Full wwPDB EM Validation Report ⓘ

Dec 4, 2023 – 10:26 AM EST

PDB ID	:	8TZH
EMDB ID	:	EMD-41759
Title	:	Structure of full-length LRRK2 bound to MLi-2 (I2020T mutant)
Authors	:	Sanz-Murillo, M.; Villagran-Suarez, A.; Alegrio Louro, J.; Leschziner, A.
Deposited on	:	2023-08-26
Resolution	:	3.90 Å(reported)
Based on initial model	:	7LHW

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:

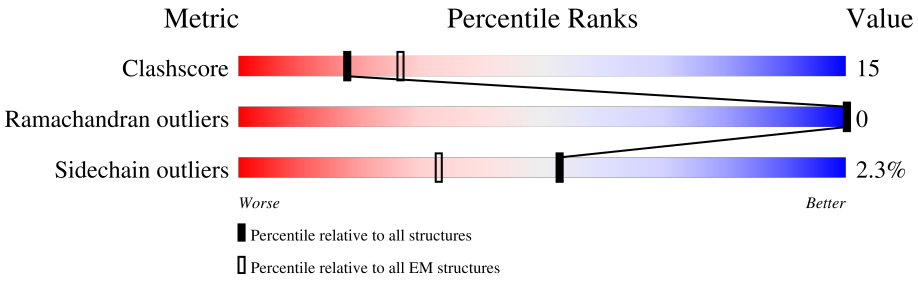
EMDB validation analysis	:	0.0.1.dev70
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

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	B	182	18% 34% 31% · 34%
2	A	2527	· 42% 16% · 41%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 11592 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.

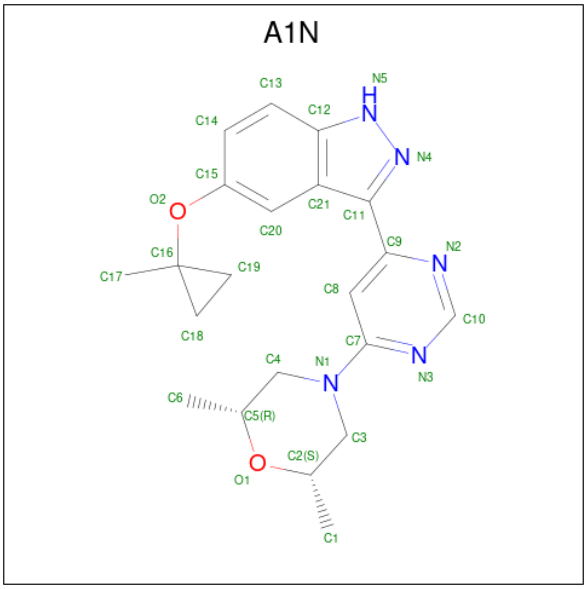
- Molecule 1 is a protein called E11 DARPin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	121	926	592	156	177	1	0	0

- Molecule 2 is a protein called Leucine-rich repeat serine/threonine-protein kinase 2.

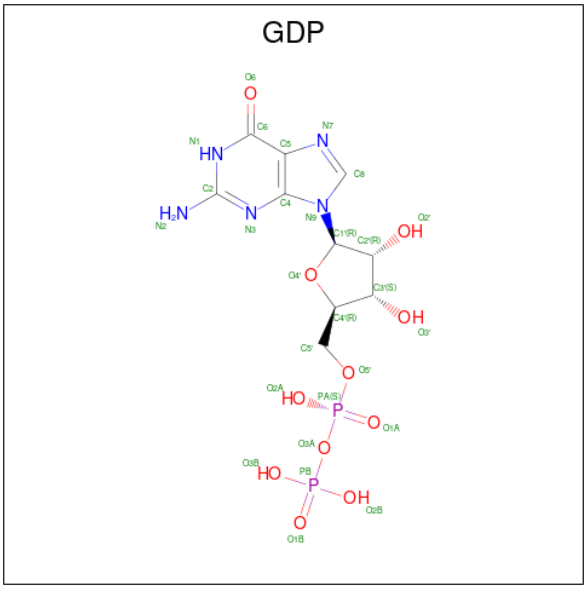
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	1485	10610	6817	1807	1925	61	0	0

- Molecule 3 is (2 {R},6 {S})-2,6-dimethyl-4-[6-[5-(1-methylcyclopropyl)oxy-1 {H}-indazol-3-yl]pyrimidin-4-yl]morpholine (three-letter code: A1N) (formula: $C_{21}H_{25}N_5O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	28	21	5	2	0

- Molecule 4 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



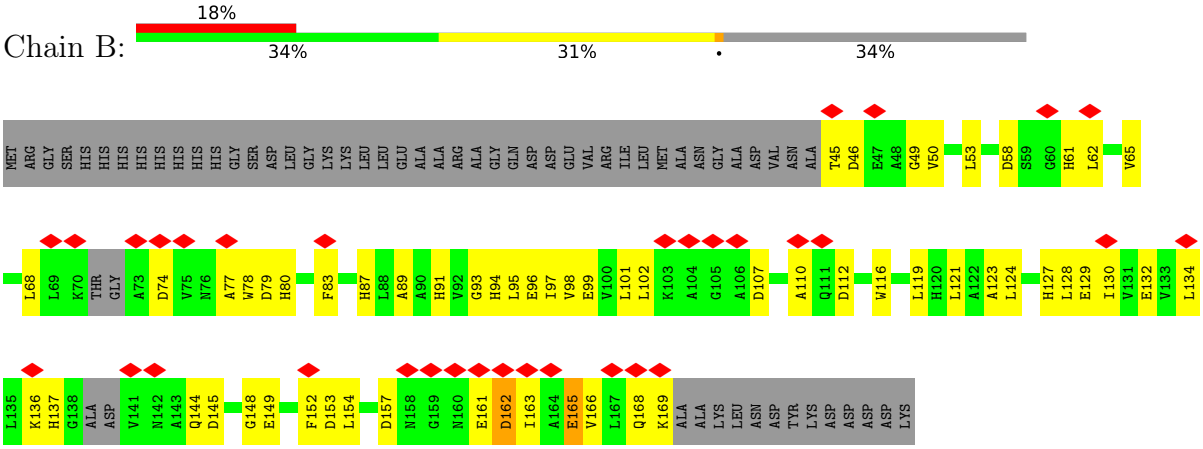
Mol	Chain	Residues	Atoms					AltConf
4	A	1	Total	C	N	O	P	0
			28	10	5	11	2	

3 Residue-property plots (i)

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

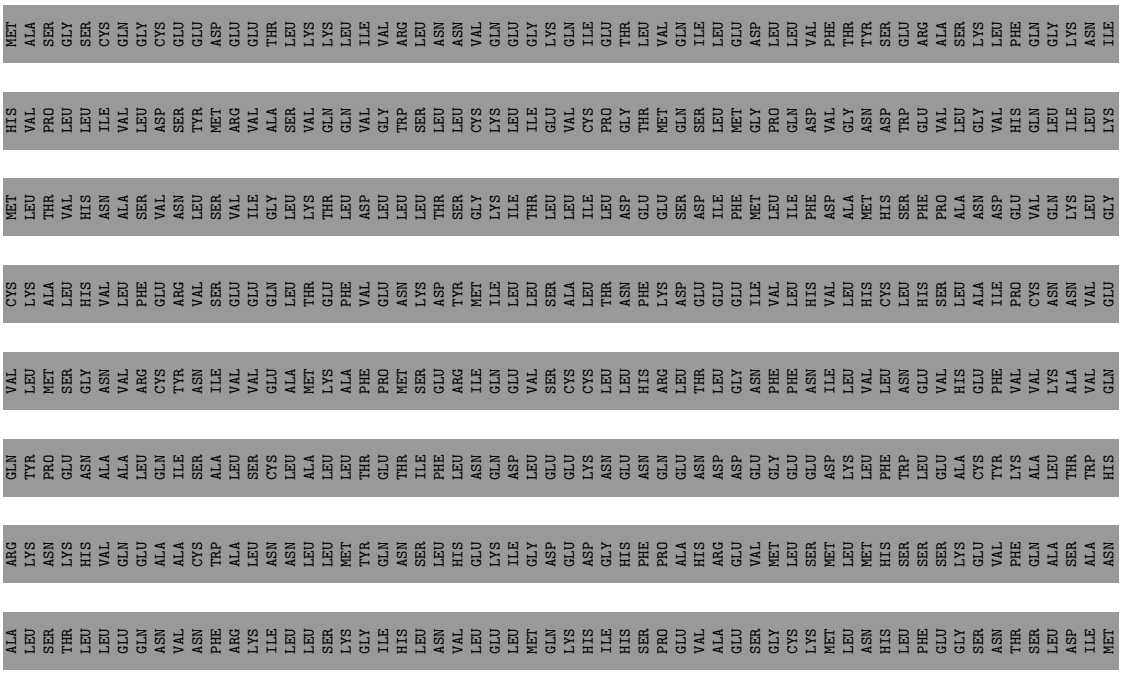
• Molecule 1: E11 DARPin

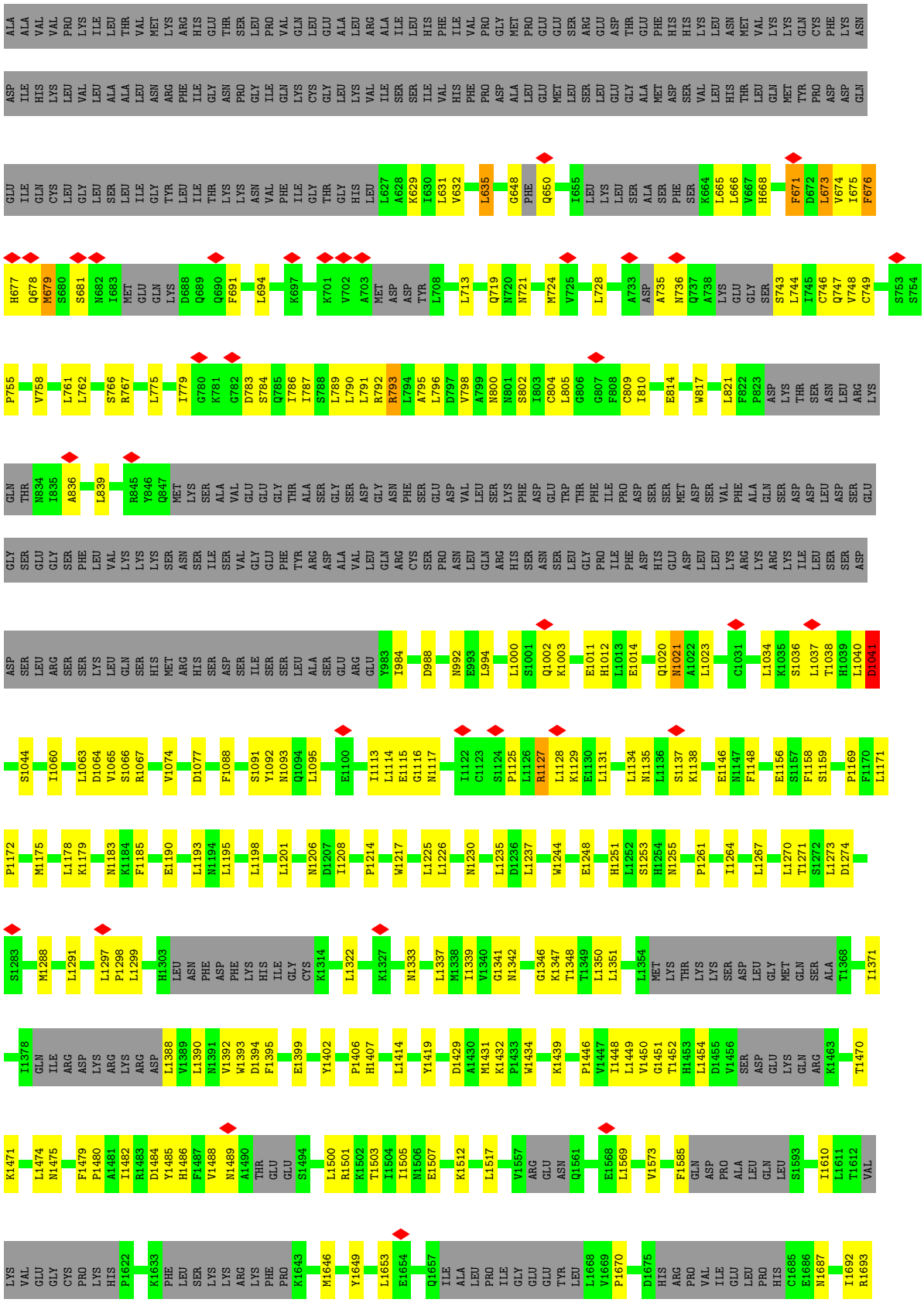
Chain B:

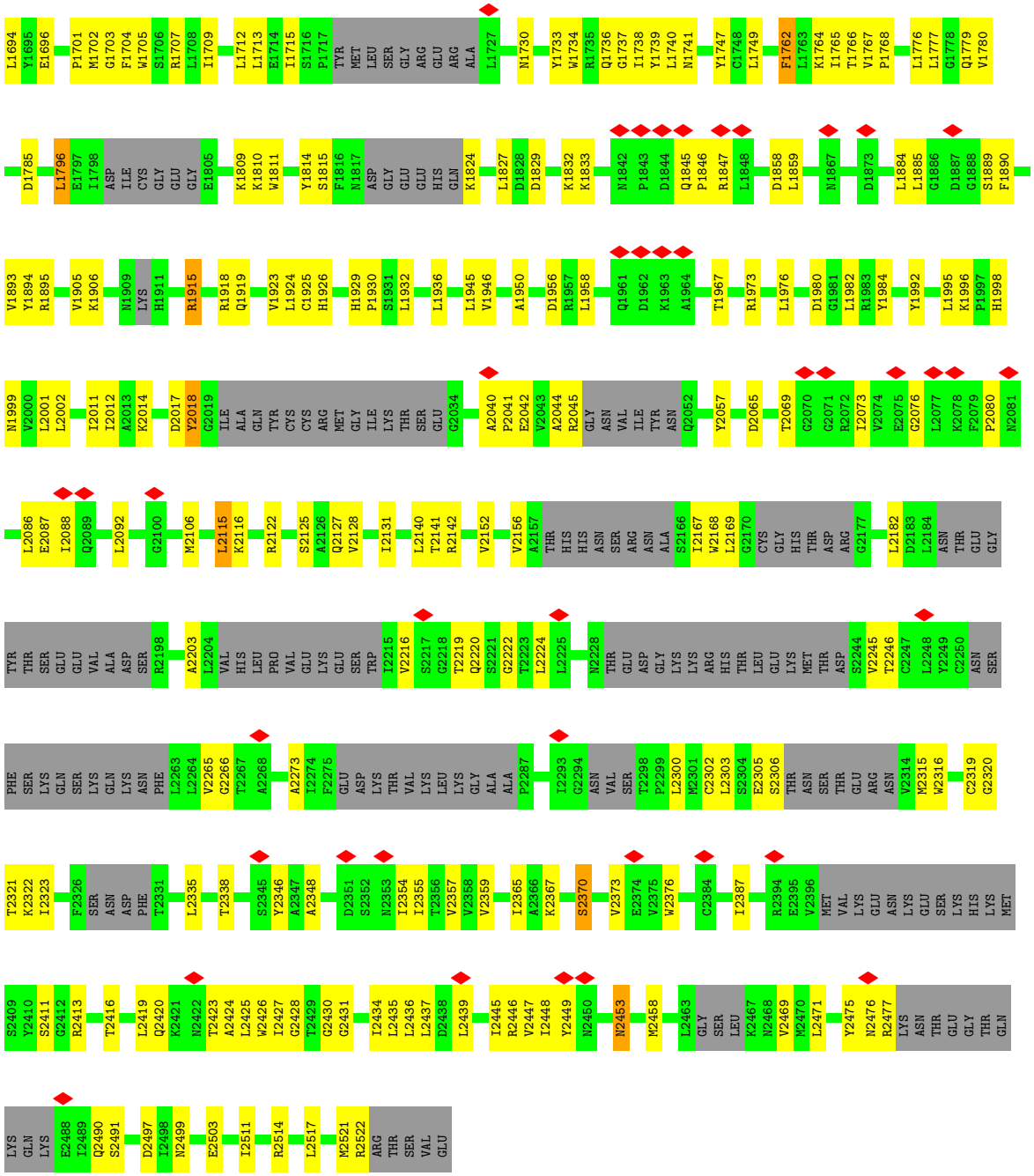


• Molecule 2: Leucine-rich repeat serine/threonine-protein kinase 2

Chain A:




ALA ALA VAL VAL PRO LYS ILE LEU LEU THR VAL MET LYS ARG HIS GLU THR SER LEU PRO VAL GLN LEU GLU GLY ALA LEU ARG ALA ILE LEU HIS PHE HIS HIS LYS LEU LEU ASN MET VAL LYS LYS GLN CYS PHE LYS ASN
ASP ILE HIS LYS LEU VAL LEU ALA ALA LEU ASN ARG PHE ILE GLY ASN PRO GLY ILE GLN LYS CYS GLY LEU LYS VAL ILE SER SER ILE VAL HIS PHE PRO ASP ALA LEU GLU MET LEU SER LEU GLU GLY ALA MET ASP SER VAL LEU HIS THR LEU GLN MET TYR PRO ASP GLN
GLU ILE GLN CYS LEU GLY LEU SER LEU ILE GLY TYR LEU ILE THR LYS LYS ASN VAL PHE ILE GLY THR GLY HIS LEU L627 A628 K629 I630 L631 V632 L635 G648 PHE Q650 I655 LEU LYS LEU SER ALA SER PHE SER K664 L665 L666 V667 H668 F671 D672 L673 V674 I675 F676
H677 Q678 M679 S680 S681 N682 I683 MET GLU GLN LYS D688 Q689 Q690 F691 L694 K697 K701 V702 A703 MET ASP ASP TYR L708 L713 Q719 N720 N721 M724 V725 L728 A733 ASP A735 N736 Q737 A738 LYS GLU GLY SER S743 L744 I745 C746 Q747 V748 C749 S753 S754
P755 V758 L761 L762 S766 R767 L775 I779 G780 K781 G782 D783 S784 Q785 I786 I787 S788 L789 L790 L791 R792 R793 L794 A795 L796 D797 V798 A799 N800 N801 S802 I803 C804 L805 G806 G807 F808 C809 I810 E814 W817 L821 F822 P823 ASP LYS THR SER ASN LEU ARG LYS
GLN THR N834 I835 A836 L839 R845 Y846 Q847 MET LYS SER ALA VAL GLU GLU GLY THR ALA SER GLY SER ASP GLY ASN PHE SER GLU ASP VAL LEU SER LYS PHE ASP GLU TRP THR PHE ILE PRO ASP SER SER MET ASP SER VAL PHE ALA GLN SER ASP LEU ASP SER GLU
GLY SER GLU GLY SER PHE LEU VAL LYS LYS LYS SER ASN SER ILE SER VAL GLY GLU PHE TYR ARG ASP ALA VAL LEU GLN ARG CYS SER PRO ASN LEU GLN ARG HIS SER ASN SER LEU GLY PRO ILE PHE ASP HIS GLU ASP LEU LEU LYS ARG LYS LYS ILE LEU SER SER ASP
ASP SER LEU ARG SER HIS MET ARG HIS SER ASP SER ILE SER SER LEU ALA SER GLU ARG GLU Y983 I984 D988 N992 E993 L994 L1000 S1001 Q1002 K1003 E1011 H1012 L1013 E1014 Q1020 N1021 A1022 L1023 C1031 L1034 K1035 S1036 L1037 T1038 H1039 L1040 D1041
S1044 I1060 L1063 D1064 V1065 S1066 R1067 V1074 D1077 F1088 S1091 Y1092 N1093 Q1094 L1095 E1100 I1113 L1114 E1115 G1116 N1117 I1122 C1123 S1124 P1125 L1126 R1127 L1128 K1129 E1130 L1131 L1134 N1135 L1136 S1137 K1138 E1146 N1147 F1148 E1156 S1157 F1158 S1159 P1169 F1170 L1171
P1172 M1175 L1178 K1179 N1183 K1184 F1185 E1190 L1193 N1194 L1195 L1198 L1201 N1206 D1207 I1208 P1214 W1217 L1225 L1226 N1230 L1235 D1236 L1237 W1244 E1248 H1251 L1252 S1253 H1254 N1255 P1261 I1264 L1267 L1270 T1271 S1272 L1273 D1274
S1283 M1288 L1291 L1297 P1298 L1299 H1303 LEU ASN PHE ASP PHE LYS HIS ILE GLY CYS K1314 L1322 K1327 N1333 L1337 M1338 I1339 V1340 G1341 N1342 G1346 K1347 T1348 T1349 L1350 L1351 L1354 MET LYS THR LYS LYS SER ASP LEU GLY MET GLN SER ALA T1368 I1371
I1378 GLN ILE ARG ASP LYS ARG LYS ARG ASP L1388 V1389 L1390 N1391 V1392 W1393 D1394 F1395 E1399 Y1402 P1406 H1407 L1414 Y1419 D1429 A1430 M1431 K1432 P1433 W1434 K1439 P1446 V1447 I1448 L1449 V1450 G1451 T1452 H1453 L1454 D1455 V1456 SER ASP GLU LYS GLN ARG K1463 T1470
K1471 L1474 N1475 F1479 P1480 A1481 I1482 R1483 D1484 Y1485 H1486 F1487 V1488 N1489 A1490 THR GLU GLU S1494 L1500 R1501 K1502 T1503 I1504 I1505 N1506 E1507 K1512 L1517 V1557 ARG GLU ASN Q1561 E1568 L1569 V1573 F1585 GLN ASP PRO ALA LEU GLN LEU S1593 I1610 L1611 T1612 VAL
LYS VAL GLU GLY CYS PRO LYS HIS P1622 K1633 PHE LEU SER LYS LYS ARG LYS PHE PRO K1643 M1646 Y1649 L1653 E1654 Q1657 ILE ALA LEU PRO ILE GLY GLU GLU TYR LEU L1668 V1669 P1670 D1675 HIS ARG PRO VAL ILE GLU LEU PRO HIS C1685 E1686 N1687 I1692 R1693


L1694 Y1695 E1696 P1701 M1702 G1703 F1704 W1705 S1706 R1707 L1708 I1709 L1712 L1713 E1714 I1715 S1716 P1717 TYR MET LEU SER GLY ARG GLU ARG ALA L1727 N1730 Y1733 W1734 R1735 Q1736 G1737 I1738 Y1739 L1740 N1741 Y1747 C1748 L1749 F1762 L1763 K1764 I1765 T1766 V1767 P1768 L1776 L1777 G1778 Q1779 V1780
D1785 L1796 E1797 I1798 ASP ILE CYS GLY GLU GLY E1805 K1809 K1810 W1811 Y1814 S1815 F1816 N1817 ASP GLY GLU GLU HIS GLN K1824 L1827 D1828 D1829 K1832 K1833 N1842 P1843 D1844 Q1845 P1846 R1847 L1848 D1858 L1859 N1867 D1873 L1884 L1885 G1886 D1887 G1888 S1889 F1890
V1893 Y1894 R1895 V1905 K1906 N1909 LYS H1911 R1915 R1918 Q1919 V1923 L1924 C1925 H1926 H1929 P1930 S1931 L1932 L1936 L1945 V1946 A1950 D1956 R1957 L1958 Q1961 D1962 K1963 A1964 T1967 R1973 L1976 D1980 G1981 L1982 R1983 Y1984 Y1992 L1995 K1996 P1997 H1998
N1999 V2000 L2001 L2002 I2011 I2012 A2013 K2014 D2017 Y2018 G2019 ILE ALA GLN TYR CYS CYS ARG MET GLY ILE LYS THR SER GLU G2034 A2040 P2041 E2042 V2043 A2044 R2045 GLY ASN VAL ILE TYR ASN Q2052 Y2057 D2065 T2069 G2070 G2071 R2072 I2073 V2074 E2075 G2076 L2077 K2078 F2079 P2080 N2081
L2086 E2087 I2088 Q2089 L2092 G2100 M2106 L2115 K2116 R2122 S2125 A2126 Q2127 V2128 I2131 L2140 T2141 R2142 V2152 V2156 A2157 THR HIS HIS ASN SER ARG ASN ALA S2166 I2167 W2168 L2169 G2170 CYS GLY HIS THR ASP ARG G2177 L2182 D2183 L2184 ASN THR GLU GLY
TYR THR SER GLU GLU VAL ALA ASP SER R2198 A2203 L2204 VAL HIS LEU PRO VAL GLU LYS GLU SER TRP I2215 V2216 S2217 G2218 T2219 Q2220 S2221 G2222 T2223 L2224 L2225 N2228 THR GLU ASP GLY LYS LYS ARG HIS THR LEU GLU LYS MET THR ASP S2244 V2245 T2246 C2247 L2248 Y2249 C2250 ASN SER
PHE SER LYS GLN SER LYS GLN LYS ASN PHE L2263 L2264 V2265 G2266 T2267 A2268 A2273 I2274 F2275 GLU ASP LYS THR VAL LYS LEU LYS GLY ALA ALA P2287 I2293 G2294 ASN VAL SER T2298 P2299 L2300 M2301 C2302 L2303 S2304 E2305 S2306 THR ASN SER THR GLU ARG ASN V2314 M2315 W2316 C2319 G2320
T2321 K2322 I2323 F2326 SER ASN ASP PHE T2331 L2335 T2338 S2345 Y2346 A2347 A2348 D2351 S2352 N2353 I2354 I2355 T2356 V2357 V2358 V2359 I2365 A2366 K2367 S2370 V2373 E2374 V2375 W2376 C2384 I2387 R2394 E2395 V2396 MET VAL LYS GLU ASN LYS GLU SER LYS HIS LYS MET
S2409 Y2410 S2411 G2412 R2413 T2416 L2419 Q2420 K2421 N2422 T2423 A2424 L2425 W2426 I2427 G2428 T2429 G2430 G2431 I2434 L2435 L2436 L2437 D2438 L2439 I2445 R2446 V2447 I2448 Y2449 N2450 N2453 M2458 L2463 GLY SER LEU K2467 N2468 V2469 M2470 L2471 Y2475 N2476 R2477 LYS ASN THR GLU GLY THR GLN
LYS GLN LYS E2488 I2489 Q2490 S2491 D2497 I2498 N2499 E2503 I2511 R2514 L2517 M2521 R2522 ARG THR SER VAL GLU

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	102649	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 ($e^-/Å^2$)	55	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	130000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.706	Depositor
Minimum map value	-0.399	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.012	Depositor
Recommended contour level	0.117	Depositor
Map size (Å)	374.0, 374.0, 374.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.935, 0.935, 0.935	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A1N, GDP

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	0.26	0/947	0.50	0/1294
2	A	0.25	0/10781	0.53	5/14713 (0.0%)
All	All	0.25	0/11728	0.53	5/16007 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1041	ASP	CB-CG-OD1	8.59	126.03	118.30
2	A	2115	LEU	CA-CB-CG	7.29	132.06	115.30
2	A	673	LEU	CA-CB-CG	6.27	129.72	115.30
2	A	1796	LEU	CA-CB-CG	6.10	129.32	115.30
2	A	635	LEU	CA-CB-CG	5.41	127.74	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	926	0	887	45	0
2	A	10610	0	9944	292	0
3	A	28	0	0	0	0
4	A	28	0	12	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	11592	0	10843	335	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 15.

