Full wwPDB EM Validation Report ⓘ

Dec 17, 2022 – 02:39 pm GMT

PDB ID	:	6YEJ
EMDB ID	:	EMD-10793
Title	:	Cryo-EM structure of the Full-length disease type human Huntingtin
Authors	:	Tame, G.; Jung, T.; Dal Perraro, M.; Hebert, H.; Song, J.
Deposited on	:	2020-03-24
Resolution	:	18.20 Å(reported)
Based on initial model	:	6EZ8

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:

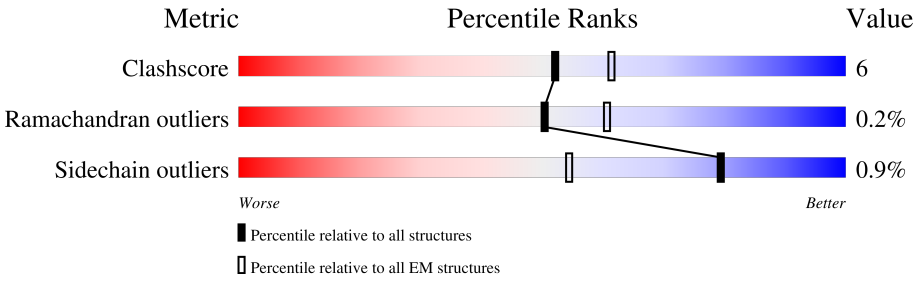
EMDB validation analysis	:	0.0.1.dev43
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 18.20 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	A	3199	11% 55% 9% 36%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 15999 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 Huntingtin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2046	15999	10276	2718	2907	98	0	0

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	MET	-	initiating methionine	UNP P42858
A	-4	ALA	-	expression tag	UNP P42858
A	-3	THR	-	expression tag	UNP P42858
A	-2	LEU	-	expression tag	UNP P42858
A	-1	GLU	-	expression tag	UNP P42858
A	0	LYS	-	expression tag	UNP P42858
A	1	LEU	-	expression tag	UNP P42858
A	2	MET	-	expression tag	UNP P42858
A	3	LYS	-	expression tag	UNP P42858
A	4	ALA	-	expression tag	UNP P42858
A	5	PHE	-	expression tag	UNP P42858
A	6	GLU	-	expression tag	UNP P42858
A	7	SER	-	expression tag	UNP P42858
A	8	LEU	-	expression tag	UNP P42858
A	9	LYS	-	expression tag	UNP P42858
A	10	SER	-	expression tag	UNP P42858
A	11	PHE	-	expression tag	UNP P42858
A	12	GLN	-	expression tag	UNP P42858
A	13	GLN	-	expression tag	UNP P42858
A	14	GLN	-	expression tag	UNP P42858
A	15	GLN	-	expression tag	UNP P42858
A	16	GLN	-	expression tag	UNP P42858
A	17	GLN	-	expression tag	UNP P42858
A	18	GLN	-	expression tag	UNP P42858
A	19	GLN	-	expression tag	UNP P42858
A	20	GLN	-	expression tag	UNP P42858
A	21	GLN	-	expression tag	UNP P42858
A	22	GLN	-	expression tag	UNP P42858

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	23	GLN	-	expression tag	UNP P42858
A	24	GLN	-	expression tag	UNP P42858
A	25	GLN	-	expression tag	UNP P42858
A	26	GLN	-	expression tag	UNP P42858
A	27	GLN	-	expression tag	UNP P42858
A	28	GLN	-	expression tag	UNP P42858
A	29	GLN	-	expression tag	UNP P42858
A	30	GLN	-	expression tag	UNP P42858
A	31	GLN	-	expression tag	UNP P42858
A	32	GLN	-	expression tag	UNP P42858
A	33	GLN	-	expression tag	UNP P42858
A	34	GLN	-	expression tag	UNP P42858
A	35	GLN	-	expression tag	UNP P42858
A	36	GLN	-	expression tag	UNP P42858
A	37	GLN	-	expression tag	UNP P42858
A	38	GLN	-	expression tag	UNP P42858
A	39	GLN	-	expression tag	UNP P42858
A	40	GLN	-	expression tag	UNP P42858
A	41	GLN	-	expression tag	UNP P42858
A	42	GLN	-	expression tag	UNP P42858
A	43	GLN	-	expression tag	UNP P42858
A	44	GLN	-	expression tag	UNP P42858
A	45	GLN	-	expression tag	UNP P42858
A	46	GLN	-	expression tag	UNP P42858
A	47	GLN	-	expression tag	UNP P42858
A	48	GLN	-	expression tag	UNP P42858
A	49	GLN	-	expression tag	UNP P42858
A	50	GLN	-	expression tag	UNP P42858
A	51	GLN	-	expression tag	UNP P42858
A	52	GLN	-	expression tag	UNP P42858
A	53	GLN	-	expression tag	UNP P42858
A	54	GLN	-	expression tag	UNP P42858
A	55	GLN	-	expression tag	UNP P42858
A	56	GLN	-	expression tag	UNP P42858
A	57	GLN	-	expression tag	UNP P42858
A	58	GLN	-	expression tag	UNP P42858
A	59	GLN	-	expression tag	UNP P42858
A	60	GLN	-	expression tag	UNP P42858
A	61	GLN	-	expression tag	UNP P42858
A	62	GLN	-	expression tag	UNP P42858
A	63	GLN	-	expression tag	UNP P42858
A	64	GLN	-	expression tag	UNP P42858

Continued on next page...

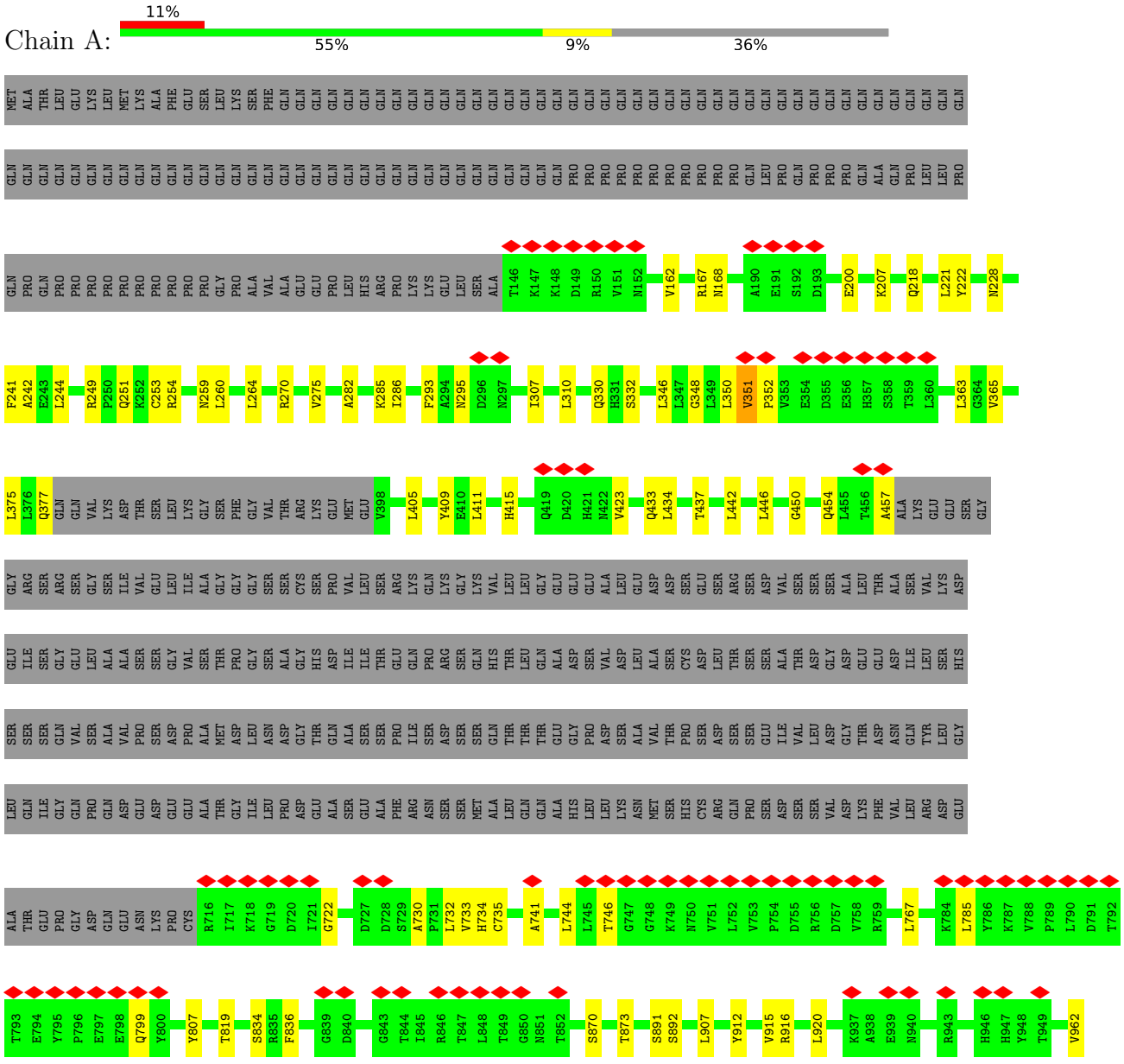
Continued from previous page...

