



wwPDB EM Validation Summary Report ⓘ

Jul 3, 2024 – 07:02 am BST

PDB ID : 7NFE
EMDB ID : EMD-12301
Title : Cryo-EM structure of NHEJ super-complex (monomer)
Authors : Chaplin, A.K.; Hardwick, S.W.; Kefala Stavridi, A.; Chirgadze, D.Y.; Blundell, T.L.
Deposited on : 2021-02-06
Resolution : 4.29 Å(reported)

This is a wwPDB EM Validation Summary 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.dev92
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) : 2.37.1

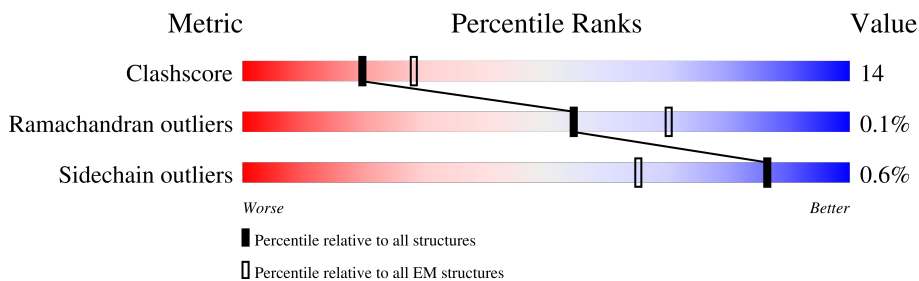
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.29 Å.

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





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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	4156	60% 26% 14%
2	B	609	51% 26% 22%
3	C	732	46% 24% 30%
4	F	299	18% 45% 19% 36%
4	G	299	8% 44% 22% 34%
5	H	336	10% 43% 17% 40%
5	I	336	17% 41% 16% 43%
6	J	911	18% 11% 72%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
7	D	24	 50% 50%
8	E	24	 46% 54%

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 44554 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 DNA-dependent protein kinase catalytic subunit,DNA-dependent protein kinase catalytic subunit,DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	3585	27806	17851	4651	5132	172	0	0

- Molecule 2 is a protein called X-ray repair cross-complementing protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	475	3673	2365	610	680	18	0	0

- Molecule 3 is a protein called X-ray repair cross-complementing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	513	3999	2557	669	752	21	0	0

- Molecule 4 is a protein called Non-homologous end-joining factor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	F	190	1465	936	247	275	7	0	0
4	G	197	1502	950	253	291	8	0	0

- Molecule 5 is a protein called DNA repair protein XRCC4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	H	201	1575	991	271	307	6	0	0
5	I	193	1521	958	257	300	6	0	0

- Molecule 6 is a protein called DNA ligase 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	J	258	2026	1284	345	386	11	0	0

- Molecule 7 is a DNA chain called DNA (5'-D(P*AP*AP*TP*AP*AP*AP*CP*TP*AP*AP*AP*AP*AP*CP*TP*AP*TP*TP*AP*TP*TP*AP*TP*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	D	24	493	238	92	139	24	0	0

