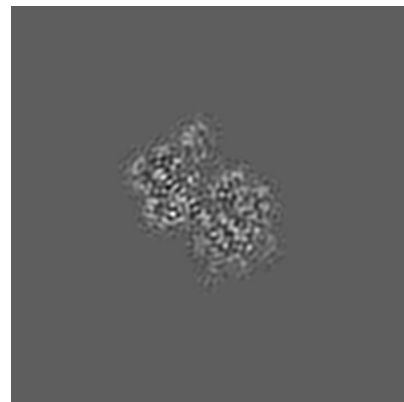
6.3.1 Primary map



X Index: 110



Y Index: 124

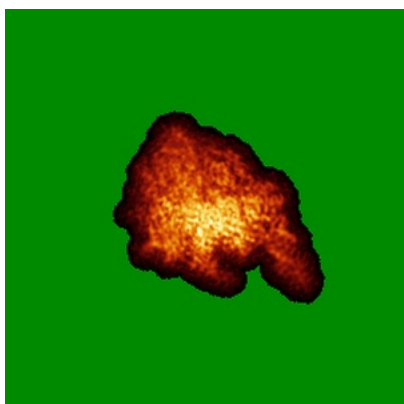


Z Index: 120

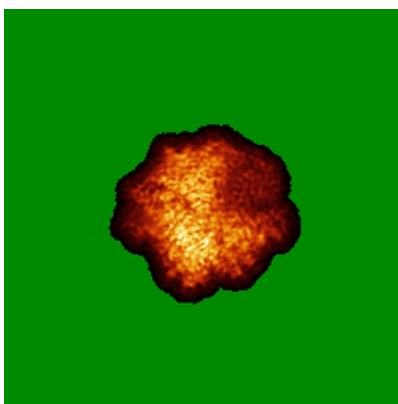
The images above show the largest variance slices of the map in three orthogonal directions.