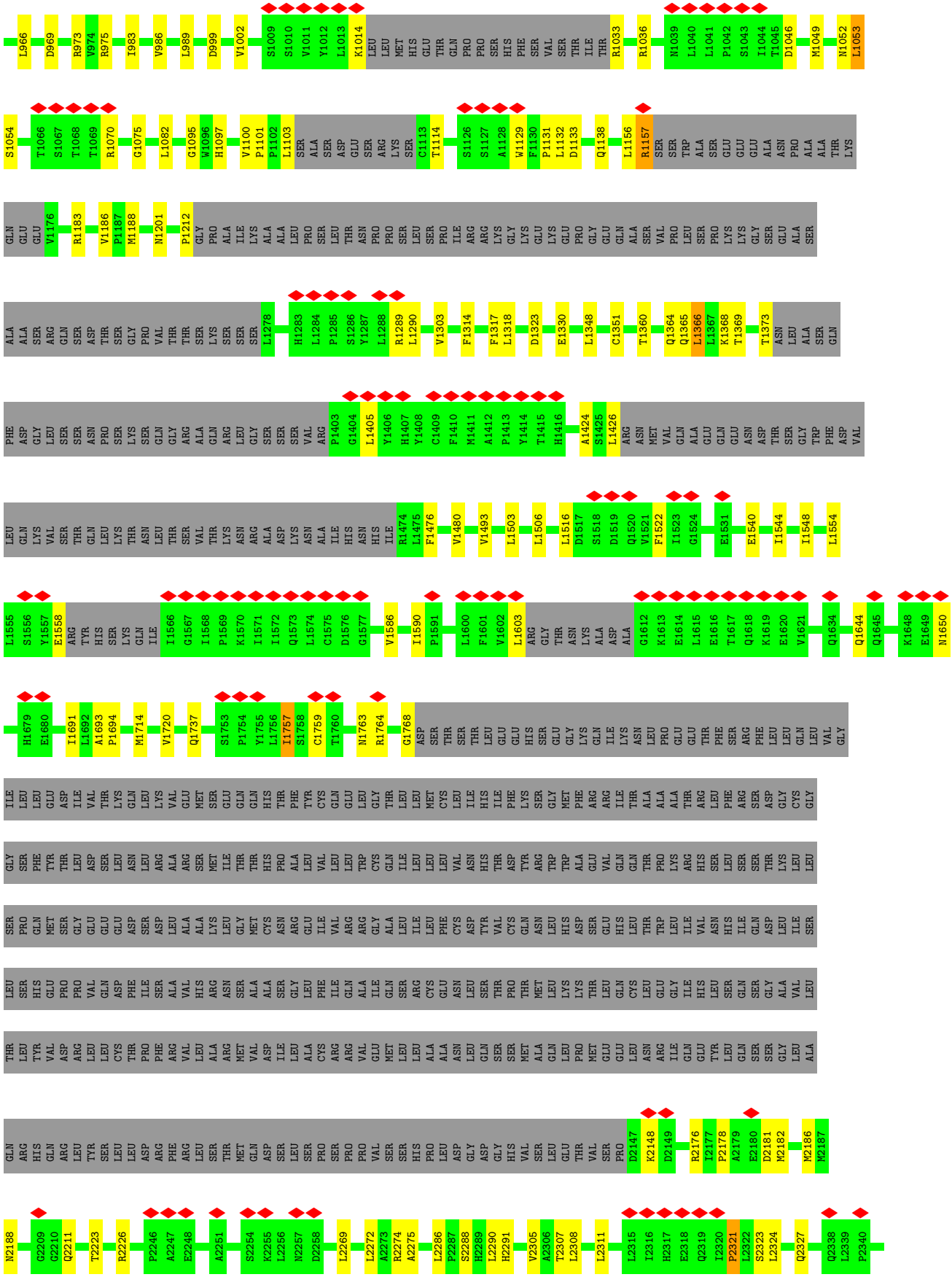
Chain	Residue	Modelled	Actual	Comment	Reference
A	65	GLN	-	expression tag	UNP P42858
A	66	GLN	-	expression tag	UNP P42858
A	67	GLN	-	expression tag	UNP P42858
A	68	GLN	-	expression tag	UNP P42858
A	1289	ARG	LYS	conflict	UNP P42858
A	2360	HIS	TYR	conflict	UNP P42858

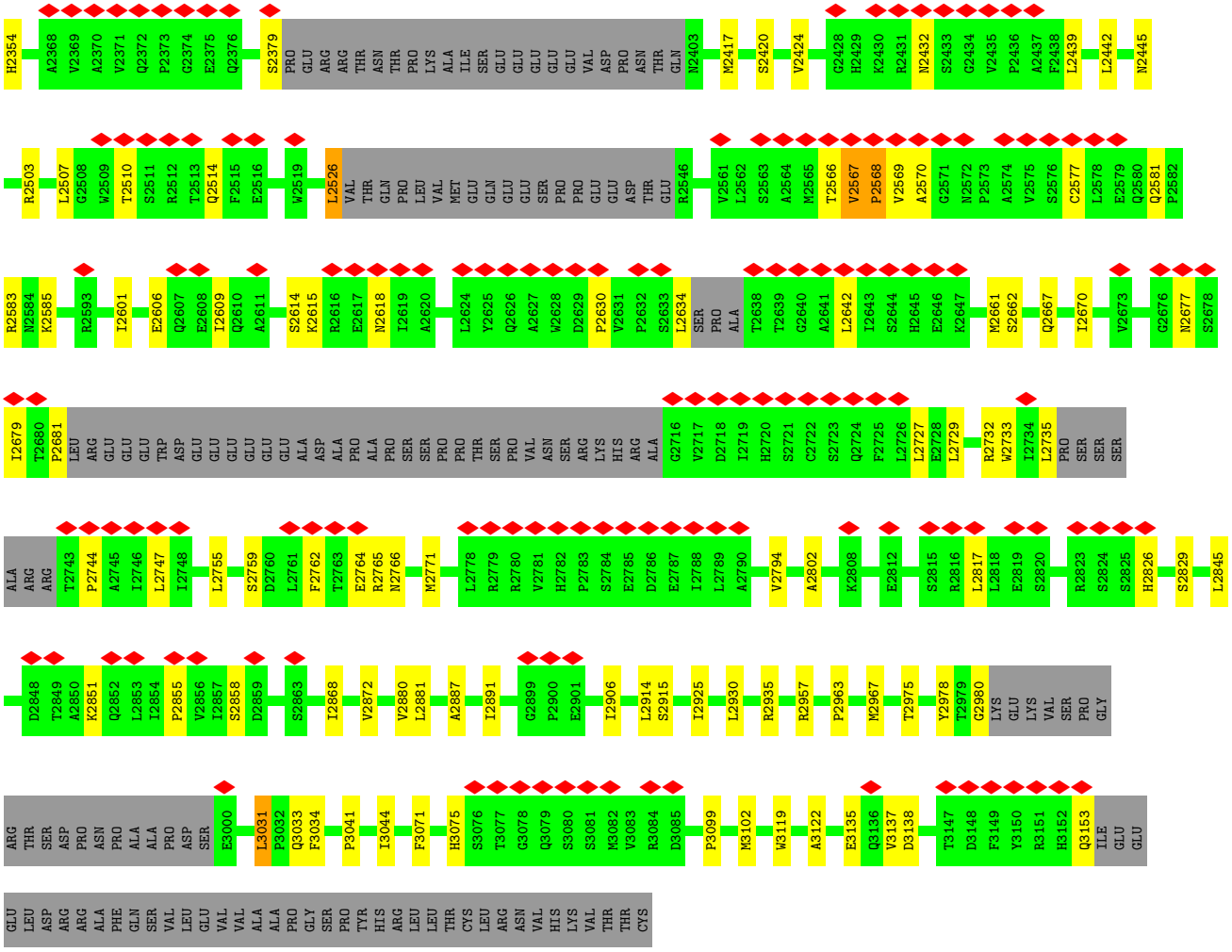
3 Residue-property plots (i)