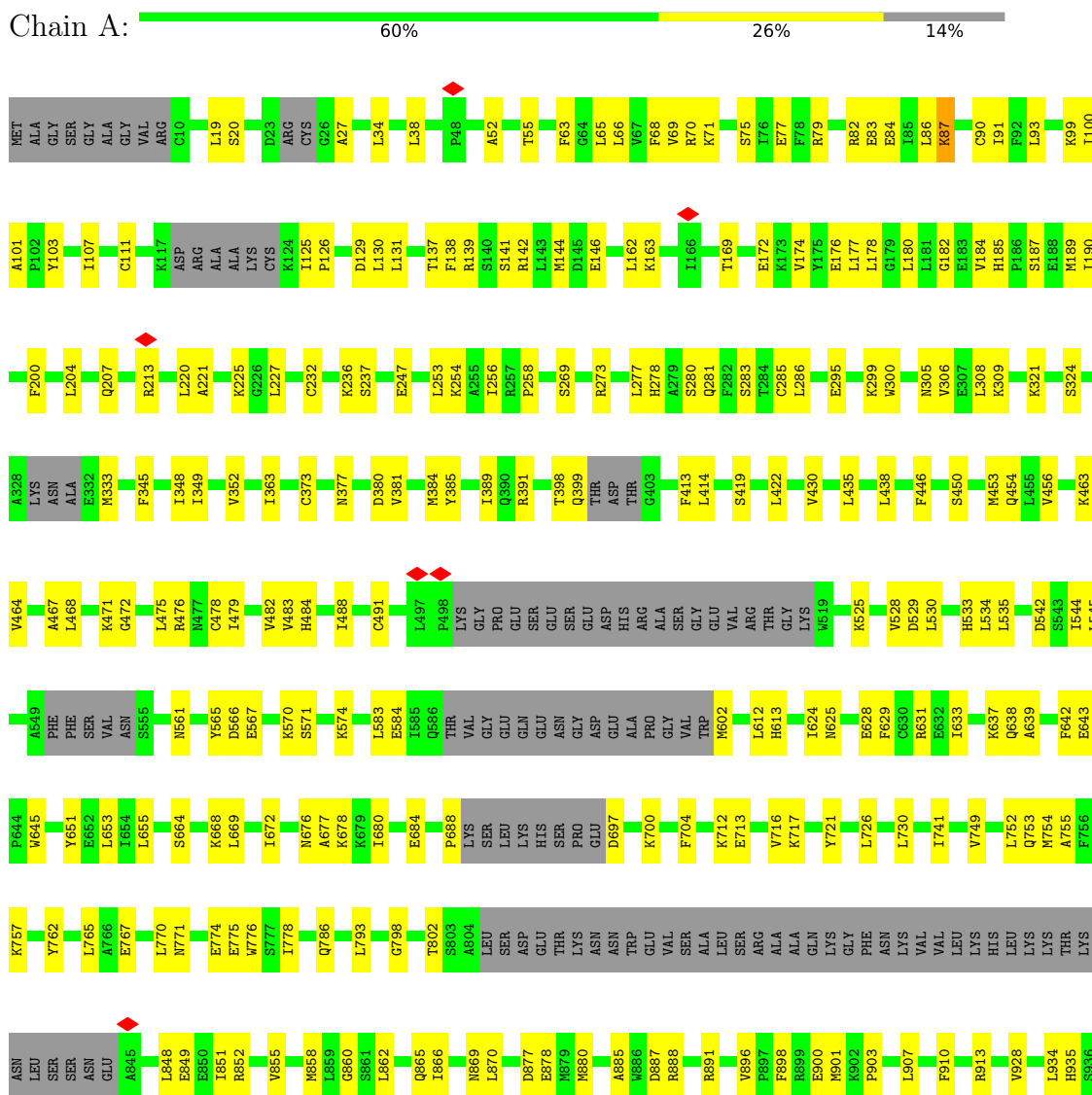
- Molecule 8 is a DNA chain called DNA (5'-D(P*TP*AP*AP*TP*AP*AP*TP*AP*GP*TP*TP*TP*TP*AP*GP*TP*TP*TP*AP*TP*TP*AP*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
8	E	24	494	240	81	149	24	0	0

3 Residue-property plots

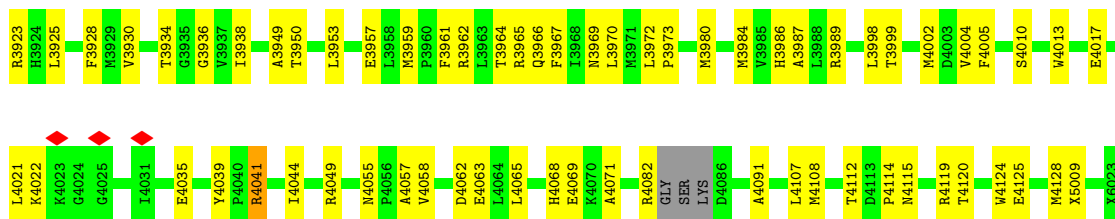
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: DNA-dependent protein kinase catalytic subunit,DNA-dependent protein kinase catalytic subunit,DNA-dependent protein kinase catalytic subunit