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

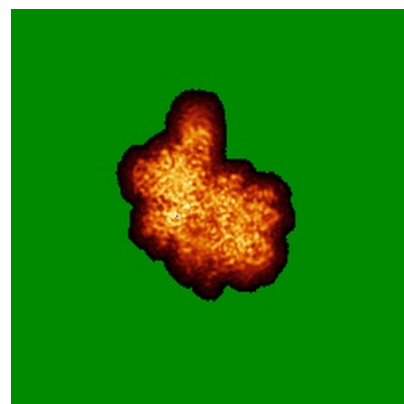
6.4.1 Primary map



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

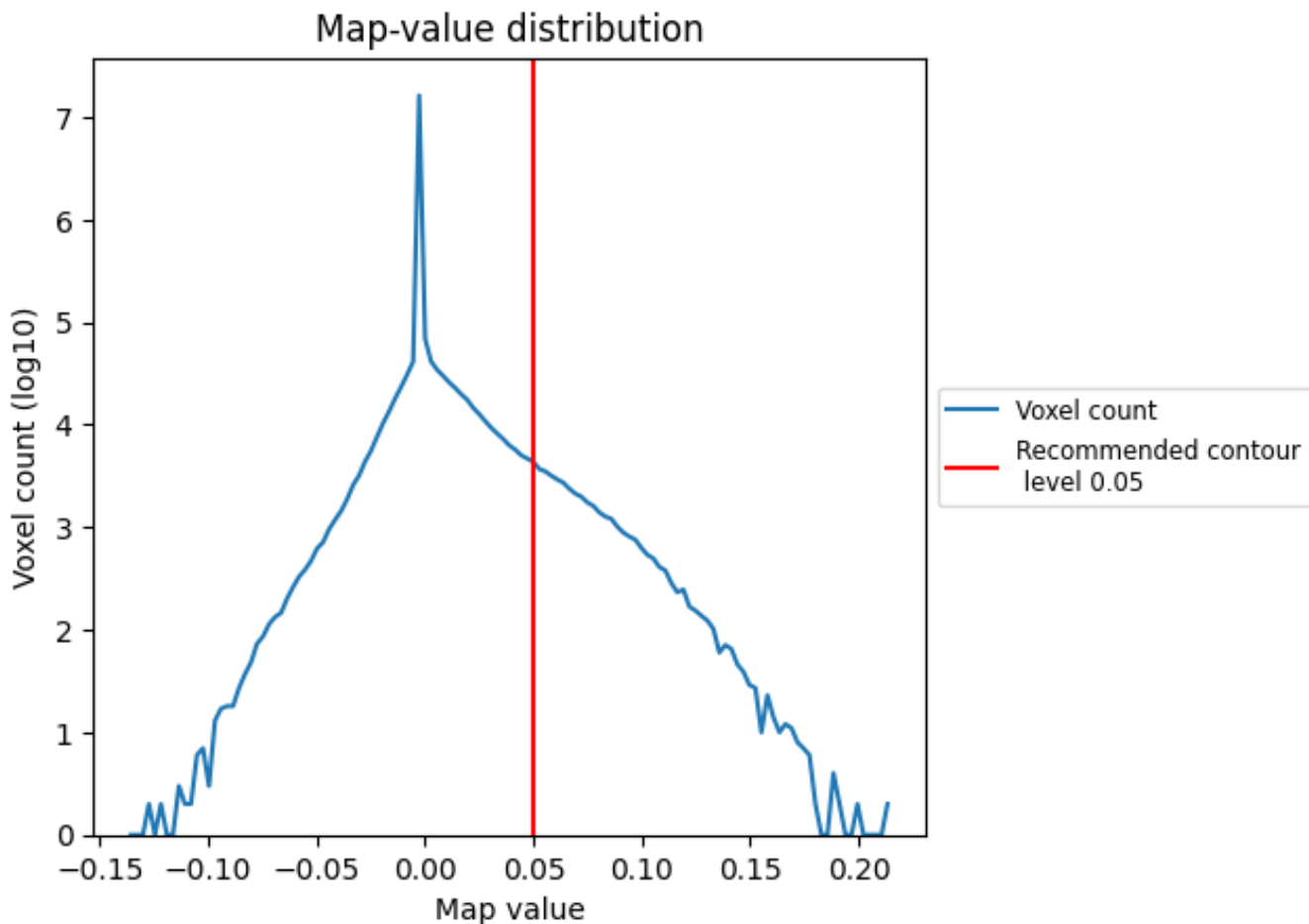
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