All (335) 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:1992:TYR:CE1	2:A:2018:TYR:HB3	1.99	0.98
2:A:1488:VAL:HG21	2:A:1500:LEU:HD22	1.66	0.78
2:A:1156:GLU:HA	2:A:1175:MET:HA	1.69	0.74
2:A:1924:LEU:HD13	2:A:2018:TYR:HE1	1.53	0.73
2:A:1419:TYR:HB2	2:A:1451:GLY:HA2	1.70	0.72
2:A:1208:ILE:HG12	2:A:1230:ASN:HD21	1.54	0.70
2:A:1333:ASN:HB3	2:A:1388:LEU:HA	1.72	0.70
2:A:1696:GLU:HA	2:A:1762:PHE:HB3	1.73	0.70
2:A:1925:CYS:O	2:A:1926:HIS:ND1	2.25	0.70
1:B:96:GLU:OE1	1:B:96:GLU:N	2.22	0.69
2:A:2306:SER:HB3	2:A:2359:VAL:HB	1.73	0.69
2:A:796:LEU:HD21	2:A:798:VAL:HG13	1.75	0.68
2:A:1976:LEU:HD21	2:A:2511:ILE:HD11	1.76	0.68
2:A:1992:TYR:HE1	2:A:2018:TYR:HB3	1.57	0.67
2:A:1235:LEU:HD23	2:A:1261:PRO:HD2	1.76	0.67
2:A:1992:TYR:CD1	2:A:2018:TYR:HB3	2.29	0.67
2:A:1214:PRO:HA	2:A:1217:TRP:HD1	1.59	0.66
1:B:144:GLN:HB3	1:B:148:GLY:HA2	1.77	0.66
2:A:1116:GLY:HA2	2:A:1138:LYS:HB2	1.78	0.66
2:A:2266:GLY:HA3	2:A:2300:LEU:HD22	1.78	0.65
2:A:1037:LEU:HD21	2:A:1040:LEU:HB2	1.78	0.65
2:A:676:PHE:HA	2:A:679:MET:SD	2.37	0.65
2:A:1044:SER:HA	2:A:1067:ARG:HB2	1.79	0.64
1:B:87:HIS:NE2	1:B:116:TRP:O	2.31	0.64
2:A:2469:VAL:HG12	2:A:2497:ASP:HA	1.80	0.63
2:A:775:LEU:O	2:A:779:ILE:HG12	1.98	0.63
2:A:793:ARG:O	2:A:793:ARG:NH1	2.30	0.63
2:A:1885:LEU:HD21	2:A:1895:ARG:HB3	1.80	0.63
1:B:98:VAL:HG21	1:B:130:ILE:HD12	1.81	0.63
1:B:107:ASP:HB3	1:B:110:ALA:HB2	1.81	0.63
2:A:1183:ASN:O	2:A:1206:ASN:ND2	2.31	0.63
2:A:743:SER:N	2:A:746:CYS:SG	2.71	0.63
2:A:1479:PHE:HB3	2:A:1480:PRO:HD2	1.80	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:2152:VAL:HG11	2:A:2169:LEU:HD23	1.80	0.62
1:B:45:THR:OG1	1:B:46:ASP:N	2.30	0.62
2:A:1399:GLU:O	2:A:1402:TYR:HB2	2.00	0.62
2:A:1929:HIS:HB3	2:A:1932:LEU:HG	1.81	0.62
2:A:1171:LEU:HD12	2:A:1172:PRO:HD2	1.82	0.61
2:A:1512:LYS:HA	2:A:1517:LEU:H	1.66	0.61
2:A:1956:ASP:OD2	2:A:1998:HIS:ND1	2.33	0.61
2:A:1950:ALA:HB2	2:A:2001:LEU:HB3	1.82	0.61
2:A:1884:LEU:HA	2:A:1894:TYR:HA	1.82	0.61
2:A:1131:LEU:HD11	2:A:1134:LEU:HB3	1.82	0.61
2:A:2453:ASN:OD1	2:A:2477:ARG:NH2	2.33	0.61
2:A:1858:ASP:O	2:A:1918:ARG:NH2	2.33	0.61
2:A:665:LEU:O	2:A:668:HIS:ND1	2.33	0.61
2:A:1924:LEU:HD13	2:A:2018:TYR:CE1	2.35	0.61
2:A:1237:LEU:HD23	2:A:1264:ILE:HG22	1.82	0.60
2:A:2321:THR:O	2:A:2338:THR:OG1	2.19	0.60
2:A:2076:GLY:HA2	2:A:2080:PRO:HA	1.83	0.60
1:B:74:ASP:HB3	1:B:77:ALA:HB2	1.84	0.60
1:B:132:GLU:HB2	1:B:136:LYS:NZ	2.17	0.60
2:A:1569:LEU:O	2:A:1573:VAL:HG12	2.01	0.60
2:A:2156:VAL:HG22	2:A:2168:TRP:HB2	1.83	0.60
2:A:814:GLU:HB2	2:A:817:TRP:CD1	2.37	0.60
2:A:1958:LEU:HG	2:A:2002:LEU:HD22	1.84	0.60
1:B:123:ALA:HA	1:B:163:ILE:HD13	1.84	0.59
2:A:674:VAL:O	2:A:678:GLN:HG2	2.02	0.59
2:A:1833:LYS:HA	2:A:1859:LEU:HD21	1.85	0.59
2:A:1092:TYR:CE1	2:A:1116:GLY:HA3	2.38	0.59
2:A:1694:LEU:HB2	2:A:1811:TRP:HB2	1.85	0.59
1:B:95:LEU:HD11	1:B:129:GLU:HG3	1.84	0.58
2:A:1984:TYR:OH	2:A:2522:ARG:NH2	2.32	0.58
2:A:2302:CYS:SG	2:A:2357:VAL:N	2.77	0.58
2:A:2435:LEU:HD23	2:A:2447:VAL:HG22	1.85	0.58
2:A:2018:TYR:CD1	2:A:2018:TYR:N	2.72	0.57
2:A:755:PRO:HB3	2:A:789:LEU:HD11	1.86	0.57
2:A:1038:THR:HA	2:A:1060:ILE:HA	1.85	0.57
2:A:2141:THR:HG23	2:A:2142:ARG:HG2	1.85	0.57
1:B:149:GLU:HB2	1:B:153:ASP:HB2	1.85	0.57
2:A:1135:ASN:OD1	2:A:1159:SER:OG	2.22	0.57
1:B:136:LYS:HD3	1:B:136:LYS:N	2.20	0.57
2:A:2065:ASP:O	2:A:2069:THR:N	2.33	0.57
2:A:1270:LEU:HD23	2:A:1291:LEU:HD13	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:149:GLU:OE2	1:B:149:GLU:N	2.38	0.56
2:A:1092:TYR:HE1	2:A:1116:GLY:HA3	1.70	0.56
1:B:94:HIS:NE2	1:B:96:GLU:OE2	2.38	0.56
2:A:1248:GLU:O	2:A:1271:THR:N	2.32	0.56
1:B:128:LEU:HD13	1:B:163:ILE:HA	1.87	0.56
2:A:1701:PRO:HG2	2:A:1704:PHE:HB2	1.85	0.56
2:A:2040:ALA:H	2:A:2044:ALA:HB3	1.69	0.56
2:A:800:ASN:HD21	2:A:1967:THR:HG21	1.71	0.56
2:A:1936:LEU:HB2	2:A:1946:VAL:HG12	1.88	0.56
2:A:1351:LEU:HD11	2:A:1392:VAL:HG11	1.88	0.56
2:A:1992:TYR:CE2	2:A:1995:LEU:HD23	2.41	0.56
1:B:128:LEU:HD11	1:B:166:VAL:HG21	1.88	0.55
2:A:1414:LEU:HD12	2:A:1446:PRO:HG2	1.89	0.55
2:A:1127:ARG:O	2:A:1129:LYS:NZ	2.33	0.55
2:A:1705:TRP:CD1	2:A:1736:GLN:HG2	2.42	0.55
2:A:758:VAL:HG11	2:A:786:ILE:HG23	1.88	0.55
2:A:671:PHE:O	2:A:675:ILE:HG22	2.07	0.55
2:A:802:SER:HA	2:A:984:ILE:HG23	1.88	0.55
2:A:2413:ARG:O	2:A:2430:GLY:N	2.39	0.55
2:A:1454:LEU:HB2	2:A:1489:ASN:HA	1.87	0.55
2:A:1730:ASN:OD1	2:A:1741:ASN:ND2	2.39	0.55
1:B:46:ASP:OD1	1:B:50:VAL:N	2.40	0.55
2:A:762:LEU:HD11	2:A:790:LEU:HD23	1.87	0.55
1:B:49:GLY:O	1:B:80:HIS:ND1	2.38	0.55
2:A:1347:LYS:NZ	2:A:1395:PHE:O	2.27	0.55
2:A:1733:TYR:HB3	2:A:1738:ILE:HA	1.89	0.55
1:B:79:ASP:OD1	1:B:83:PHE:N	2.39	0.54
2:A:631:LEU:O	2:A:635:LEU:HD22	2.06	0.54
1:B:112:ASP:OD1	1:B:116:TRP:N	2.35	0.54
2:A:1041:ASP:HB2	2:A:1064:ASP:HB3	1.89	0.54
2:A:1715:ILE:HD11	2:A:1779:GLN:HB3	1.88	0.54
1:B:89:ALA:HB1	1:B:98:VAL:HG22	1.89	0.54
1:B:152:PHE:HE2	1:B:168:GLN:HB3	1.70	0.54
2:A:1264:ILE:O	2:A:1267:LEU:HB2	2.08	0.54
2:A:1091:SER:O	2:A:1093:ASN:ND2	2.41	0.54
2:A:736:ASN:HB3	2:A:766:SER:HA	1.89	0.54
2:A:810:ILE:HG12	2:A:992:ASN:HB3	1.90	0.54
2:A:1115:GLU:HG2	2:A:1137:SER:HB2	1.89	0.54
2:A:1041:ASP:OD1	2:A:1041:ASP:O	2.26	0.54
1:B:62:LEU:HD13	1:B:96:GLU:HG2	1.91	0.53
2:A:1439:LYS:HB2	2:A:1480:PRO:HD3	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1692:ILE:HG13	2:A:1766:THR:HG22	1.89	0.53
1:B:165:GLU:HA	1:B:168:GLN:HE21	1.72	0.53
2:A:1956:ASP:N	2:A:1956:ASP:OD1	2.40	0.53
1:B:58:ASP:OD2	2:A:2348:ALA:N	2.35	0.53
1:B:98:VAL:HG11	1:B:130:ILE:HG23	1.91	0.53
2:A:673:LEU:HD13	2:A:677:HIS:HE1	1.72	0.53
2:A:2300:LEU:HA	2:A:2319:CYS:HA	1.90	0.53
2:A:673:LEU:HD12	2:A:674:VAL:HG13	1.90	0.53
2:A:814:GLU:HB2	2:A:817:TRP:NE1	2.24	0.53
2:A:1915:ARG:O	2:A:1915:ARG:NH1	2.37	0.53
2:A:1270:LEU:HB3	2:A:1291:LEU:HD22	1.90	0.53
2:A:1992:TYR:OH	2:A:1999:ASN:OD1	2.27	0.53
2:A:1670:PRO:HB3	2:A:1709:ILE:HD11	1.91	0.52
2:A:2316:TRP:HE3	2:A:2323:ILE:HD11	1.73	0.52
2:A:2224:LEU:H	2:A:2224:LEU:HD23	1.74	0.52
2:A:1253:SER:O	2:A:1255:ASN:ND2	2.42	0.52
2:A:1449:LEU:HD21	2:A:1482:ILE:HD12	1.92	0.52
2:A:2476:ASN:HB2	2:A:2490:GLN:HB3	1.91	0.52
1:B:61:HIS:O	1:B:65:VAL:HG12	2.10	0.52
2:A:994:LEU:HB2	2:A:1021:ASN:ND2	2.24	0.52
2:A:1919:GLN:O	2:A:1923:VAL:HG12	2.09	0.52
2:A:1128:LEU:HD23	2:A:1131:LEU:HB2	1.92	0.52
2:A:2042:GLU:N	2:A:2042:GLU:OE1	2.43	0.52
2:A:2365:ILE:HD12	2:A:2376:TRP:CD1	2.46	0.51
2:A:792:ARG:HD3	2:A:796:LEU:HD13	1.93	0.51
2:A:2246:THR:OG1	2:A:2300:LEU:O	2.20	0.51
2:A:2425:LEU:HB2	2:A:2439:LEU:HD21	1.93	0.51
2:A:2471:LEU:HD12	2:A:2471:LEU:H	1.74	0.51
1:B:165:GLU:HA	1:B:168:GLN:NE2	2.26	0.51
2:A:1929:HIS:NE2	2:A:1980:ASP:OD1	2.40	0.51
2:A:743:SER:N	2:A:746:CYS:HG	2.09	0.51
2:A:1297:LEU:HD23	2:A:1299:LEU:HD11	1.93	0.51
2:A:676:PHE:HE2	2:A:724:MET:HG3	1.76	0.51
2:A:1348:THR:N	4:A:2602:GDP:O2A	2.41	0.50
2:A:2018:TYR:O	2:A:2018:TYR:HD1	1.92	0.50
2:A:1274:ASP:HA	2:A:1298:PRO:HG2	1.93	0.50
2:A:2411:SER:OG	2:A:2431:GLY:N	2.43	0.50
2:A:1692:ILE:HD11	2:A:1764:LYS:HE3	1.93	0.50
2:A:1337:LEU:HD23	2:A:1392:VAL:HG12	1.93	0.50
2:A:2125:SER:HA	2:A:2128:VAL:HG22	1.94	0.50
2:A:1020:GLN:HA	2:A:1044:SER:HB2	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1501:ARG:O	2:A:1505:ILE:HG12	2.12	0.49
2:A:1000:LEU:HD23	2:A:1000:LEU:H	1.77	0.49
1:B:94:HIS:CD2	1:B:97:ILE:HG13	2.48	0.49
1:B:102:LEU:HB3	1:B:137:HIS:CD2	2.46	0.49
2:A:1214:PRO:HA	2:A:1217:TRP:CD1	2.45	0.49
2:A:1065:VAL:O	2:A:1065:VAL:HG23	2.12	0.49
2:A:1198:LEU:HD21	2:A:1201:LEU:HB2	1.93	0.49
2:A:676:PHE:CE2	2:A:724:MET:HG3	2.48	0.49
2:A:1889:SER:OG	2:A:1890:PHE:N	2.46	0.49
2:A:1893:VAL:HA	2:A:1906:LYS:HA	1.95	0.49
2:A:713:LEU:HA	2:A:728:LEU:HD13	1.95	0.49
2:A:1406:PRO:HG3	2:A:1702:MET:HB3	1.94	0.49
2:A:1342:ASN:HD22	2:A:1431:MET:HB2	1.79	0.48
2:A:736:ASN:HB2	2:A:767:ARG:HG2	1.94	0.48
2:A:674:VAL:HA	2:A:677:HIS:ND1	2.28	0.48
2:A:1063:LEU:HD22	2:A:1088:PHE:HE1	1.78	0.48