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: Huntingtin




L966 D969 R973 V974 R975 I983 V986 L999 D999 V1002 S1009 S1010 V1011 Y1012 L1013 K1014 LEU LEU MET HIS GLU THR GLN PRO PRO SER HIS PHE SER VAL SER THR ILE THR R1033 R1036 N1039 L1040 L1041 P1042 S1043 I1044 T1045 D1046 M1049 N1052 L1053
S1054 T1066 S1067 T1068 T1069 R1070 G1075 L1082 G1095 W1096 H1097 V1100 P1101 P1102 L1103 SER ALA SER ASP GLU SER ARG LYS SER C1113 T1114 S1126 S1127 A1128 W1129 F1130 P1131 L1132 D1133 Q1138 L1156 R1157 SER SER TRP ALA SER GLU GLU GLU ALA ASN PRO ALA ALA THR LYS
GLN GLU GLU V1176 R1183 V1186 P1187 M1188 N1201 P1212 GLY PRO ALA ILE LYS ALA ALA LEU PRO SER LEU THR ASN PRO PRO SER LEU SER PRO ILE ARG ARG LYS GLY LYS GLU LYS GLU PRO GLY GLU GLN ALA SER VAL PRO LEU SER PRO LYS LYS GLY SER GLU ALA SER
ALA ALA SER ARG GLN SER ASP THR SER GLY PRO VAL THR THR SER LYS SER SER SER L1278 H1283 L1284 P1285 S1286 Y1287 L1288 R1289 L1290 V1303 F1314 F1317 L1318 D1323 E1330 L1348 C1351 T1360 Q1364 Q1365 L1366 L1367 K1368 T1369 T1373 ASN LEU ALA SER GLN
PHE ASP GLY LEU SER SER ASN PRO SER LYS SER GLN GLY ARG ALA GLN ARG LEU GLY SER SER SER VAL ARG P1403 G1404 L1405 Y1406 H1407 Y1408 C1409 F1410 M1411 A1412 P1413 Y1414 T1415 H1416 A1424 S1425 L1426 ARG ASN MET VAL GLN ALA GLU GLN GLU ASN ASP THR SER GLY TRP PHE ASP VAL
LEU GLN LYS VAL SER THR GLN LEU LYS THR ASN LEU THR SER VAL THR LYS ASN ARG ALA ASP LYS ASN ALA ILE HIS ASN HIS ILE R1474 L1475 F1476 V1480 V1493 L1503 L1506 L1516 D1517 S1518 D1519 Q1520 V1521 F1522 I1523 G1524 E1531 E1540 I1544 I1548 L1554
L1555 S1556 Y1557 E1558 ARG TYR HIS SER LYS GLN ILE I1566 G1567 I1568 P1569 K1570 I1571 I1572 Q1573 L1574 C1575 D1576 G1577 V1586 I1590 P1591 L1600 F1601 V1602 L1603 ARG GLY THR ASN LYS ALA ASP ALA G1612 K1613 E1614 L1615 E1616 T1617 Q1618 K1619 E1620 V1621 Q1634 Q1644 Q1645 K1648 E1649 N1650
H1679 E1680 I1691 L1692 A1693 P1694 M1714 V1720 Q1737 S1753 P1754 Y1755 L1756 I1757 S1758 C1759 T1760 N1763 R1764 G1768 ASP SER THR SER THR LEU GLU GLU THR PHE SER ARG PHE LEU LEU GLN LEU VAL GLY
ILE LEU LEU GLU ASP ILE VAL THR LYS GLN LEU LYS VAL GLU MET SER GLU GLN GLN HIS THR PHE TYR CYS GLN GLU LEU GLY THR LEU LEU MET CYS LEU ILE HIS ILE PHE LYS SER GLY MET PHE ARG ARG ILE THR ALA ALA THR ARG LEU PHE ARG SER ASP GLY CYS GLY
GLY SER PHE TYR THR LEU ASP SER LEU ASN LEU ARG ALA ARG SER MET ILE THR HIS PRO ALA LEU VAL LEU LEU TRP CYS GLN ILE LEU LEU LEU LEU VAL ASN HIS THR ASP TYR ARG TRP TRP ALA GLU VAL GLN GLN THR PRO LYS ARG HIS SER LEU SER SER THR LYS LEU LEU
SER PRO GLN MET SER GLY GLU GLU GLU ASP SER ASP LEU ALA ALA ALA LYS LEU GLY MET CYS ASN ARG GLU ILE VAL ARG ARG GLY ALA LEU LEU ILE LEU PHE CYS ASP TYR VAL CYS GLN ASN LEU HIS ASP SER GLU HIS LEU THR TRP LEU ILE VAL ASN HIS ILE GLN ASP LEU ILE SER
LEU SER HIS GLU PRO PRO VAL GLN ASP PHE ILE SER ALA VAL HIS ARG ASN SER ALA SER GLY LEU PHE ILE GLN ALA ILE GLN SER ARG CYS GLU ASN LEU SER THR PRO THR MET LEU LYS LYS THR LEU GLN CYS LEU GLU GLY ILE HIS LEU LEU SER GLN SER GLY ALA VAL LEU
THR LEU TYR VAL ASP ARG LEU LEU CYS THR PRO PHE ARG VAL LEU ALA ARG MET VAL ASP ILE LEU ALA CYS ARG ARG VAL GLU MET LEU LEU ALA ALA ASN LEU GLN SER SER MET ALA GLN LEU PRO MET GLU GLU LEU ASN ARG ILE GLN GLU TYR LEU GLN SER SER GLY LEU ALA
GLN ARG HIS GLN ARG LEU TYR SER LEU LEU ASP ARG PHE ARG LEU SER THR MET GLN ASP SER LEU SER PRO PRO PRO VAL SER SER HIS PRO LEU ASP GLY ASP GLY HIS VAL SER LEU GLU THR VAL SER PRO D2147 K2148 D2149 R2176 I2177 P2178 A2179 E2180 D2181 M2182 M2186 M2187
N2188 G2209 G2210 Q2211 T2223 R2226 P2246 A2247 E2248 A2251 S2254 K2255 L2256 N2257 D2258 L2269 L2272 A2273 R2274 A2275 L2286 P2287 S2288 H2289 L2290 H2291 V2305 A2306 T2307 L2308 L2311 L2315 I2316 H2317 E2318 Q2319 I2320 P2321 L2322 S2323 L2324 Q2327 Q2338 L2339 P2340


H2354 A2368 V2369 A2370 V2371 Q2372 P2373 G2374 E2375 Q2376 S2379 PRO GLU ARG ARG THR ASN THR PRO LYS ALA ILE SER GLU GLU GLU GLU GLU VAL ASP PRO ASN THR GLN N2403 M2417 S2420 V2424 G2428 H2429 K2430 R2431 N2432 S2433 G2434 V2435 P2436 A2437 F2438 L2439 L2442 N2445
R2503 L2507 G2508 W2509 T2510 S2511 R2512 T2513 Q2514 F2515 E2516 W2519 L2526 VAL THR GLN PRO LEU VAL MET GLU GLN GLU GLU GLU SER PRO PRO GLU GLU ASP THR GLU R2546 V2561 L2562 S2563 A2564 M2565 T2566 V2567 P2568 V2569 A2570 G2571 N2572 P2573 A2574 V2575 S2576 C2577 L2578 E2579 Q2580 Q2581 P2582
R2583 N2584 K2585 R2593 I2601 E2606 Q2607 E2608 I2609 Q2610 A2611 S2614 K2615 R2616 E2617 N2618 I2619 A2620 L2624 Y2625 Q2626 A2627 W2628 D2629 P2630 V2631 P2632 S2633 L2634 SER PRO ALA T2638 T2639 G2640 A2641 L2642 I2643 S2644 H2645 E2646 K2647 M2661 S2662 Q2667 I2670 V2673 G2676 N2677 S2678
I2679 T2680 P2681 LEU ARG GLU GLU GLU TRP ASP GLU GLU GLU GLU GLU GLU ALA ASP ALA PRO ALA PRO SER SER PRO PRO THR SER PRO VAL ASN SER ARG LYS HIS ARG ALA G2716 V2717 D2718 I2719 H2720 S2721 C2722 S2723 Q2724 F2725 L2726 L2727 E2728 L2729 R2732 W2733 I2734 L2735 PRO SER SER SER
ALA ARG ARG T2743 P2744 A2745 I2746 L2747 I2748 L2755 S2759 D2760 L2761 F2762 T2763 E2764 R2765 N2766 M2771 L2778 R2779 R2780 V2781 H2782 P2783 S2784 E2785 D2786 E2787 I2788 L2789 A2790 V2794 A2802 K2808 E2812 S2815 R2816 L2817 L2818 E2819 S2820 R2823 S2824 S2825 H2826 S2829 L2845
D2848 T2849 A2850 K2851 Q2852 L2853 I2854 P2855 V2856 I2857 S2858 D2859 S2863 I2868 V2872 V2880 L2881 A2887 I2891 G2899 P2900 E2901 I2906 L2914 S2915 I2925 L2930 R2935 R2967 P2963 M2967 T2975 Y2978 T2979 G2980 LYS GLU LYS VAL SER PRO GLY
ARG THR SER ASP PRO ASN PRO ALA ALA ALA PRO ASP SER E3000 L3031 P3032 Q3033 F3034 P3041 I3044 F3071 H3075 S3076 T3077 G3078 Q3079 S3080 S3081 M3082 V3083 R3084 D3085 P3099 M3102 W3119 A3122 E3135 Q3136 V3137 D3138 T3147 D3148 F3149 Y3150 R3151 H3152 Q3153 ILE GLU GLU
GLU LEU ASP ARG ARG ALA ALA PHE GLN SER VAL LEU GLU VAL VAL ALA ALA PRO GLY SER PRO TYR HIS ARG LEU LEU THR CYS LEU ARG ASN VAL HIS LYS VAL THR THR CYS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	21781	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 ($e^-/Å^2$)	33.6	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	400	Depositor
Magnification	47170	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.016	Depositor
Minimum map value	-0.001	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.0058	Depositor
Map size (Å)	254.4, 254.4, 254.4	wwPDB
Map dimensions	240, 240, 240	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.52	18/16315 (0.1%)	0.67	24/22179 (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
1	A	0	4