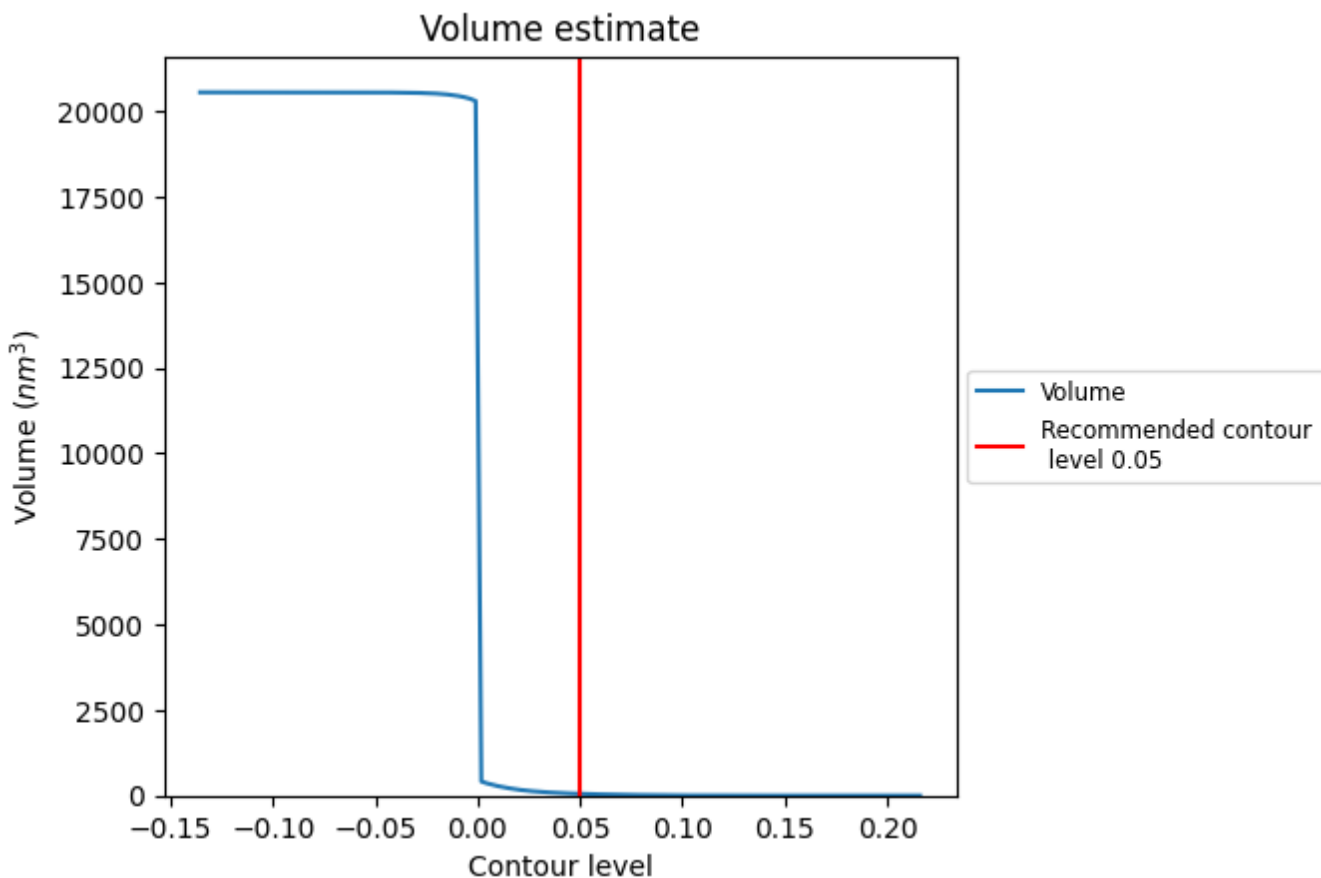
This section contains the results of statistical analysis of the map.

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.