2:A:1190:GLU:HA	2:A:1193:LEU:HD23	1.95	0.48
2:A:1925:CYS:SG	2:A:1926:HIS:N	2.87	0.48
2:A:2115:LEU:HD12	2:A:2115:LEU:O	2.13	0.48
2:A:1471:LYS:O	2:A:1475:ASN:ND2	2.47	0.48
2:A:2041:PRO:HG3	2:A:2057:TYR:CD2	2.48	0.48
2:A:2127:GLN:O	2:A:2131:ILE:HG12	2.13	0.48
2:A:2476:ASN:N	2:A:2490:GLN:O	2.33	0.48
2:A:744:LEU:O	2:A:748:VAL:HG23	2.13	0.47
2:A:2041:PRO:HG3	2:A:2057:TYR:CG	2.48	0.47
2:A:2045:ARG:NH1	2:A:2087:GLU:O	2.47	0.47
2:A:2305:GLU:HB2	2:A:2315:MET:HG2	1.95	0.47
1:B:80:HIS:HD1	1:B:80:HIS:H	1.62	0.47
2:A:783:ASP:OD1	2:A:784:SER:N	2.48	0.47
2:A:1146:GLU:HA	2:A:1169:PRO:HB2	1.96	0.47
2:A:1226:LEU:HA	2:A:1251:HIS:HB2	1.96	0.47
2:A:1693:ARG:HB2	2:A:1765:ILE:HG23	1.96	0.47
2:A:666:LEU:HD12	2:A:671:PHE:CE2	2.50	0.47
2:A:2302:CYS:HB2	2:A:2355:ILE:O	2.15	0.47
1:B:94:HIS:O	1:B:98:VAL:HG23	2.15	0.46
2:A:1337:LEU:HB2	2:A:1390:LEU:HD12	1.97	0.46
1:B:165:GLU:O	1:B:169:LYS:NZ	2.44	0.46
2:A:1610:ILE:HG21	2:A:1653:LEU:HD21	1.96	0.46
2:A:1703:GLY:HA3	2:A:1707:ARG:NH1	2.30	0.46
2:A:1832:LYS:HD2	2:A:1832:LYS:HA	1.72	0.46
2:A:2434:ILE:HB	2:A:2448:ILE:HB	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1125:PRO:HA	2:A:1148:PHE:HA	1.98	0.46
2:A:673:LEU:HD12	2:A:674:VAL:N	2.31	0.46
2:A:1341:GLY:O	2:A:1434:TRP:NE1	2.49	0.46
2:A:2424:ALA:HA	2:A:2437:LEU:O	2.16	0.46
2:A:2106:MET:SD	2:A:2140:LEU:HD13	2.56	0.46
2:A:2373:VAL:HB	2:A:2387:ILE:HG13	1.97	0.46
2:A:1693:ARG:NH1	2:A:1858:ASP:OD2	2.41	0.46
1:B:102:LEU:HB3	1:B:137:HIS:NE2	2.31	0.45
2:A:735:ALA:HB1	2:A:761:LEU:HD12	1.98	0.45
2:A:1011:GLU:HA	2:A:1034:LEU:HA	1.98	0.45
2:A:1767:VAL:HG11	2:A:1777:LEU:HB2	1.97	0.45
2:A:1810:LYS:H	2:A:1810:LYS:HG2	1.58	0.45
1:B:53:LEU:HB3	1:B:68:LEU:HD23	1.98	0.45
2:A:1776:LEU:O	2:A:1780:VAL:HG12	2.16	0.45
1:B:96:GLU:HA	1:B:99:GLU:OE2	2.16	0.45
2:A:2219:THR:OG1	2:A:2220:GLN:N	2.49	0.45
2:A:2320:GLY:O	2:A:2354:ILE:HG22	2.16	0.45
2:A:2428:GLY:HA2	2:A:2434:ILE:HD13	1.97	0.45
2:A:1159:SER:HB2	2:A:1179:LYS:HB2	1.97	0.45
2:A:2065:ASP:OD2	2:A:2073:ILE:HG12	2.17	0.45
2:A:743:SER:O	2:A:747:GLN:NE2	2.45	0.45
2:A:1693:ARG:HB2	2:A:1765:ILE:CG2	2.47	0.45
2:A:1956:ASP:OD2	2:A:1998:HIS:HA	2.17	0.45
2:A:1270:LEU:HD21	2:A:1273:LEU:HD22	1.98	0.45
2:A:1486:HIS:HE1	2:A:1503:THR:HG21	1.80	0.45
2:A:1930:PRO:O	2:A:2014:LYS:NZ	2.38	0.45
2:A:2300:LEU:HD21	2:A:2303:LEU:HD21	1.98	0.45
1:B:91:HIS:HB2	1:B:121:LEU:HD23	1.98	0.45
2:A:1077:ASP:N	2:A:1077:ASP:OD1	2.51	0.45
2:A:2086:LEU:HD12	2:A:2087:GLU:HG3	1.99	0.45
2:A:795:ALA:HB1	2:A:804:CYS:O	2.17	0.44
2:A:805:LEU:HD23	2:A:805:LEU:HA	1.83	0.44
2:A:1646:MET:HA	2:A:1649:TYR:HB3	1.99	0.44
2:A:2426:TRP:CD1	2:A:2436:LEU:HD22	2.52	0.44
2:A:2514:ARG:HG2	2:A:2514:ARG:HH11	1.82	0.44
2:A:648:GLY:O	2:A:650:GLN:N	2.49	0.44
2:A:1484:ASP:OD1	2:A:1485:TYR:N	2.50	0.44
2:A:719:GLN:OE1	2:A:721:ASN:HB2	2.18	0.44
2:A:2490:GLN:NE2	2:A:2491:SER:O	2.50	0.44
2:A:1432:LYS:HE2	2:A:1474:LEU:HD13	1.99	0.44
2:A:2322:LYS:NZ	2:A:2335:LEU:HD23	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1486:HIS:CE1	2:A:1503:THR:HG21	2.53	0.44
2:A:1996:LYS:HD2	2:A:1998:HIS:HB2	2.00	0.44
2:A:1452:THR:HG22	2:A:1452:THR:O	2.17	0.43
2:A:1747:TYR:CZ	2:A:1768:PRO:HD3	2.52	0.43
2:A:1814:TYR:HE1	2:A:1827:LEU:HB2	1.82	0.43
2:A:1158:PHE:O	2:A:1178:LEU:HD12	2.18	0.43
1:B:119:LEU:HB2	1:B:134:LEU:HD23	1.99	0.43
1:B:124:LEU:HD12	1:B:154:LEU:HD22	2.00	0.43
2:A:1012:HIS:HA	2:A:1036:SER:HB3	1.99	0.43
2:A:1346:GLY:HA3	2:A:1452:THR:HG21	2.01	0.43
2:A:1982:LEU:HD12	2:A:1995:LEU:HD11	2.00	0.43
2:A:2436:LEU:HB2	2:A:2445:ILE:HB	2.00	0.43
2:A:1038:THR:HA	2:A:1060:ILE:HD12	2.01	0.43
2:A:1815:SER:HB3	2:A:1824:LYS:HD2	2.00	0.43
2:A:2436:LEU:HD12	2:A:2446:ARG:HG2	2.00	0.43
2:A:1288:MET:HB2	2:A:1322:LEU:HD13	1.98	0.43
2:A:1973:ARG:HG2	2:A:2012:ILE:HD12	1.99	0.43
2:A:804:CYS:HA	2:A:988:ASP:HB3	2.00	0.43
2:A:1712:LEU:O	2:A:1713:LEU:HD23	2.18	0.43
2:A:2425:LEU:HD23	2:A:2427:ILE:HD11	1.99	0.43
2:A:2419:LEU:HD12	2:A:2420:GLN:N	2.34	0.43
2:A:677:HIS:O	2:A:681:SER:HB3	2.19	0.43
2:A:2018:TYR:CD1	2:A:2018:TYR:O	2.71	0.43
2:A:2092:LEU:HD23	2:A:2092:LEU:HA	1.88	0.43
2:A:1715:ILE:HG22	2:A:1740:LEU:HD11	2.01	0.43
2:A:1747:TYR:CE2	2:A:1768:PRO:HD3	2.54	0.43
2:A:1814:TYR:CE1	2:A:1827:LEU:HB2	2.54	0.43
2:A:1074:VAL:HB	2:A:1095:LEU:HD21	2.00	0.42
2:A:1371:ILE:HD12	2:A:1393:TRP:CE3	2.54	0.42
2:A:787:ILE:HD12	2:A:817:TRP:CE3	2.53	0.42
2:A:1002:GLN:HG2	2:A:1003:LYS:H	1.84	0.42
2:A:1251:HIS:HA	2:A:1274:ASP:HB3	2.00	0.42
2:A:1414:LEU:HD11	2:A:1507:GLU:HB3	2.01	0.42
2:A:1796:LEU:O	2:A:1796:LEU:HD12	2.19	0.42
2:A:2445:ILE:HD13	2:A:2445:ILE:HA	1.88	0.42
2:A:1273:LEU:HD12	2:A:1273:LEU:HA	1.86	0.42
2:A:1687:ASN:HD21	2:A:1824:LYS:HD3	1.83	0.42
2:A:2416:THR:HG21	2:A:2458:MET:H	1.83	0.42
2:A:1339:ILE:HG23	2:A:1394:ASP:HA	2.00	0.42
2:A:2116:LYS:HB2	2:A:2122:ARG:HG2	2.00	0.42
2:A:1248:GLU:O	2:A:1270:LEU:HD12	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1297:LEU:HA	2:A:1298:PRO:HD3	1.73	0.42
2:A:1693:ARG:NH2	2:A:1829:ASP:OD2	2.52	0.42
2:A:2354:ILE:HD11	2:A:2357:VAL:HG23	2.01	0.42
2:A:2517:LEU:O	2:A:2521:MET:HG2	2.18	0.42
1:B:97:ILE:HG22	1:B:101:LEU:HD23	2.02	0.42
2:A:691:PHE:O	2:A:694:LEU:HG	2.19	0.42
2:A:1845:GLN:OE1	2:A:1847:ARG:HG3	2.20	0.42
2:A:2167:ILE:HG22	2:A:2182:LEU:HB3	2.01	0.42
1:B:79:ASP:OD2	2:A:2346:TYR:OH	2.32	0.42
2:A:1414:LEU:HD21	2:A:1448:ILE:HD12	2.01	0.42
2:A:836:ALA:HA	2:A:839:LEU:HD12	2.02	0.41
2:A:2011:ILE:HD13	2:A:2011:ILE:HA	1.94	0.41
2:A:992:ASN:O	2:A:994:LEU:N	2.53	0.41
2:A:1739:TYR:HB2	2:A:1749:LEU:HD13	2.01	0.41
2:A:2045:ARG:HD2	2:A:2088:ILE:HA	2.02	0.41
2:A:2423:THR:HB	2:A:2439:LEU:HB2	2.03	0.41
1:B:145:ASP:OD1	1:B:148:GLY:N	2.47	0.41
2:A:1351:LEU:HD12	2:A:1351:LEU:HA	1.90	0.41
2:A:1195:LEU:HD21	2:A:1198:LEU:HD12	2.02	0.41
2:A:1929:HIS:ND1	2:A:1930:PRO:HD2	2.35	0.41
2:A:1114:LEU:HB3	2:A:1117:ASN:HD22	1.85	0.41
2:A:1201:LEU:O	2:A:1225:LEU:HA	2.20	0.41
2:A:1208:ILE:CG1	2:A:1230:ASN:HD21	2.29	0.41
2:A:1270:LEU:HD21	2:A:1273:LEU:HD13	2.01	0.41
1:B:152:PHE:CE2	1:B:168:GLN:HB3	2.54	0.41
1:B:162:ASP:N	1:B:162:ASP:OD1	2.53	0.41
2:A:673:LEU:O	2:A:677:HIS:CE1	2.74	0.41
2:A:791:LEU:HB3	2:A:821:LEU:HD11	2.02	0.41
2:A:779:ILE:HD12	2:A:817:TRP:HZ3	1.84	0.41
2:A:1696:GLU:OE1	2:A:1809:LYS:HE2	2.21	0.41
2:A:2265:VAL:HB	2:A:2273:ALA:HB3	2.03	0.41
2:A:2367:LYS:O	2:A:2370:SER:HB3	2.21	0.41
2:A:1014:GLU:HA	2:A:1036:SER:O	2.21	0.41
2:A:1929:HIS:CG	2:A:1930:PRO:HD2	2.56	0.41
2:A:2152:VAL:HG11	2:A:2169:LEU:HB3	2.03	0.41
2:A:2315:MET:HE2	2:A:2315:MET:HB2	1.86	0.41
2:A:676:PHE:CD2	2:A:724:MET:HE3	2.56	0.41
2:A:1066:SER:O	2:A:1092:TYR:HB2	2.20	0.41
2:A:1214:PRO:HB3	2:A:1244:TRP:CD1	2.56	0.41
2:A:1350:LEU:HD11	2:A:1450:VAL:HG11	2.02	0.41
2:A:1470:THR:HG23	2:A:1474:LEU:HD23	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1734:TRP:CZ2	2:A:1737:GLY:HA3	2.56	0.41
2:A:2222:GLY:HA2	2:A:2245:VAL:HG23	2.03	0.41
2:A:2499:ASN:O	2:A:2503:GLU:HB2	2.20	0.41
2:A:817:TRP:CD1	2:A:817:TRP:N	2.89	0.40
2:A:1371:ILE:HD12	2:A:1393:TRP:HE3	1.86	0.40
2:A:2203:ALA:O	2:A:2216:VAL:N	2.48	0.40
1:B:93:GLY:HA3	1:B:127:HIS:CE1	2.56	0.40
2:A:1185:PHE:HD1	2:A:1185:PHE:HA	1.77	0.40
2:A:1906:LYS:HB3	2:A:1945:LEU:HB2	2.04	0.40
2:A:629:LYS:O	2:A:632:VAL:HG22	2.21	0.40
2:A:1905:VAL:HG22	2:A:1946:VAL:HG22	2.03	0.40
2:A:1113:ILE:HG23	2:A:1135:ASN:HB2	2.04	0.40
2:A:1845:GLN:HA	2:A:1846:PRO:HD3	1.95	0.40
2:A:2354:ILE:HA	2:A:2367:LYS:HA	2.03	0.40
2:A:1021:ASN:HD22	2:A:1023:LEU:CD1	2.35	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	B	115/182 (63%)	111 (96%)	4 (4%)	0	100	100
2	A	1407/2527 (56%)	1285 (91%)	122 (9%)	0	100	100
All	All	1522/2709 (56%)	1396 (92%)	126 (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
1	B	95/141 (67%)	90 (95%)	5 (5%)	22 52
2	A	1031/2281 (45%)	1010 (98%)	21 (2%)	55 74
All	All	1126/2422 (46%)	1100 (98%)	26 (2%)	53 71