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1768	GLY	C-O	-14.52	1.00	1.23
1	A	2980	GLY	C-O	-14.50	1.00	1.23
1	A	1373	THR	C-O	-12.07	1.00	1.23
1	A	2379	SER	C-O	-12.07	1.00	1.23
1	A	2526	LEU	C-O	-12.07	1.00	1.23
1	A	3153	GLN	C-O	-12.07	1.00	1.23
1	A	457	ALA	C-O	-12.06	1.00	1.23
1	A	1014	LYS	C-O	-12.06	1.00	1.23
1	A	1558	GLU	C-O	-12.06	1.00	1.23
1	A	2735	LEU	C-O	-12.06	1.00	1.23
1	A	1426	LEU	C-O	-12.05	1.00	1.23
1	A	1603	LEU	C-O	-12.05	1.00	1.23
1	A	1157	ARG	C-O	-12.03	1.00	1.23
1	A	2634	LEU	C-O	-12.02	1.00	1.23
1	A	377	GLN	C-O	-11.99	1.00	1.23
1	A	1103	LEU	C-O	-11.99	1.00	1.23
1	A	1212	PRO	C-O	-11.41	1.00	1.23
1	A	2681	PRO	C-O	-11.41	1.00	1.23

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1405	LEU	CA-CB-CG	7.78	133.20	115.30
1	A	2980	GLY	CA-C-O	-6.43	109.02	120.60
1	A	1768	GLY	CA-C-O	-6.42	109.04	120.60
1	A	907	LEU	CA-CB-CG	5.99	129.07	115.30
1	A	1554	LEU	CA-CB-CG	5.74	128.50	115.30
1	A	1366	LEU	CA-CB-CG	5.55	128.06	115.30
1	A	434	LEU	CA-CB-CG	5.54	128.05	115.30
1	A	1103	LEU	CA-C-O	-5.33	108.90	120.10
1	A	1157	ARG	CA-C-O	-5.32	108.94	120.10
1	A	1014	LYS	CA-C-O	-5.30	108.96	120.10
1	A	1558	GLU	CA-C-O	-5.30	108.96	120.10
1	A	2634	LEU	CA-C-O	-5.30	108.97	120.10
1	A	457	ALA	CA-C-O	-5.29	108.98	120.10
1	A	1603	LEU	CA-C-O	-5.28	109.01	120.10
1	A	1373	THR	CA-C-O	-5.28	109.01	120.10
1	A	2526	LEU	CA-C-O	-5.28	109.02	120.10
1	A	377	GLN	CA-C-O	-5.27	109.03	120.10
1	A	1426	LEU	CA-C-O	-5.27	109.03	120.10
1	A	2379	SER	CA-C-O	-5.27	109.03	120.10
1	A	2735	LEU	CA-C-O	-5.27	109.04	120.10
1	A	3153	GLN	CA-C-O	-5.26	109.06	120.10
1	A	2845	LEU	CA-CB-CG	5.16	127.17	115.30
1	A	1053	LEU	CA-CB-CG	5.01	126.83	115.30
1	A	920	LEU	CA-CB-CG	5.00	126.80	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1100	VAL	Peptide
1	A	1369	THR	Peptide
1	A	2323	SER	Peptide
1	A	351	VAL	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	A	15999	0	16385	185	0
All	All	15999	0	16385	185	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 6.

All (185) 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:1157:ARG:HD3	1:A:2679:ILE:CD1	1.17	1.64
1:A:1157:ARG:HD2	1:A:2679:ILE:CG2	1.10	1.58
1:A:1157:ARG:CD	1:A:2679:ILE:CD1	1.87	1.48
1:A:1157:ARG:CD	1:A:2679:ILE:HG21	1.44	1.45
1:A:1157:ARG:CZ	1:A:2679:ILE:HD13	1.47	1.42
1:A:1157:ARG:HE	1:A:2765:ARG:CA	1.15	1.42
1:A:1157:ARG:NE	1:A:2679:ILE:HD13	1.36	1.36
1:A:1157:ARG:HD2	1:A:2679:ILE:CB	1.56	1.33
1:A:1157:ARG:CD	1:A:2679:ILE:HD13	1.51	1.30
1:A:1157:ARG:CD	1:A:2679:ILE:CG2	2.06	1.25
1:A:1157:ARG:HE	1:A:2765:ARG:CB	1.48	1.24
1:A:1157:ARG:CD	1:A:2679:ILE:CB	2.16	1.23
1:A:1157:ARG:NH1	1:A:2679:ILE:HD13	1.56	1.19
1:A:1157:ARG:NE	1:A:2765:ARG:CB	2.06	1.18
1:A:1156:LEU:HB3	1:A:2765:ARG:NH1	1.64	1.12
1:A:1157:ARG:NH1	1:A:2679:ILE:CD1	2.12	1.11
1:A:1157:ARG:HD3	1:A:2679:ILE:CG1	1.80	1.10
1:A:1157:ARG:NE	1:A:2765:ARG:CA	2.00	1.10
1:A:1157:ARG:CZ	1:A:2679:ILE:CD1	2.37	1.03
1:A:1157:ARG:CD	1:A:2679:ILE:CG1	2.37	1.02
1:A:1157:ARG:NE	1:A:2765:ARG:HB2	1.53	1.02
1:A:1157:ARG:HH11	1:A:2679:ILE:CD1	1.72	0.99
1:A:1157:ARG:CB	1:A:2679:ILE:HB	1.93	0.97
1:A:1157:ARG:HE	1:A:2765:ARG:HA	1.29	0.96
1:A:1157:ARG:HH11	1:A:2679:ILE:CG1	1.79	0.93
1:A:1157:ARG:CD	1:A:2679:ILE:HB	1.99	0.92
1:A:1157:ARG:HD3	1:A:2679:ILE:HD12	0.93	0.91
1:A:1156:LEU:CB	1:A:2765:ARG:NH1	2.38	0.87
1:A:1157:ARG:NE	1:A:2679:ILE:CD1	2.23	0.84
1:A:1157:ARG:HH11	1:A:2679:ILE:HG12	1.42	0.83
1:A:1157:ARG:CD	1:A:2679:ILE:HD12	1.81	0.81
1:A:1156:LEU:HB3	1:A:2765:ARG:HH11	1.48	0.78
1:A:1157:ARG:HB2	1:A:2679:ILE:HB	1.66	0.77