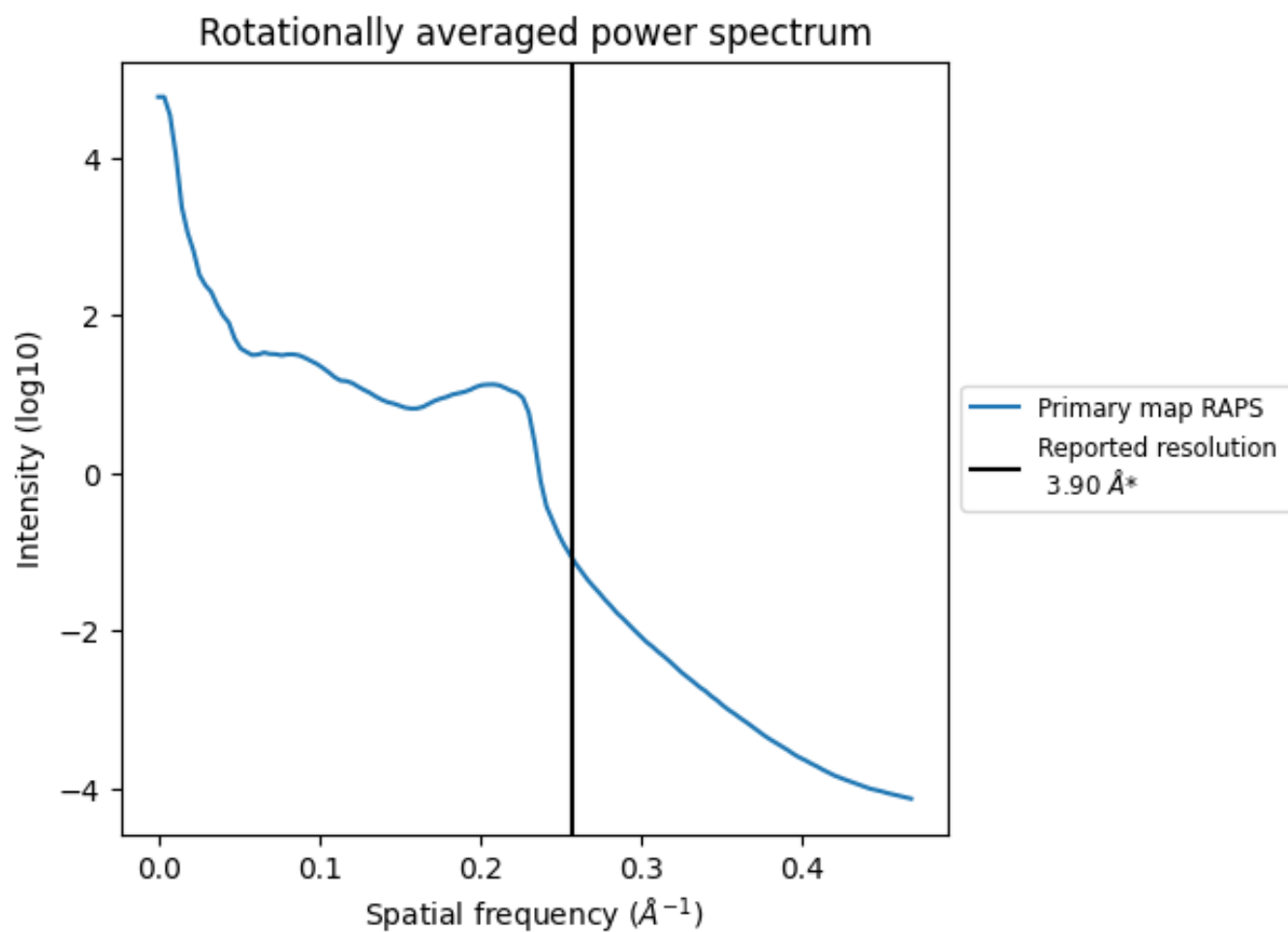
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 51 nm³; this corresponds to an approximate mass of 46 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 0.256\AA^{-1}

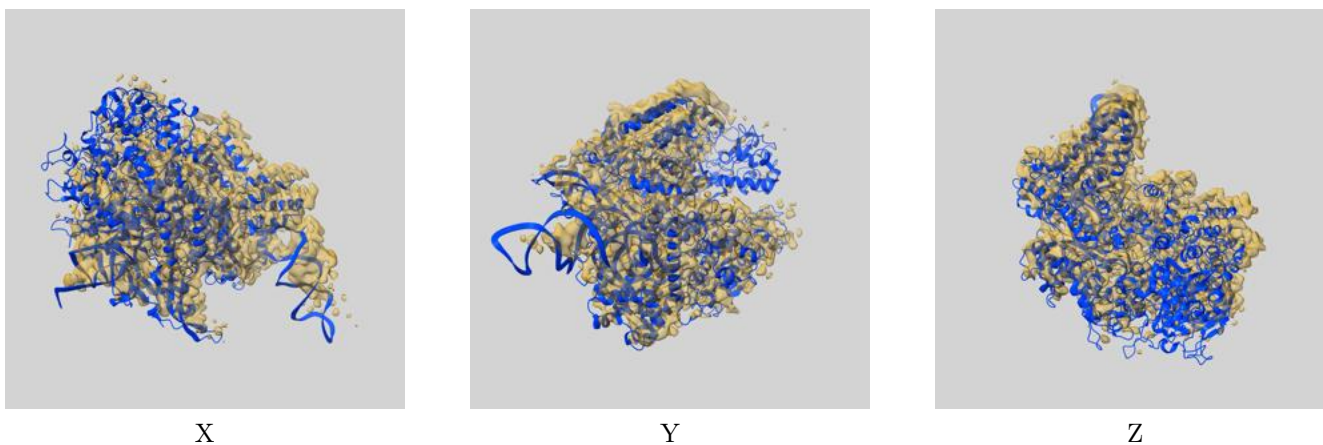
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-8749 and PDB model 5VZL. 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 0.05 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 [i](#)