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	78	TRP
1	B	157	ASP
1	B	161	GLU
1	B	162	ASP
1	B	165	GLU
2	A	671	PHE
2	A	676	PHE
2	A	679	MET
2	A	749	CYS
2	A	793	ARG
2	A	809	CYS
2	A	1021	ASN
2	A	1041	ASP
2	A	1127	ARG
2	A	1407	HIS
2	A	1429	ASP
2	A	1585	PHE
2	A	1762	PHE
2	A	1785	ASP
2	A	1915	ARG
2	A	2017	ASP
2	A	2018	TYR
2	A	2370	SER
2	A	2449	TYR
2	A	2453	ASN
2	A	2475	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	168	GLN
2	A	721	ASN
2	A	1021	ASN
2	A	1741	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 (i)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	GDP	A	2602	2	24,30,30	0.96	1 (4%)	30,47,47	1.29	5 (16%)
3	A1N	A	2601	-	29,32,32	3.68	13 (44%)	37,48,48	2.15	10 (27%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GDP	A	2602	2	-	4/12/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	A1N	A	2601	-	-	0/10/29/29	0/5/5/5

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2601	A1N	C11-N4	-10.99	1.14	1.35
3	A	2601	A1N	C20-C21	-6.37	1.29	1.42
3	A	2601	A1N	O1-C2	-6.05	1.33	1.44
3	A	2601	A1N	C8-C7	-5.96	1.30	1.39
3	A	2601	A1N	O1-C5	-5.86	1.33	1.44
3	A	2601	A1N	C13-C12	-5.26	1.32	1.41
3	A	2601	A1N	C7-N3	-4.92	1.23	1.34
3	A	2601	A1N	C10-N3	-4.06	1.26	1.33
3	A	2601	A1N	N5-N4	-3.85	1.30	1.37
3	A	2601	A1N	C13-C14	-2.70	1.30	1.36
3	A	2601	A1N	C8-C9	-2.68	1.35	1.39
4	A	2602	GDP	C6-N1	-2.51	1.34	1.37
3	A	2601	A1N	C14-C15	-2.44	1.33	1.38
3	A	2601	A1N	C21-C12	-2.29	1.36	1.42

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	2601	A1N	C10-N3-C7	7.04	121.09	114.94
3	A	2601	A1N	C11-C9-N2	4.75	123.13	117.41
3	A	2601	A1N	N3-C10-N2	-4.27	121.93	128.60
3	A	2601	A1N	C4-N1-C3	3.48	123.08	113.42
4	A	2602	GDP	C3'-C2'-C1'	3.36	106.04	100.98
3	A	2601	A1N	C13-C12-N5	3.33	135.62	130.19
3	A	2601	A1N	C8-C7-N1	-3.20	118.49	122.29
3	A	2601	A1N	C14-C13-C12	-2.71	117.42	120.84
4	A	2602	GDP	O2B-PB-O3A	2.61	113.39	104.64
3	A	2601	A1N	C3-N1-C7	-2.51	114.57	120.39
3	A	2601	A1N	C8-C9-C11	-2.44	117.80	120.98
3	A	2601	A1N	C8-C9-N2	-2.38	119.07	122.16
4	A	2602	GDP	C5-C6-N1	2.32	118.04	113.95
4	A	2602	GDP	PA-O3A-PB	-2.31	124.92	132.83
4	A	2602	GDP	C8-N7-C5	2.29	107.34	102.99

There are no chirality outliers.

All (4) torsion outliers are listed below:

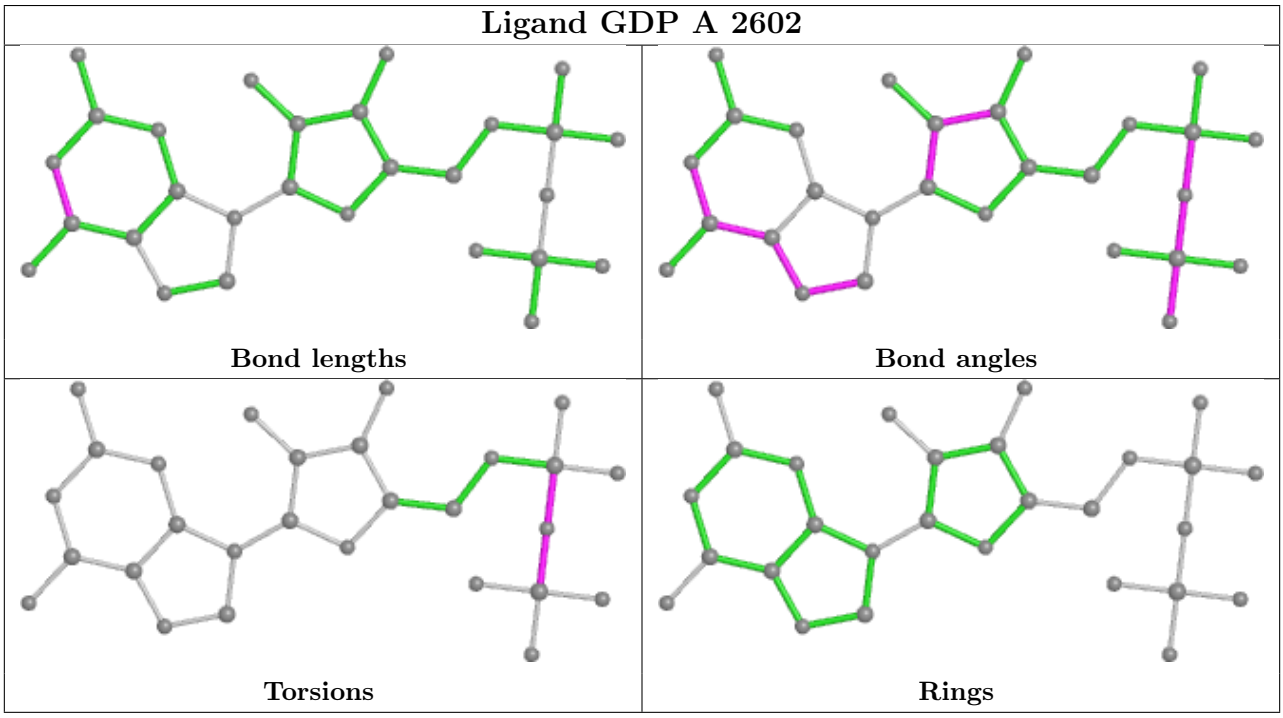
Mol	Chain	Res	Type	Atoms
4	A	2602	GDP	PA-O3A-PB-O2B
4	A	2602	GDP	PA-O3A-PB-O1B
4	A	2602	GDP	PA-O3A-PB-O3B
4	A	2602	GDP	PB-O3A-PA-O2A

There are no ring outliers.

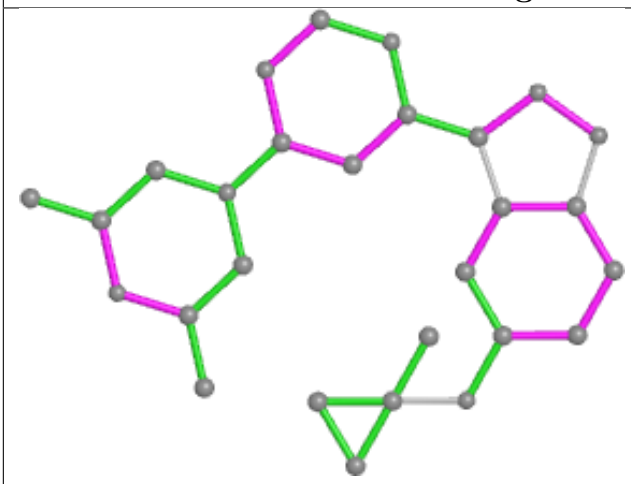
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	2602	GDP	1	0

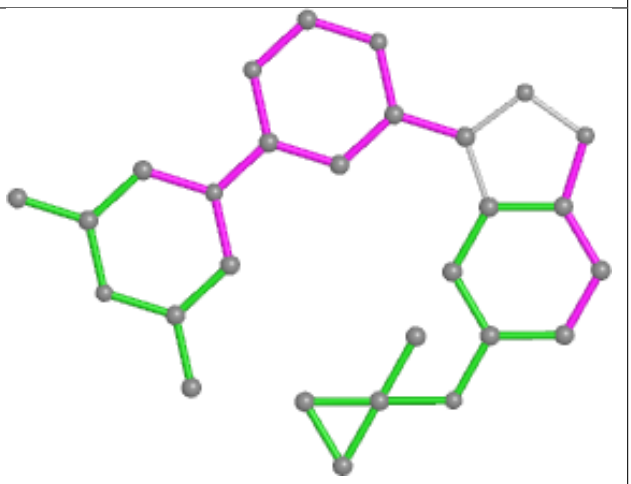
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



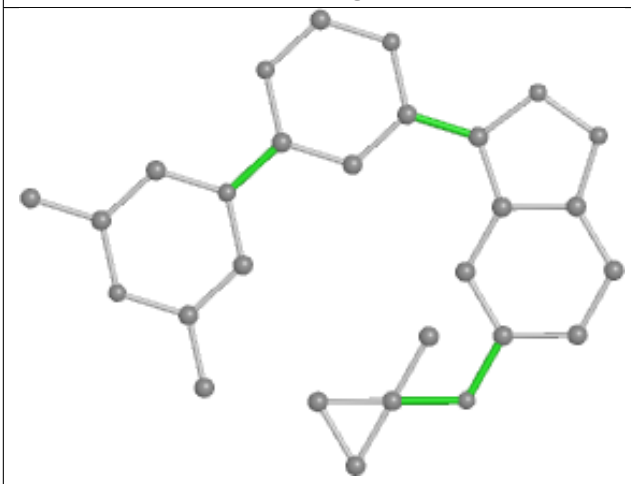
Ligand A1N A 2601



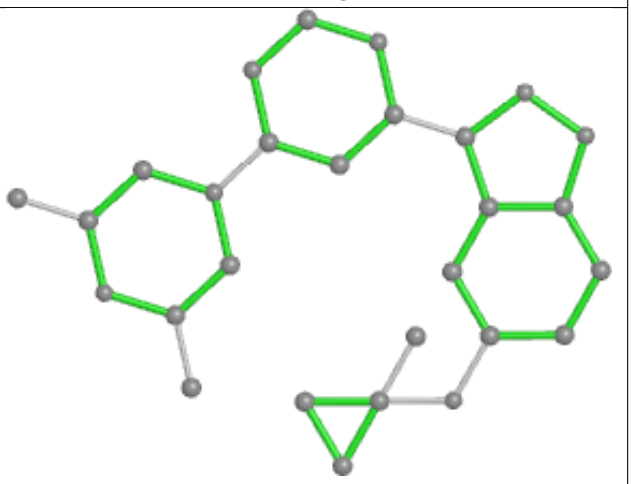
Bond lengths



Bond angles



Torsions



Rings

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.