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1157:ARG:NE	1:A:2679:ILE:HG21	2.00	0.76
1:A:1157:ARG:HD2	1:A:2679:ILE:CG1	2.15	0.70
1:A:1157:ARG:HD2	1:A:2679:ILE:HG21	0.70	0.69
1:A:1131:PRO:HB2	1:A:1290:LEU:HD21	1.74	0.69
1:A:1157:ARG:HB3	1:A:2679:ILE:HB	1.76	0.67
1:A:363:LEU:HD21	1:A:423:VAL:HA	1.80	0.63
1:A:1156:LEU:CB	1:A:2765:ARG:HH11	2.03	0.62
1:A:2274:ARG:HH21	1:A:2324:LEU:HD11	1.65	0.62
1:A:1424:ALA:O	1:A:1737:GLN:NE2	2.34	0.60
1:A:2577:CYS:SG	1:A:2618:ASN:ND2	2.74	0.60
1:A:2887:ALA:HB1	1:A:2906:ILE:HD13	1.82	0.60
1:A:2288:SER:HA	1:A:2291:HIS:HD2	1.66	0.60
1:A:228:ASN:OD1	1:A:270:ARG:NH2	2.35	0.59
1:A:1033:ARG:O	1:A:1368:LYS:NZ	2.35	0.59
1:A:916:ARG:NH1	1:A:969:ASP:OD1	2.36	0.59
1:A:983:ILE:HD11	1:A:1082:LEU:HB3	1.84	0.58
1:A:975:ARG:HD2	1:A:1075:GLY:HA3	1.86	0.58
1:A:2503:ARG:O	1:A:2507:LEU:HB2	2.03	0.57
1:A:2311:LEU:HD13	1:A:2321:PRO:HG2	1.87	0.57
1:A:2679:ILE:HG21	1:A:2765:ARG:HB2	1.86	0.57
1:A:1544:ILE:HG12	1:A:1548:ILE:HG13	1.86	0.57
1:A:1157:ARG:CG	1:A:2679:ILE:HB	2.35	0.56
1:A:254:ARG:NH2	1:A:293:PHE:O	2.38	0.56
1:A:2327:GLN:HE21	1:A:2442:LEU:HD11	1.70	0.56
1:A:1157:ARG:NE	1:A:2765:ARG:HA	1.97	0.56
1:A:2269:LEU:HD22	1:A:2307:THR:HG22	1.86	0.56
1:A:744:LEU:HB2	1:A:807:TYR:HE2	1.70	0.56
1:A:1157:ARG:HD3	1:A:2679:ILE:CB	2.05	0.56
1:A:1759:CYS:O	1:A:1763:ASN:ND2	2.40	0.55
1:A:2420:SER:O	1:A:2424:VAL:N	2.37	0.55
1:A:2566:THR:HB	1:A:2570:ALA:HA	1.87	0.55
1:A:912:TYR:HD2	1:A:915:VAL:HG23	1.71	0.55
1:A:411:LEU:O	1:A:415:HIS:ND1	2.39	0.54
1:A:1157:ARG:NH1	1:A:2679:ILE:HD11	2.20	0.54
1:A:2891:ILE:HD11	1:A:2906:ILE:HD12	1.89	0.54
1:A:409:TYR:OH	1:A:735:CYS:SG	2.65	0.54
1:A:741:ALA:HB2	1:A:785:LEU:HD11	1.90	0.53
1:A:348:GLY:HA2	1:A:351:VAL:HB	1.90	0.53
1:A:989:LEU:HD12	1:A:1052:ASN:HB3	1.89	0.53
1:A:2764:GLU:HG2	1:A:2766:ASN:H	1.74	0.53
1:A:1330:GLU:OE2	1:A:1365:GLN:NE2	2.42	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1156:LEU:HB3	1:A:2765:ARG:HH12	1.67	0.52
1:A:2670:ILE:HD13	1:A:2802:ALA:HB1	1.92	0.52
1:A:1157:ARG:HB2	1:A:2679:ILE:CB	2.38	0.52
1:A:1132:LEU:HD21	1:A:1289:ARG:HB3	1.92	0.51
1:A:450:GLY:HA3	1:A:454:GLN:HE22	1.76	0.51
1:A:2439:LEU:HD23	1:A:2442:LEU:HD12	1.93	0.51
1:A:3135:GLU:H	1:A:3138:ASP:HB2	1.76	0.51
1:A:2872:VAL:HG11	1:A:2925:ILE:HG21	1.91	0.51
1:A:260:LEU:O	1:A:264:LEU:N	2.43	0.51
1:A:999:ASP:HB2	1:A:1002:VAL:HG23	1.93	0.50
1:A:1138:GLN:HB3	1:A:1317:PHE:HD1	1.77	0.50
1:A:2606:GLU:HA	1:A:2609:ILE:HD12	1.92	0.50
1:A:2759:SER:HA	1:A:2762:PHE:HD2	1.76	0.49
1:A:1133:ASP:N	1:A:1133:ASP:OD1	2.44	0.49
1:A:346:LEU:HB3	1:A:365:VAL:HG13	1.94	0.49
1:A:2420:SER:HB2	1:A:2424:VAL:HB	1.95	0.49
1:A:1644:GLN:HE21	1:A:1691:ILE:HD13	1.78	0.48
1:A:200:GLU:HB3	1:A:1303:VAL:HG13	1.95	0.48
1:A:1156:LEU:C	1:A:2765:ARG:HD3	2.20	0.48
1:A:1586:VAL:HA	1:A:1590:ILE:HD12	1.95	0.48
1:A:2585:LYS:O	1:A:2935:ARG:NH2	2.35	0.48
1:A:222:TYR:CZ	1:A:259:ASN:HB3	2.49	0.48
1:A:330:GLN:HE21	1:A:375:LEU:HD21	1.79	0.47
1:A:2178:PRO:HG3	1:A:3119:TRP:HH2	1.80	0.47
1:A:282:ALA:O	1:A:286:ILE:N	2.40	0.47
1:A:2868:ILE:HG22	1:A:2872:VAL:HG22	1.95	0.47
1:A:351:VAL:HG22	1:A:352:PRO:HD3	1.96	0.47
1:A:2176:ARG:HH11	1:A:3122:ALA:HB2	1.79	0.47
1:A:3071:PHE:O	1:A:3075:HIS:ND1	2.47	0.47
1:A:2286:LEU:HD13	1:A:2290:LEU:HB3	1.96	0.47
1:A:249:ARG:NH2	1:A:251:GLN:OE1	2.48	0.46
1:A:1493:VAL:HG21	1:A:1540:GLU:HB2	1.98	0.46
1:A:2526:LEU:HD22	1:A:2733:TRP:HH2	1.79	0.46
1:A:2662:SER:O	1:A:2667:GLN:NE2	2.49	0.46
1:A:1097:HIS:HB2	1:A:1114:THR:HG21	1.97	0.46
1:A:1476:PHE:O	1:A:1480:VAL:N	2.43	0.46
1:A:307:ILE:HA	1:A:310:LEU:HD23	1.97	0.46
1:A:3099:PRO:HG2	1:A:3102:MET:HB3	1.96	0.46
1:A:221:LEU:HB3	1:A:241:PHE:CE1	2.50	0.46
1:A:253:CYS:SG	1:A:254:ARG:N	2.89	0.46
1:A:1070:ARG:HG3	1:A:1129:TRP:HZ2	1.80	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1516:LEU:HD11	1:A:1522:PHE:HB3	1.97	0.46
1:A:1503:LEU:HD23	1:A:1506:LEU:HD12	1.97	0.46
1:A:2794:VAL:HG22	1:A:2817:LEU:HD21	1.98	0.46
1:A:870:SER:HB2	1:A:873:THR:HG23	1.98	0.46
1:A:891:SER:OG	1:A:892:SER:N	2.49	0.46
1:A:2855:PRO:HA	1:A:2858:SER:HB3	1.97	0.46
1:A:218:GLN:HE21	1:A:244:LEU:HB3	1.80	0.46
1:A:405:LEU:HB3	1:A:442:LEU:HD12	1.95	0.46
1:A:746:THR:O	1:A:799:GLN:NE2	2.48	0.46
1:A:1157:ARG:CB	1:A:2679:ILE:CB	2.82	0.46
1:A:2148:LYS:HG2	1:A:3119:TRP:HE1	1.80	0.46
1:A:3031:LEU:HA	1:A:3034:PHE:HB3	1.97	0.46
1:A:722:GLY:O	1:A:734:HIS:ND1	2.49	0.45
1:A:986:VAL:HG11	1:A:1053:LEU:HD23	1.97	0.45
1:A:1157:ARG:CG	1:A:2679:ILE:CG2	2.89	0.45
1:A:2975:THR:HA	1:A:2978:TYR:HB2	1.98	0.45
1:A:730:ALA:HB3	1:A:733:VAL:HG23	1.97	0.45
1:A:1046:ASP:HB3	1:A:1049:MET:HB3	1.97	0.45
1:A:2182:MET:O	1:A:2186:MET:N	2.50	0.45
1:A:2581:GLN:N	1:A:2667:GLN:O	2.46	0.45
1:A:3041:PRO:HA	1:A:3044:ILE:HG12	1.98	0.45
1:A:807:TYR:HB2	1:A:819:THR:HG21	1.99	0.45
1:A:2881:LEU:HD12	1:A:2925:ILE:HD13	1.99	0.45
1:A:433:GLN:NE2	1:A:437:THR:OG1	2.50	0.45
1:A:1314:PHE:O	1:A:1318:LEU:N	2.44	0.45
1:A:1650:ASN:N	1:A:1650:ASN:OD1	2.50	0.45
1:A:2305:VAL:HG21	1:A:2354:HIS:HB3	1.99	0.45
1:A:2729:LEU:HD23	1:A:2732:ARG:HH21	1.82	0.45
1:A:3135:GLU:HG3	1:A:3137:VAL:H	1.81	0.45
1:A:2826:HIS:HB3	1:A:2829:SER:HB3	1.99	0.44
1:A:2568:PRO:O	1:A:2570:ALA:N	2.51	0.44
1:A:2759:SER:HA	1:A:2762:PHE:CD2	2.51	0.44
1:A:2914:LEU:HD13	1:A:2930:LEU:HD12	1.98	0.44
1:A:1714:MET:HB2	1:A:1720:VAL:HG22	1.99	0.44
1:A:2915:SER:HA	1:A:2957:ARG:HD2	1.98	0.44
1:A:2963:PRO:O	1:A:2967:MET:N	2.51	0.44
1:A:1054:SER:HB2	1:A:1095:GLY:HA2	1.99	0.43
1:A:1348:LEU:HA	1:A:1351:CYS:HB3	2.00	0.43
1:A:162:VAL:HA	1:A:167:ARG:HH22	1.84	0.43
1:A:2223:THR:HG23	1:A:2275:ALA:HB1	2.00	0.43
1:A:2755:LEU:HD21	1:A:2771:MET:HG3	2.00	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:350:LEU:HD22	1:A:411:LEU:HD11	2.00	0.43
1:A:242:ALA:HB1	1:A:285:LYS:HB2	1.99	0.43
1:A:1157:ARG:HD3	1:A:2679:ILE:HB	1.83	0.43
1:A:962:VAL:O	1:A:966:LEU:N	2.42	0.43
1:A:767:LEU:HD13	1:A:819:THR:HG23	2.00	0.42
1:A:1183:ARG:HE	1:A:1186:VAL:HG21	1.84	0.42
1:A:2630:PRO:HA	1:A:2642:LEU:HD21	2.00	0.42
1:A:1366:LEU:HD12	1:A:1476:PHE:HZ	1.84	0.42
1:A:446:LEU:HB3	1:A:732:LEU:HG	2.01	0.42
1:A:2727:LEU:HD23	1:A:2727:LEU:HA	1.92	0.42
1:A:2872:VAL:HG13	1:A:2880:VAL:HG11	2.01	0.42
1:A:1360:THR:O	1:A:1364:GLN:N	2.47	0.42
1:A:2618:ASN:HD21	1:A:2661:MET:HG3	1.85	0.42
1:A:2417:MET:O	1:A:2420:SER:OG	2.30	0.42
1:A:2614:SER:OG	1:A:2615:LYS:N	2.53	0.41
1:A:1693:ALA:HA	1:A:1694:PRO:HD3	1.91	0.41
1:A:270:ARG:HD2	1:A:275:VAL:HG11	2.03	0.41
1:A:2510:THR:OG1	1:A:2514:GLN:OE1	2.31	0.41
1:A:1157:ARG:HH12	1:A:2677:ASN:HB3	1.86	0.41
1:A:2226:ARG:HG3	1:A:2272:LEU:HD11	2.03	0.41
1:A:2601:ILE:HG12	1:A:3033:GLN:NE2	2.35	0.41
1:A:2181:ASP:N	1:A:2181:ASP:OD1	2.53	0.41
1:A:834:SER:O	1:A:836:PHE:N	2.54	0.41
1:A:207:LYS:HE2	1:A:207:LYS:HB2	1.85	0.41
1:A:1757:ILE:H	1:A:1757:ILE:HG13	1.78	0.41
1:A:2567:VAL:HG13	1:A:2568:PRO:HD2	2.03	0.41
1:A:1476:PHE:HB3	1:A:1480:VAL:HG23	2.03	0.41
1:A:1036:ARG:NH1	1:A:1323:ASP:OD2	2.51	0.40
1:A:2744:PRO:HD2	1:A:2747:LEU:HD12	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	2010/3199 (63%)	1872 (93%)	133 (7%)	5 (0%)	47 81