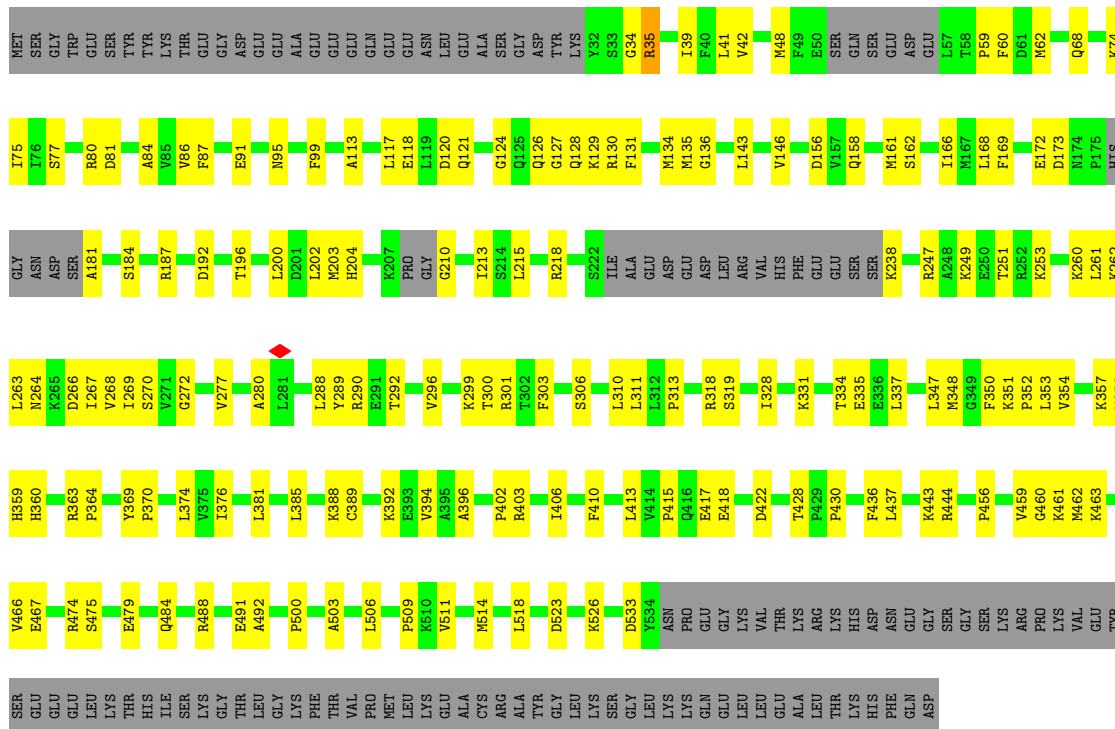


P2373	L2374	R2377	F2378	M2379	P2387	T2395	V2400	L2411	Y2412	L2415	K2416	S2417	K2418	D2419	F2420	M2424	R2425	D2428	D2429	E2430	R2431	L2438	M2442	M2443	K2447	P2448	V2449	R2452	E2453	L2454	P2457	V2458	E2460	F2461	H2464	P2465	S2466	T2467	Y2474	N2475	L2476	L2477	M2478								
D2269	N2270	S2271	I2274	L2277	V2280	L2285	Q2170	L2171	H2177	G2178	G2179	C2180	H2183	Y2184	M2185	I2189	T2192	T2197	A2200	E2201	K2207	L2215	L2219	V2223	F2224	H2225	P2226	K2227	V2230	F2231	L2235	L2341	C2342	L2349	F2257	E2258	K2259	F2260	S2265	S2466	V2367	T2368	F2371	P2372							
PHE	ARG	ARG	ARG	GLN	ARG	ASP	PRO	THR	VAL	HIS	ASP	ASP	VAL	VAL	LEU	GLU	PRO	GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLN	GLY	PRO	PRO	GLN	GLY	GLY	GLY	VAL	VAL	PRO	PRO	ARG	ASP	L2122	W2125	L2129	H2130	L2133	F2145			
ILE	ARG	LYS	ALA	ALA	ARG	GLU	ALA	ALA	ASN	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP			
GLU	ILE	ARG	LYS	ALA	ARG	GLU	ALA	ALA	ASN	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP		
T1924	E1925	M1926	ALA	GLY	GLU	ASN	GLN	L1933	R1936	R1937	Y1940	H1941	C1942	M1946	A1948	I1949	I1952	V1955	K1960	F1961	Y1962	I1970	S1970	C1971	V1972	L1973	L1974	K1985	R1986	TYR	ASN	VAL	PHE	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO
H1830	C1831	S1832	L1833	D1834	V1844	V1845	I1847	A1848	D1849	K1852	K1857	LEU	ASN	E1860	S1861	T1862	Q1866	I1867	T1868	M1871	K1875	I1876	V1879	R1883	PRO	PRO	D1887	D1888	V1889	I1896	V1899	F1900	HIS	GLY	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL
D1748	A1749	L1750	E1751	T1754	E1760	T1763	E1764	V1765	L1766	G1767	R1768	E1769	H1772	V1773	E1776	F1778	O1779	S1780	R1783	R1784	G1789	S1790	C1791	V1792	T1793	Q1794	V1795	G1796	L1797	Y1802	D1809	F1810	R1811	L1812	S1813	Q1817	F1818	F1819	V1820	D1821	S1822	E1823	L1824	L1825	T1826	L1827	W1828	W1829			