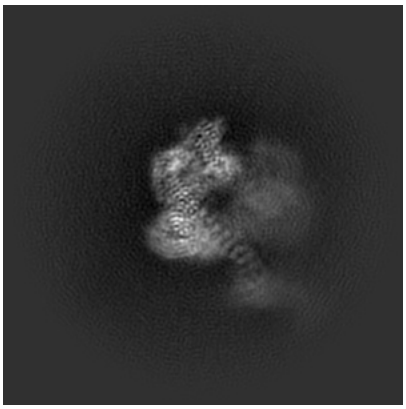
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-41759. These allow visual inspection of the internal detail of the map and identification of artifacts.

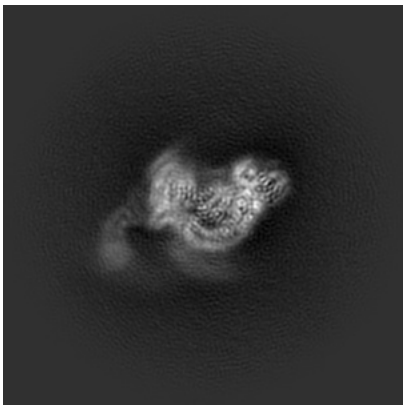
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

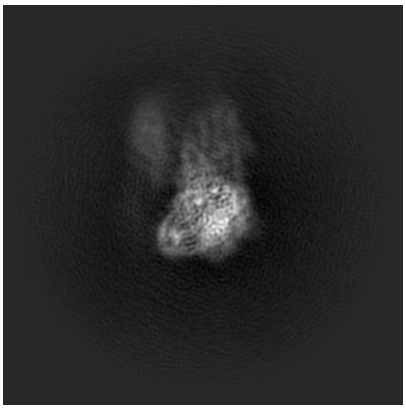
6.1.1 Primary map



X

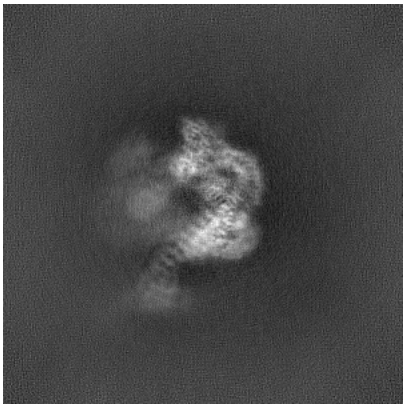


Y

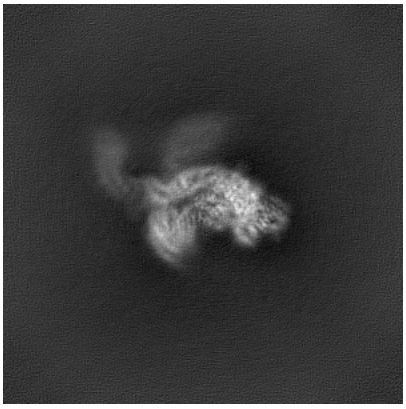


Z

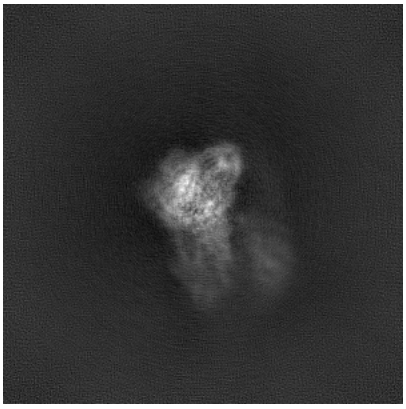
6.1.2 Raw map



X



Y

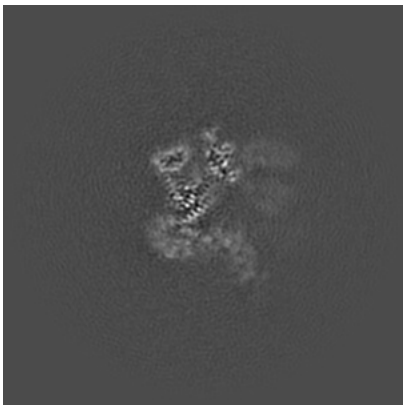


Z

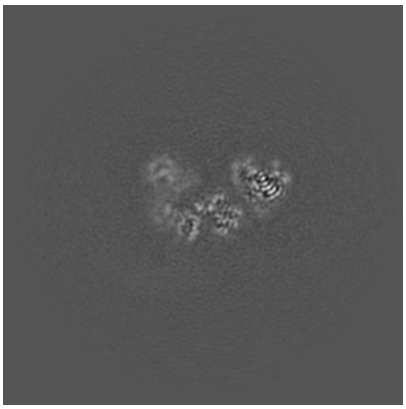
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

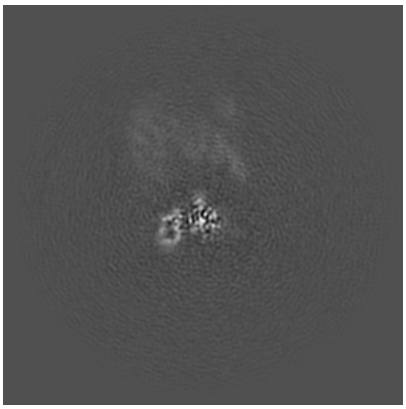
6.2.1 Primary map



X Index: 200

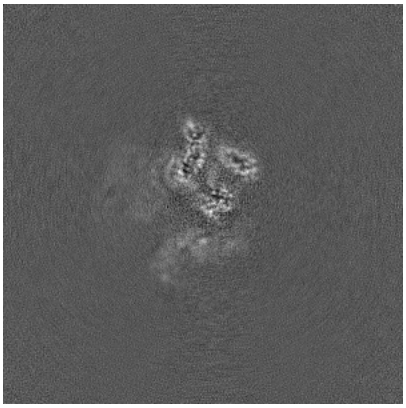


Y Index: 200

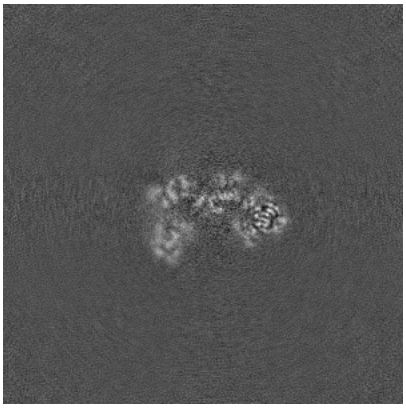


Z Index: 200

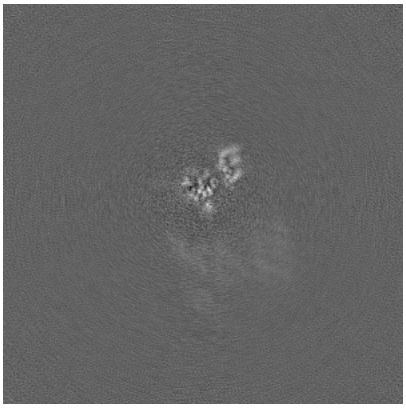
6.2.2 Raw map



X Index: 200



Y Index: 200

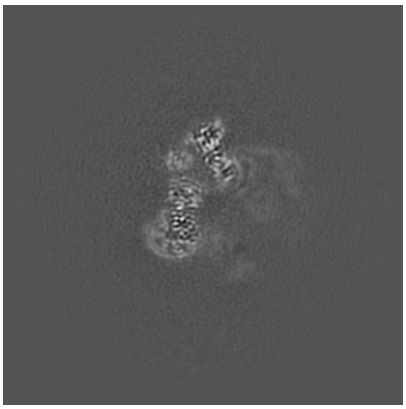


Z Index: 200

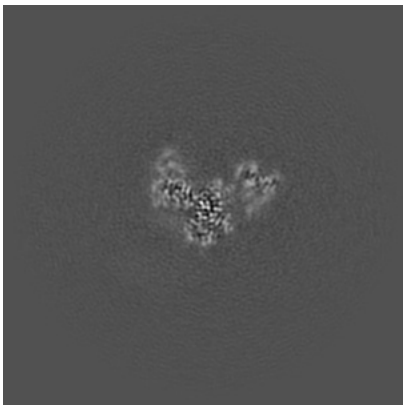
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

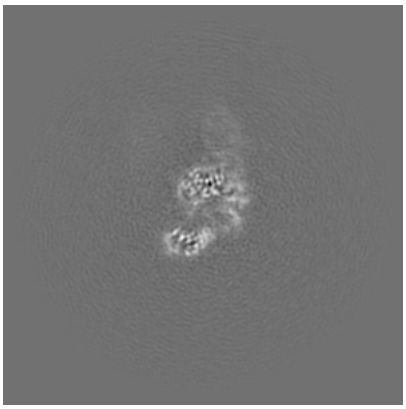
6.3.1 Primary map



X Index: 211



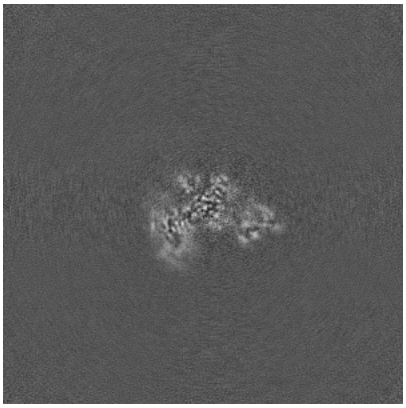
Y Index: 185



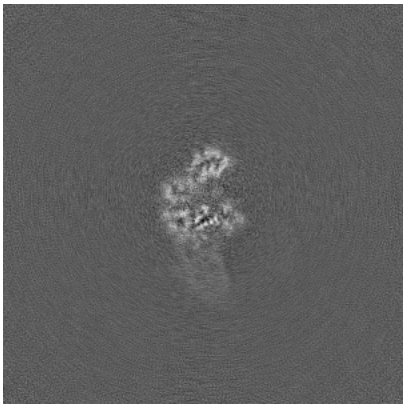
Z Index: 235

6.3.2 Raw map

X Index: 195



Y Index: 214

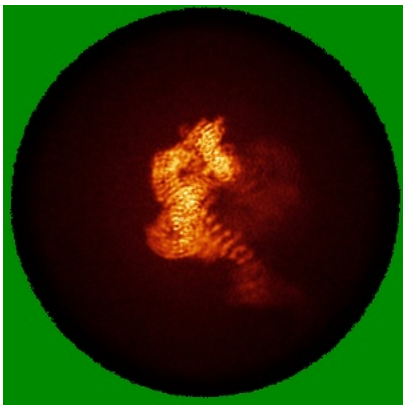


Z Index: 238

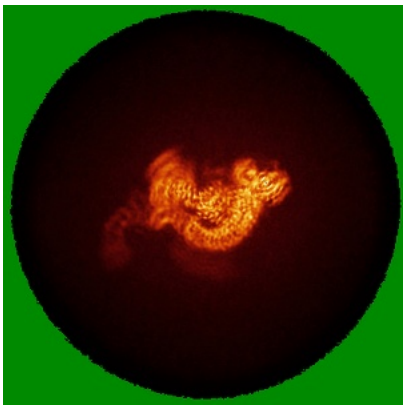
The images above show the largest variance slices of the map in three orthogonal directions.