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2569	VAL
1	A	332	SER
1	A	2568	PRO
1	A	1101	PRO
1	A	2321	PRO

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	1800/2824 (64%)	1784 (99%)	16 (1%)	78 87

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

Mol	Chain	Res	Type
1	A	168	ASN
1	A	295	ASN
1	A	973	ARG
1	A	1188	MET
1	A	1201	ASN
1	A	1757	ILE
1	A	1764	ARG
1	A	2188	ASN
1	A	2211	GLN
1	A	2308	LEU
1	A	2432	ASN
1	A	2445	ASN
1	A	2567	VAL
1	A	2583	ARG
1	A	2851	LYS
1	A	3031	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	168	ASN
1	A	295	ASN
1	A	432	GLN
1	A	433	GLN
1	A	454	GLN
1	A	955	GLN
1	A	1146	ASN
1	A	1365	GLN
1	A	1547	ASN
1	A	1644	GLN
1	A	1737	GLN
1	A	1763	ASN
1	A	2188	ASN
1	A	2192	ASN
1	A	2291	HIS
1	A	2610	GLN
1	A	2618	ASN
1	A	2667	GLN
1	A	3033	GLN
1	A	3126	HIS
1	A	3140	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

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.

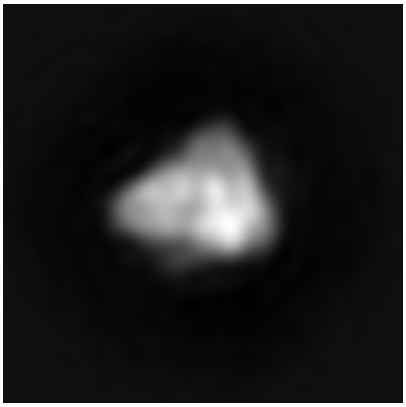
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-10793. 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

6.1.1 Primary map



X

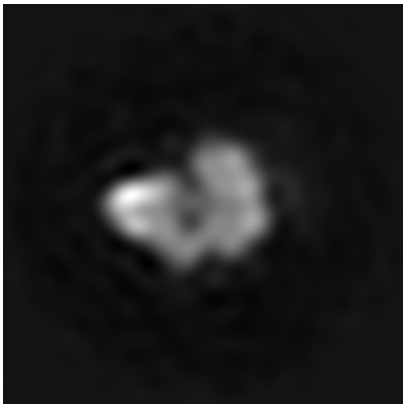
Y

Z

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

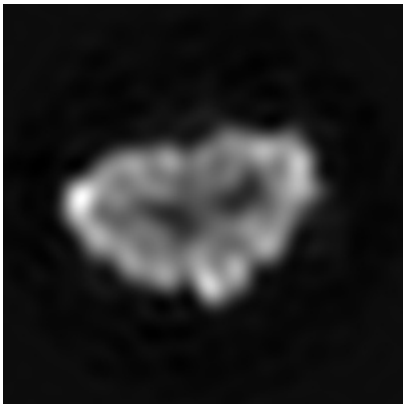
6.2 Central slices

6.2.1 Primary map



X Index: 120

Y Index: 120

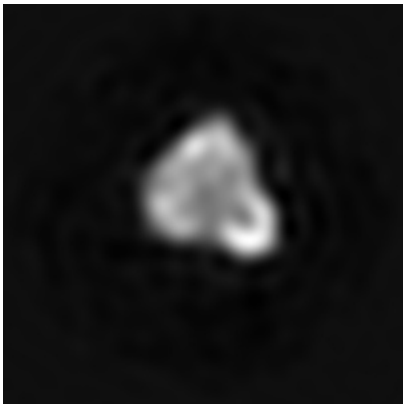


Z Index: 120

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: 160

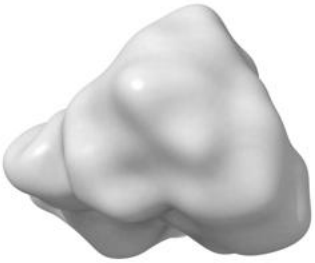
Y Index: 134

Z Index: 110

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

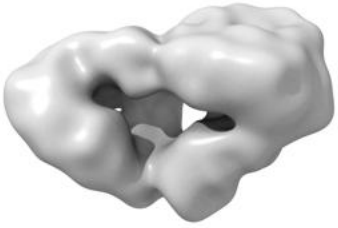
6.4 Orthogonal surface views (i)

6.4.1 Primary map



X

Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0058. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

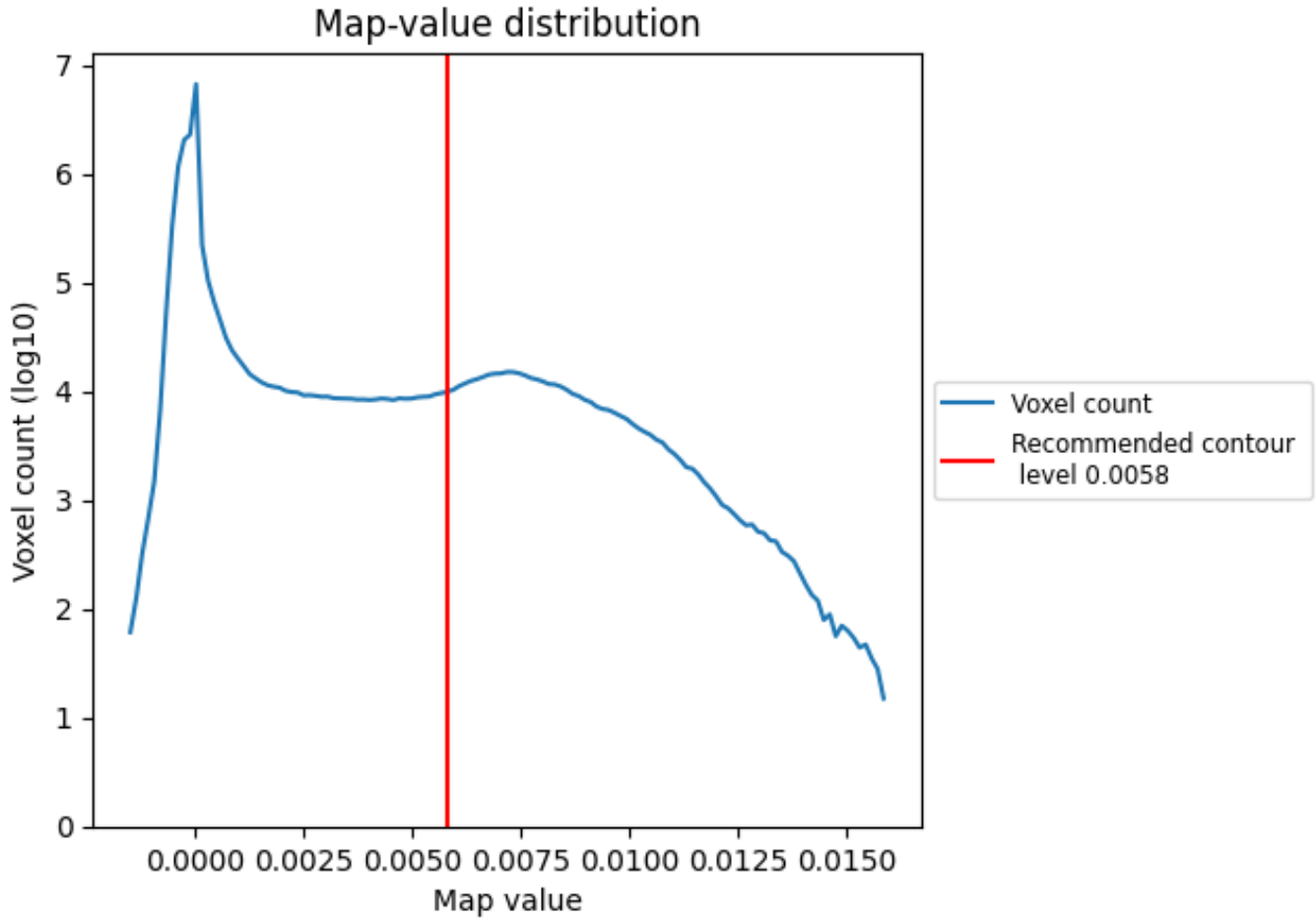
6.5 Mask visualisation (i)