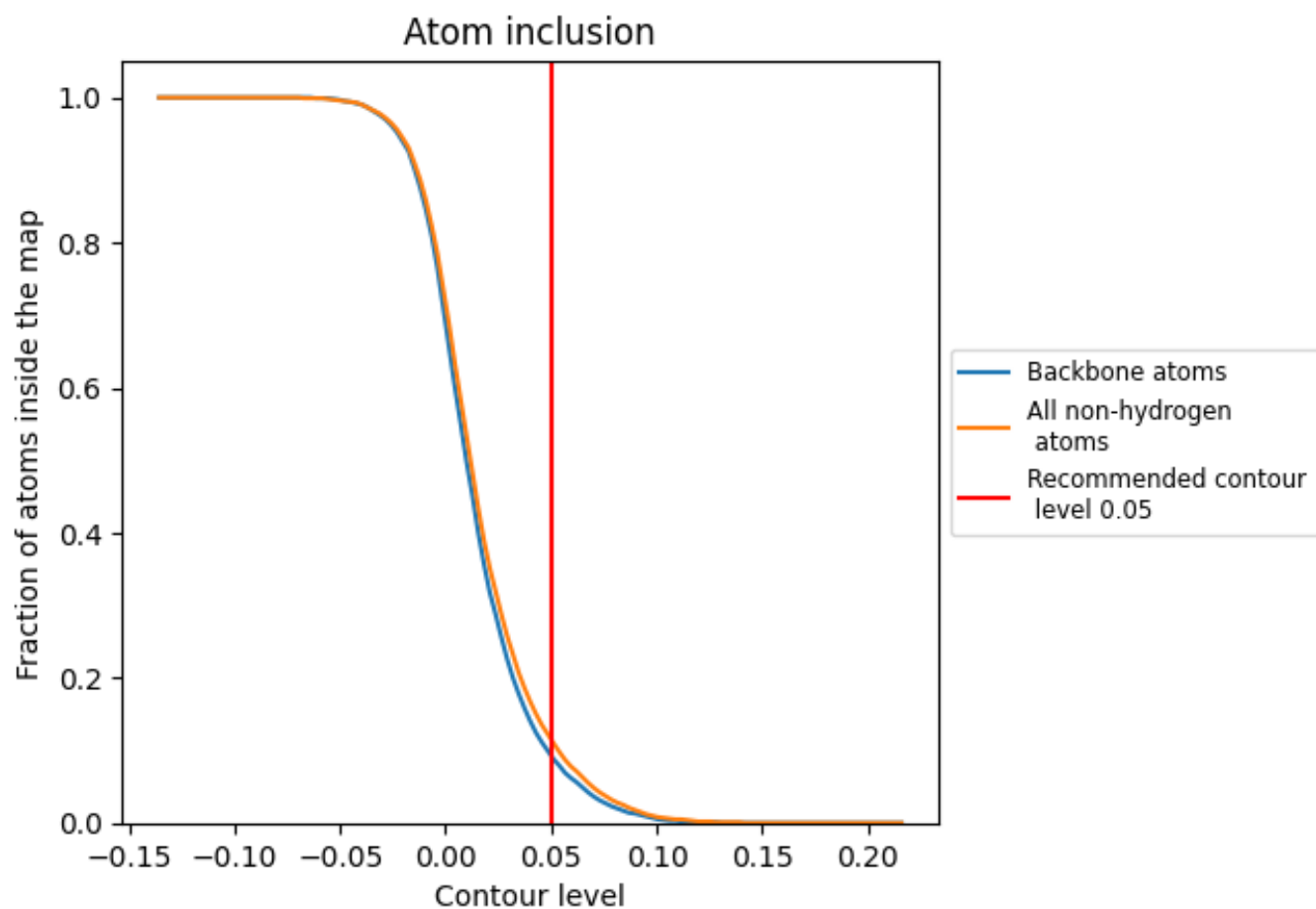
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.05).









9.4 Atom inclusion [i](#)



At the recommended contour level, 9% of all backbone atoms, 12% 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	 0.1150	 0.0060
A	 0.1080	 0.0040
B	 0.1400	 0.0200
C	 0.1280	 -0.0130