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

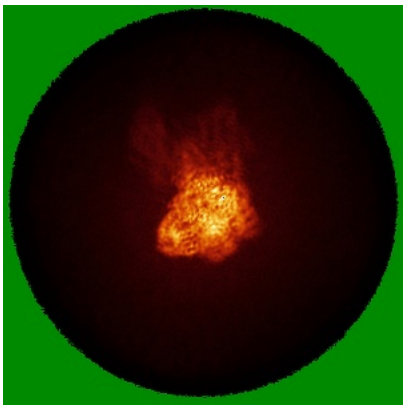
6.4.1 Primary map



X

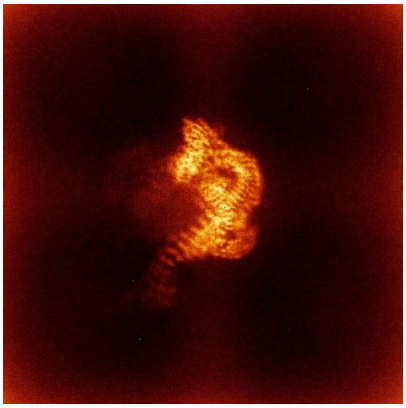


Y

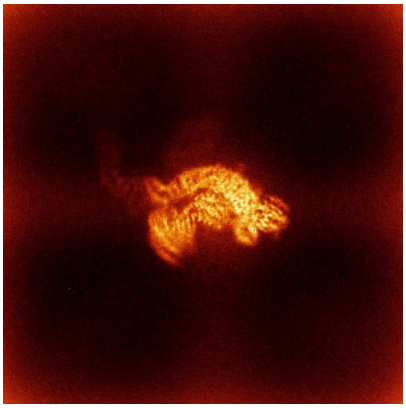


Z

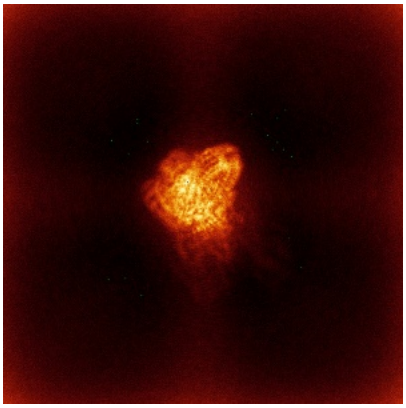
6.4.2 Raw map



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.

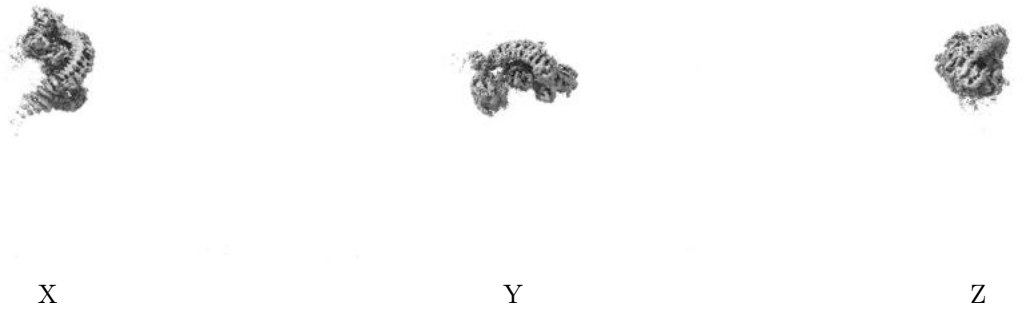
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.117. 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.

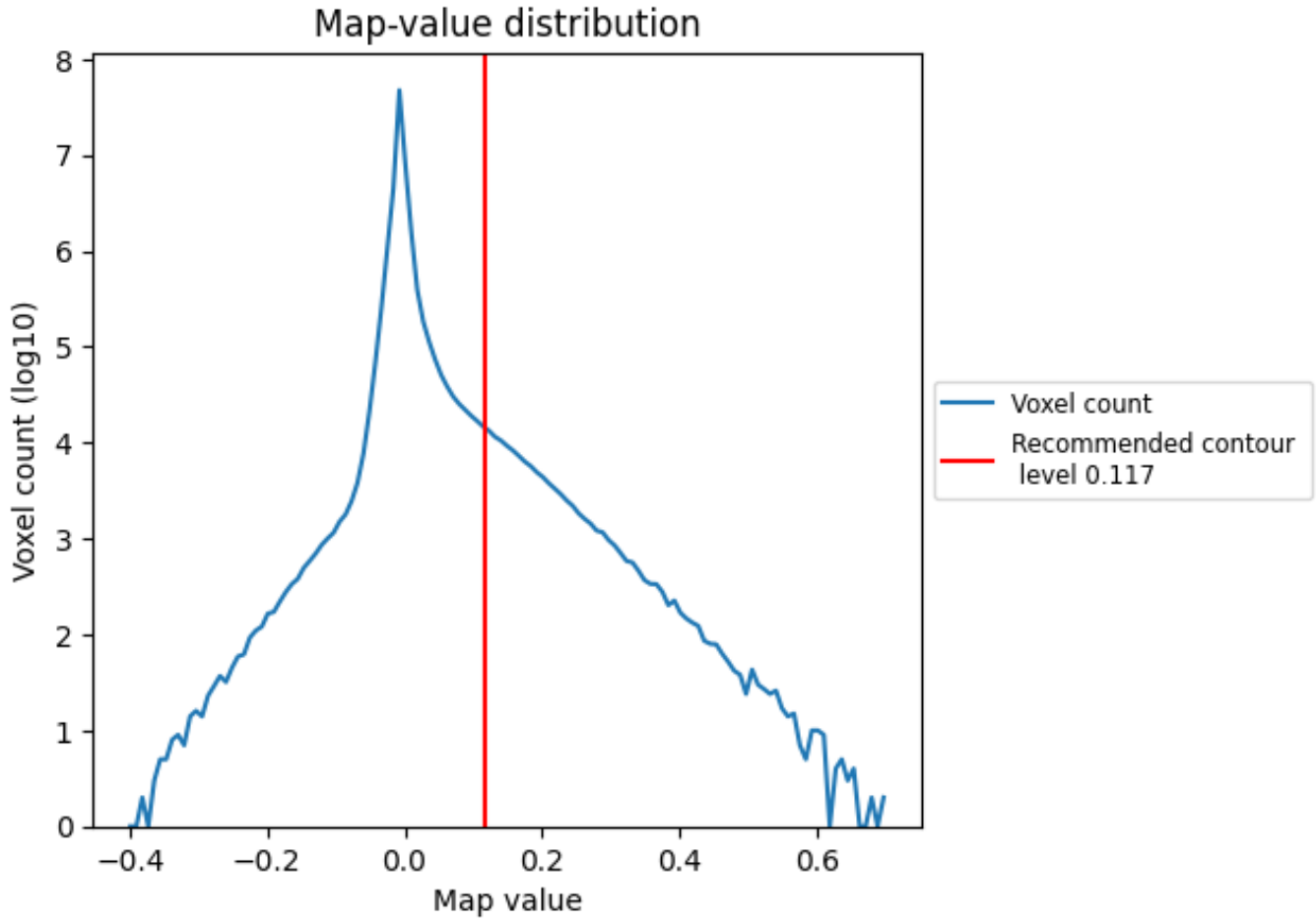
6.6 Mask visualisation (i)

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

7 Map analysis

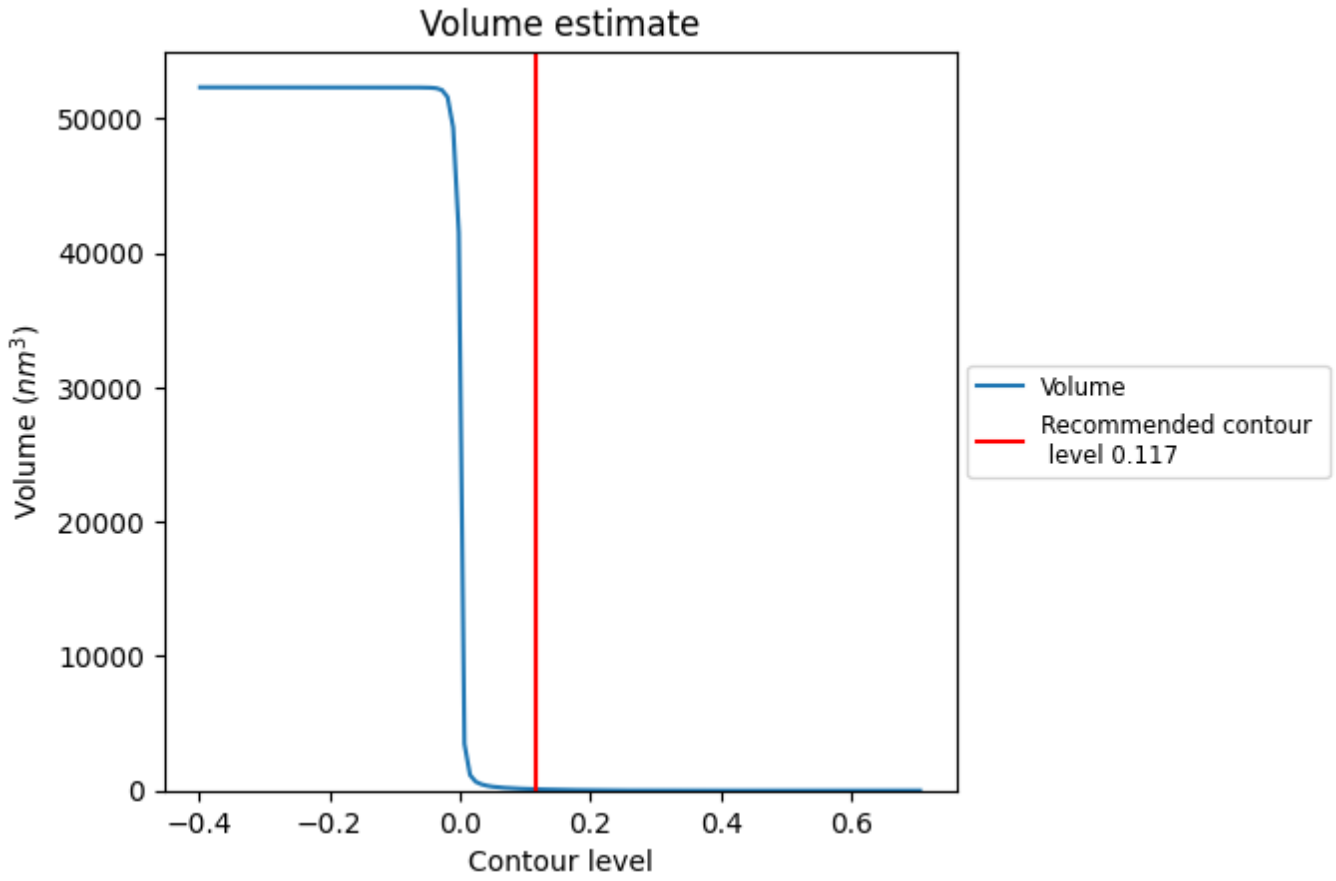
This section contains the results of statistical analysis of the map.

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.

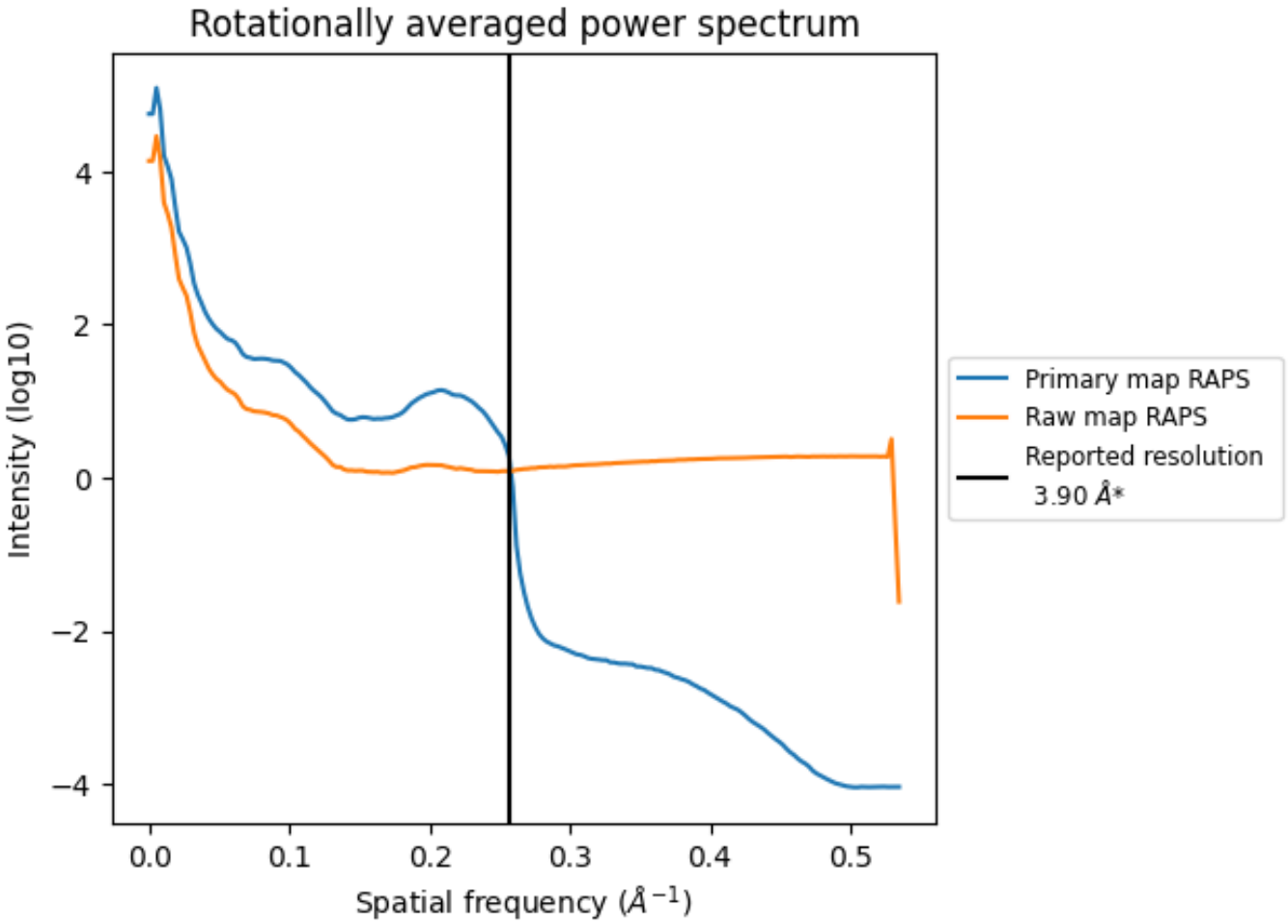
7.2 Volume estimate



The volume at the recommended contour level is 99 nm^3; this corresponds to an approximate mass of 89 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)