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

7 Map analysis

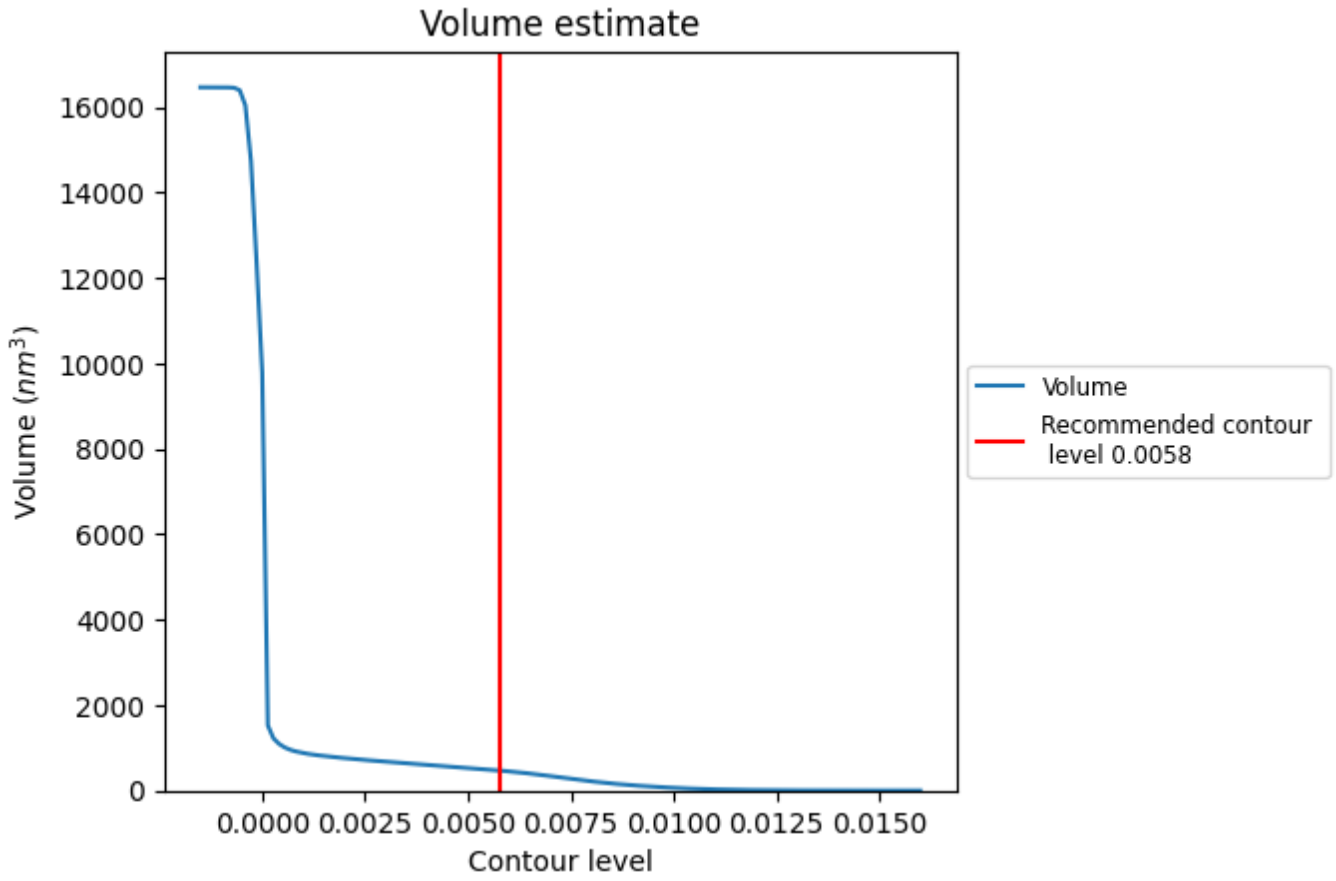
This section contains the results of statistical analysis of the map.

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.

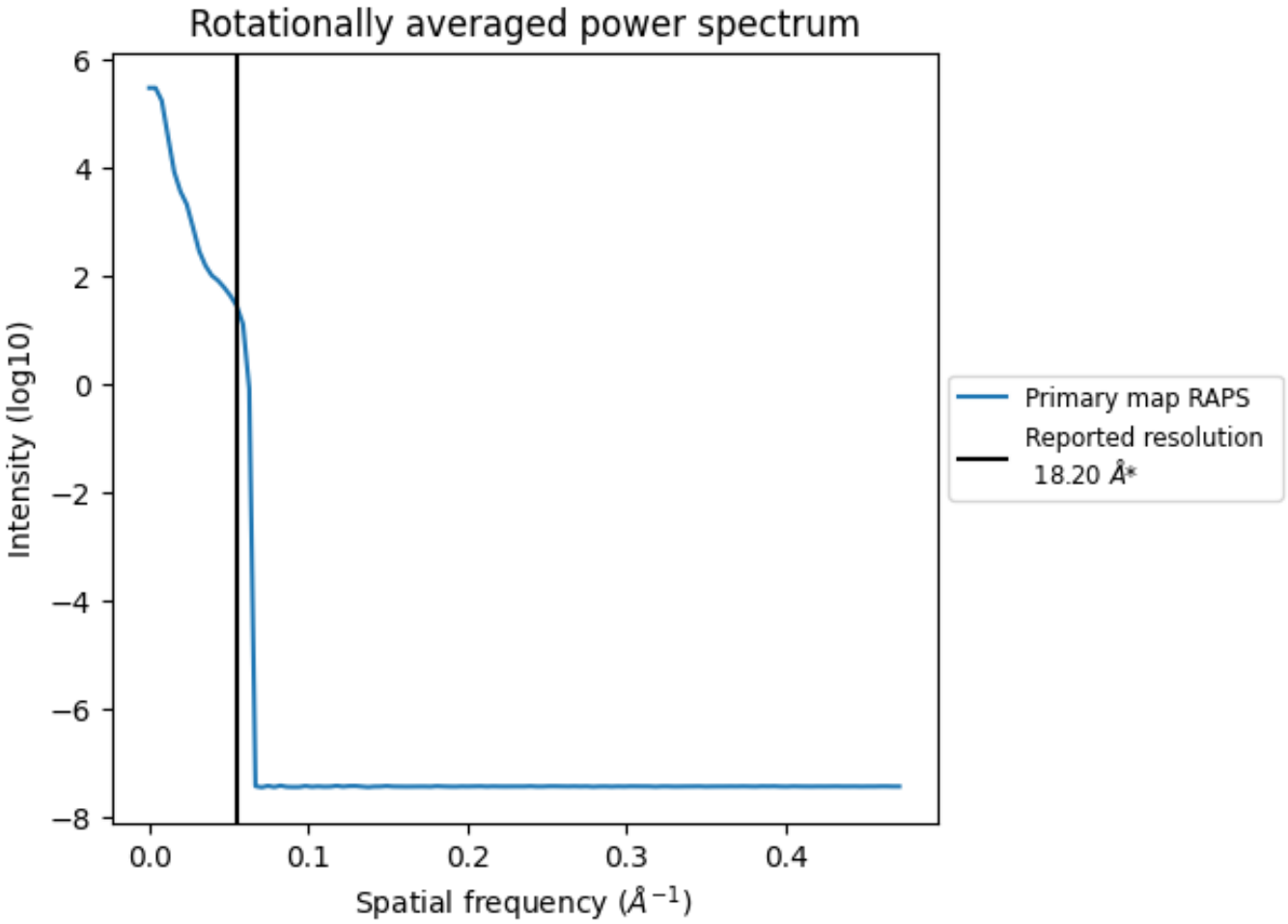
7.2 Volume estimate



The volume at the recommended contour level is 466 nm^3; this corresponds to an approximate mass of 421 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)

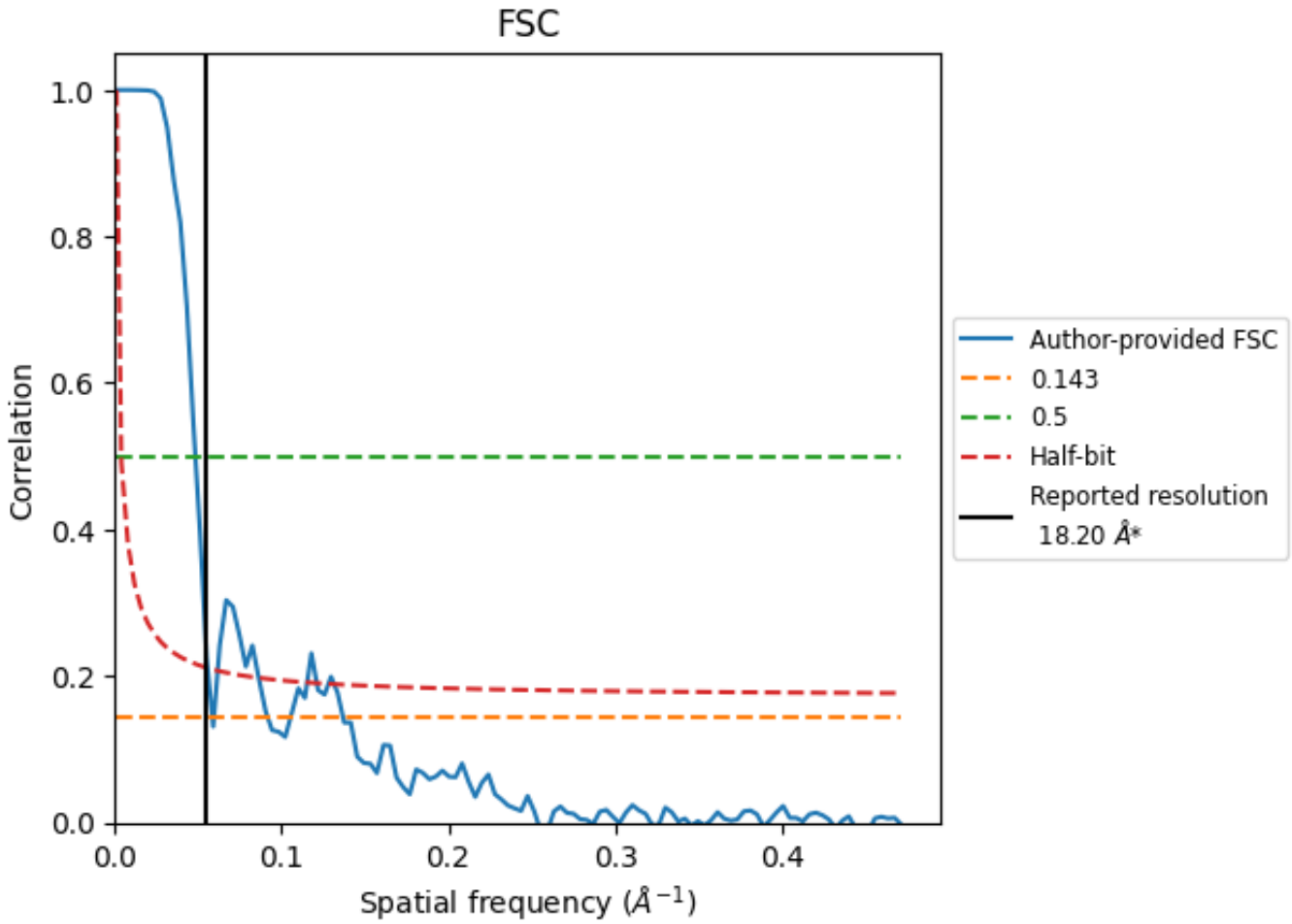


*Reported resolution corresponds to spatial frequency of 0.055 Å^{-1}

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 0.055 Å^{-1}

8.2 Resolution estimates (i)

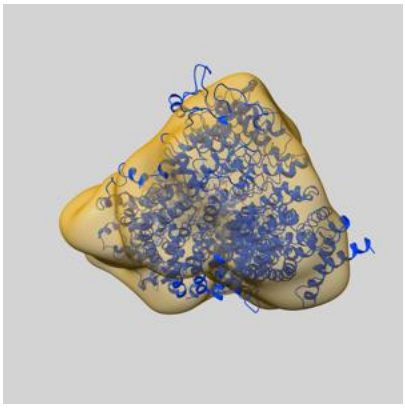
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	18.20	-	-
Author-provided FSC curve	17.09	20.70	17.99
Unmasked-calculated*	-	-	-

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

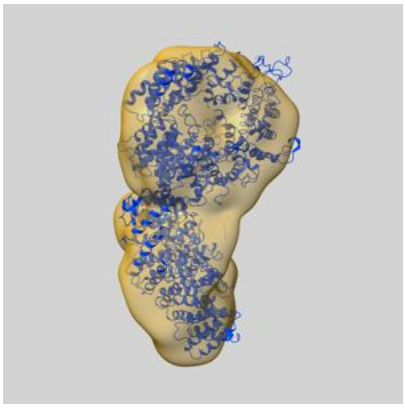
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-10793 and PDB model 6YEJ. Per-residue inclusion information can be found in section 3 on page 6.

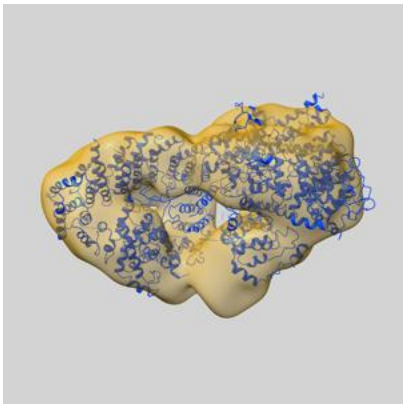
9.1 Map-model overlay



X



Y



Z

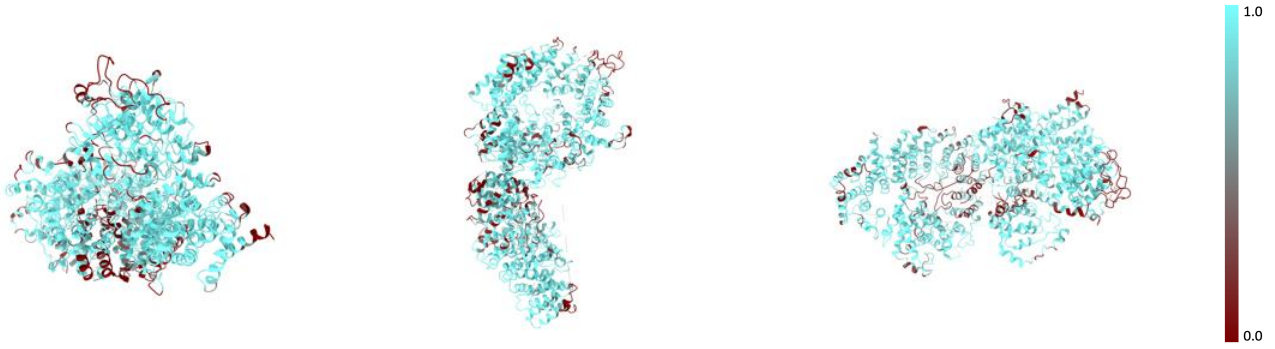
The images above show the 3D surface view of the map at the recommended contour level 0.0058 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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.

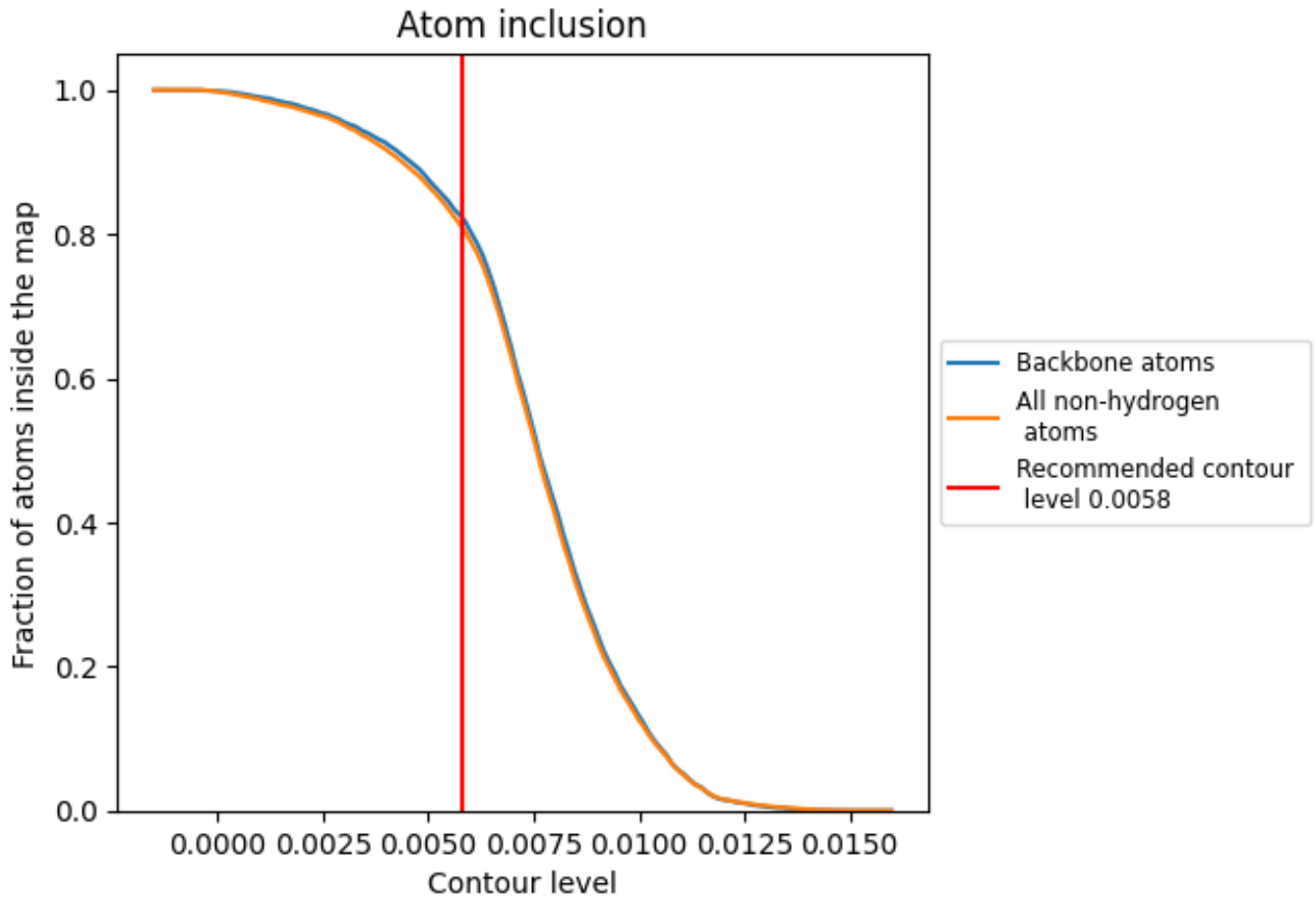
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.0058).

9.4 Atom inclusion (i)



At the recommended contour level, 82% of all backbone atoms, 81% 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 (0.0058) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8101	0.0360
A	0.8101	0.0360