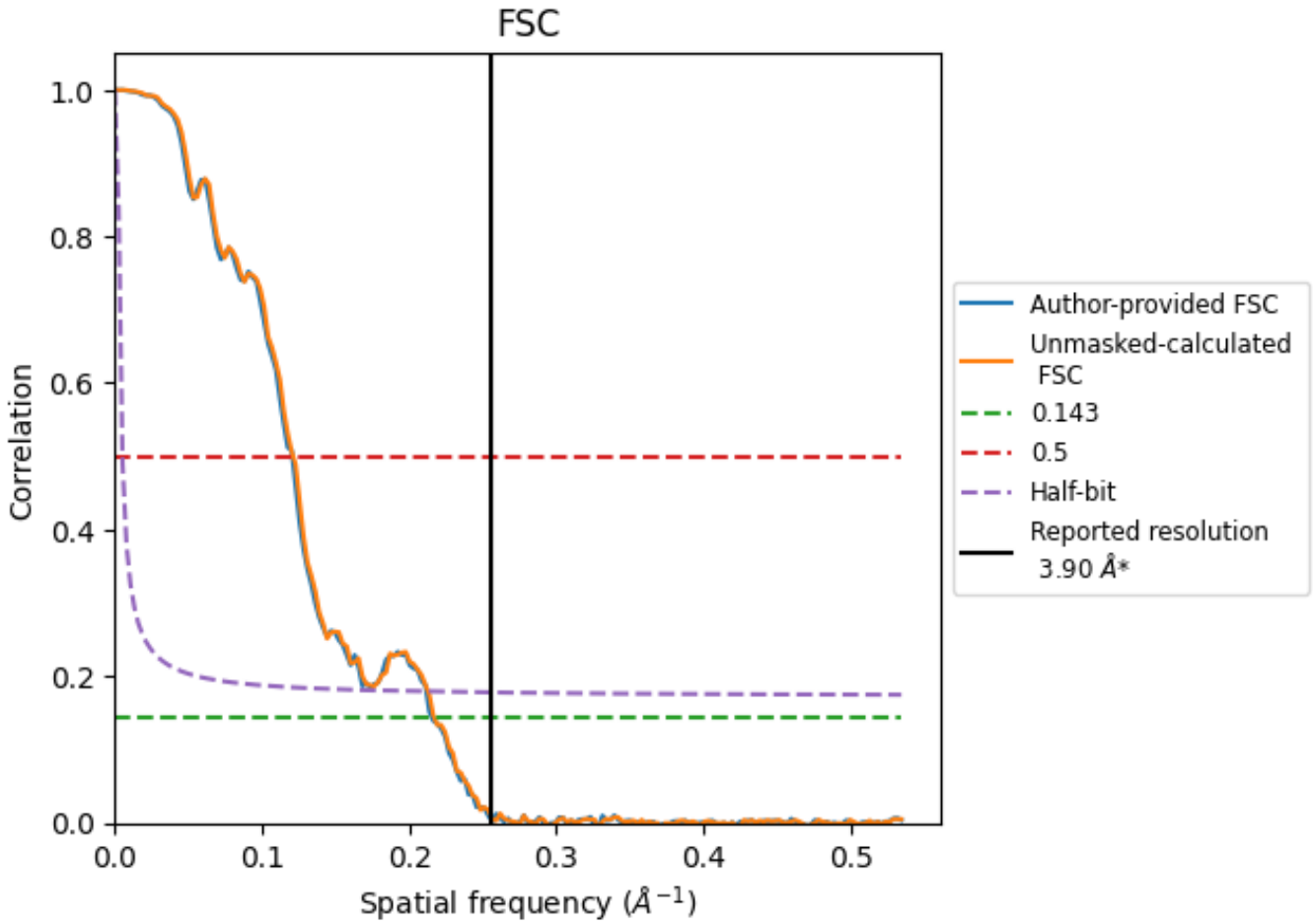


*Reported resolution corresponds to spatial frequency of 0.256 Å^{-1}

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 0.256 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	4.63	8.28	4.72
Unmasked-calculated*	4.60	8.24	4.69

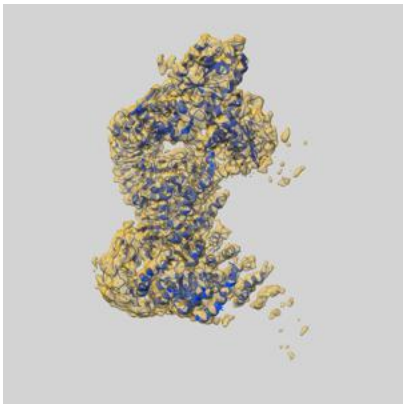
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 4.63 differs from the reported value 3.9 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.60 differs from the reported value 3.9 by more than 10 %

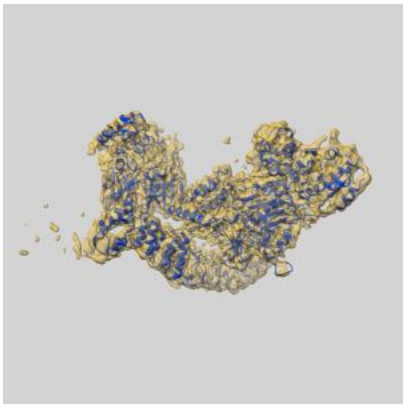
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-41759 and PDB model 8TZH. Per-residue inclusion information can be found in section 3 on page 5.

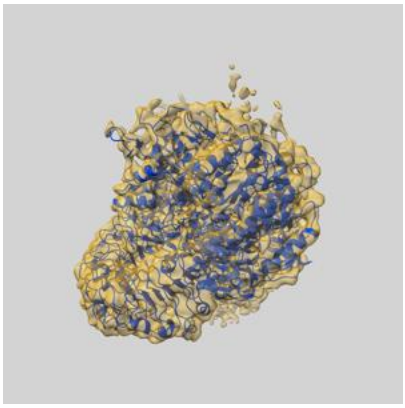
9.1 Map-model overlay



X



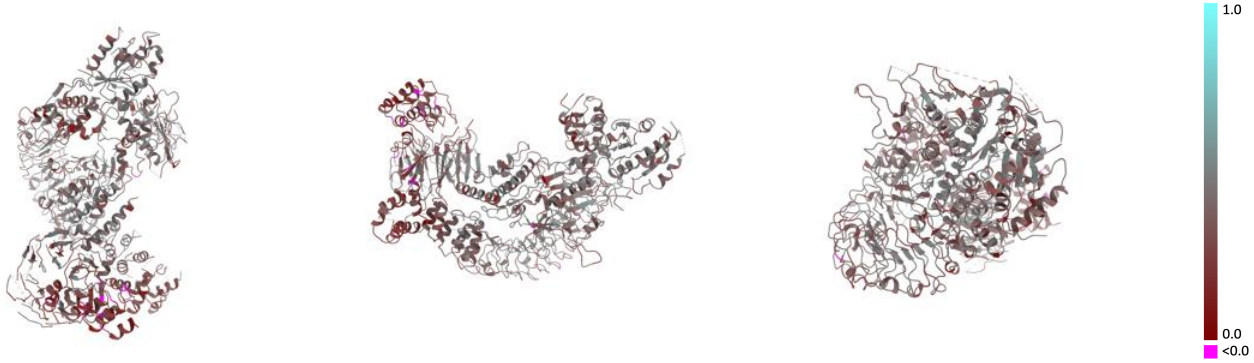
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.117 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.

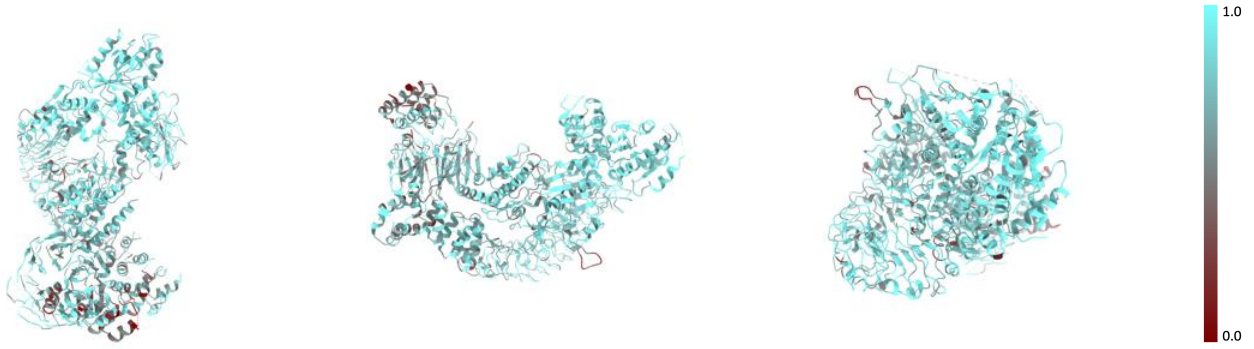
9.2 Q-score mapped to coordinate model (i)



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.

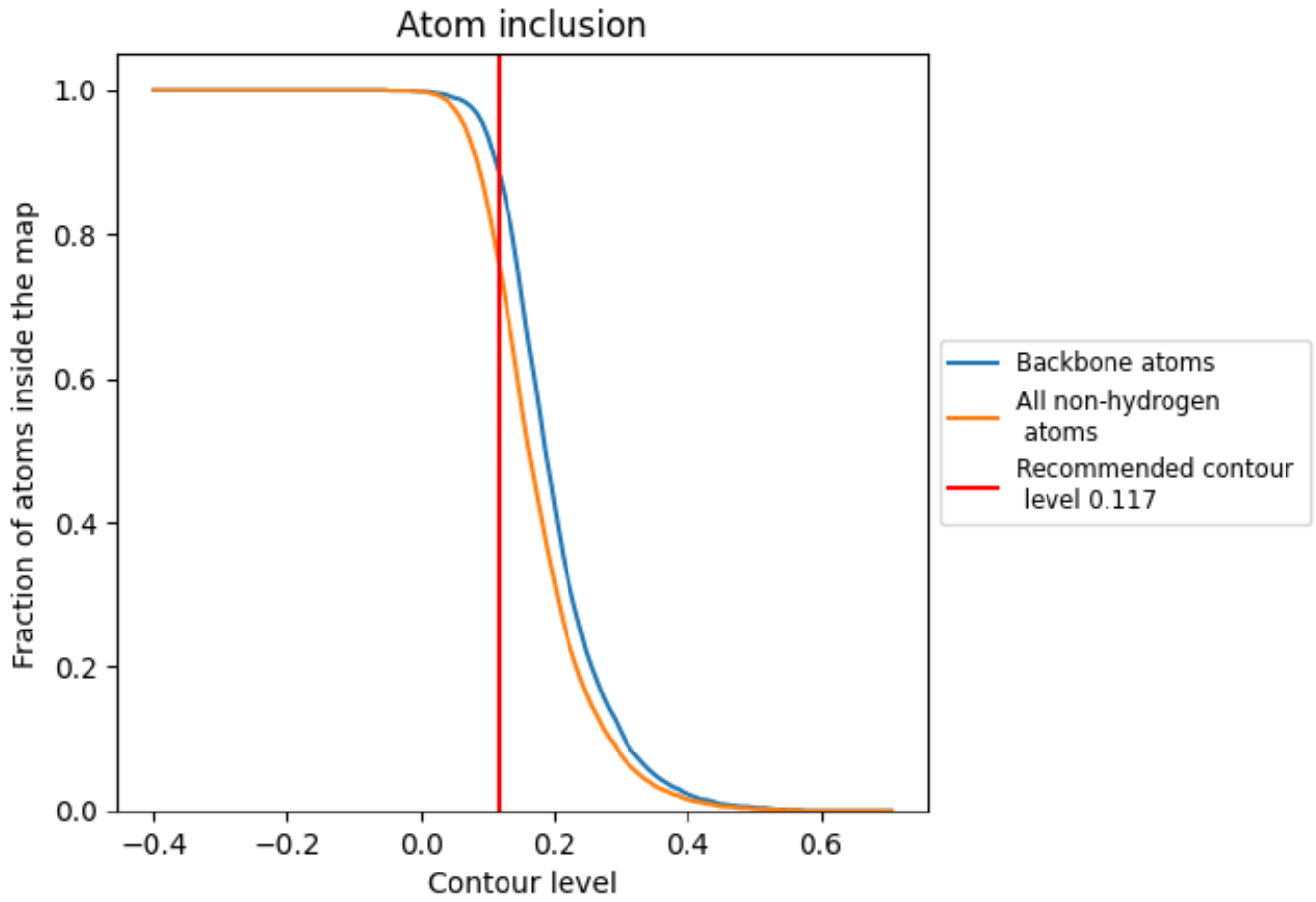
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.117).

9.4 Atom inclusion (i)



At the recommended contour level, 89% of all backbone atoms, 76% 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 (0.117) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7610	0.3770
A	0.7760	0.3900
B	0.5820	0.2320