S1637	E1640	T1641	K1642	V1645	S1657	S1660	F1661	M1662	H1665	G1666	I1667	E1670	Y1675	T1694	L1695	L1696	F1697	F1699	T1700	S1701	L1702	T1703	E1709	R1712	V1713	Q1716	V1719	M1724	Q1725	S1726	T1733	P1734	R1735	F1736	Y1739	L1741	D1742	C1743	M1743	K1744	K1745										
V1537	L1538	E1539	T1540	ALA	SER	LEU	GLY	SER	GLN	SER	S1549	V1550	I1551	H1552	Y1560	S1564	N1568	T1569	E1570	L1571	L1572	M1600	L1601	D1602	Q1603	R1606	E1607	R1608	Q1611	Q1614	G1615	L1616	T1620	L1621	I1622	L1623	Q1624	H1625	W1626	K1627											
I1428	E1429	E1430	L1431	C1432	A1433	V1434	Y1437	V1451	V1452	S1453	A1454	Q1457	L1458	H1459	R1460	L1463	H1465	Q1471	D1474	L1475	H1476	H1477	E1482	L1483	L1486	V1487	P1489	GLY	ASP	GLU	ARG	GLN	CYS	P1501	S1502	L1503	D1504	L1505	L1515	F1519	L1527	L1528	L1531								
K1074	F1082	I1085	Y1086	E1087	E1088	F1089	E1092	E1093	S1094	L1095	V1096	E1097	Q1098	F1099	Y1099	W1100	F1101	E1102	I1106	L1111	A1112	H1115	C1127	D1132	R1136	H1142	M1146	K1147	A1148	Q1043	I1044	R1151	L1152	L1153	P1154	S1162	V1162	L1163	C1164	L1165	V1169	D1413	A1286	Q1287	H1175	R1178	P1179	Q1180	L1181	E1182	
C1183	R1184	H1185	K1186	F1191	V1195	P1196	L1197	L1198	P1204	L1212	E1215	F1219	L1220	E1225	G1228	S1233	G1234	I1235	L1236	A1237	Q1238	P1239	Y1243	T1253	L1254	C1255	W1256	L1257	D1258	L1259	L1260	L1261	L1264	E1265	V1400	M1401	L1402	M1403	K1404	D1413	A1286	Q1287	H1175	R1178	P1179	Q1180	L1181	E1182			
K1311	PHE	GLY	THR	GLY	ALA	ALA	ASN	ARG	ALA	THR	SER	Q1324	Q1325	V1338	W1339	R1340	I1341	M1342	T1346	K1361	D1362	L1363	C1364	M1365	H1367	L1368	M1369	R1370	C1377	E1378	P1379	F1384	V1389	Q1390	C1399	V1400	M1401	L1402	M1403	K1404	D1413	A1286	Q1287	H1175	R1178	P1179	Q1180	L1181	E1182		
I1428	E1429	E1430	L1431	C1432	A1433	V1434	Y1437	V1451	V1452	S1453	A1454	Q1457	L1458	H1459	R1460	L1463	H1465	Q1471	D1474	L1475	H1476	H1477	E1482	L1483	L1486	V1487	P1489	GLY	ASP	GLU	ARG	GLN	CYS	P1501	S1502	L1503	D1504	L1505	L1515	F1519	L1527	L1528	L1531								

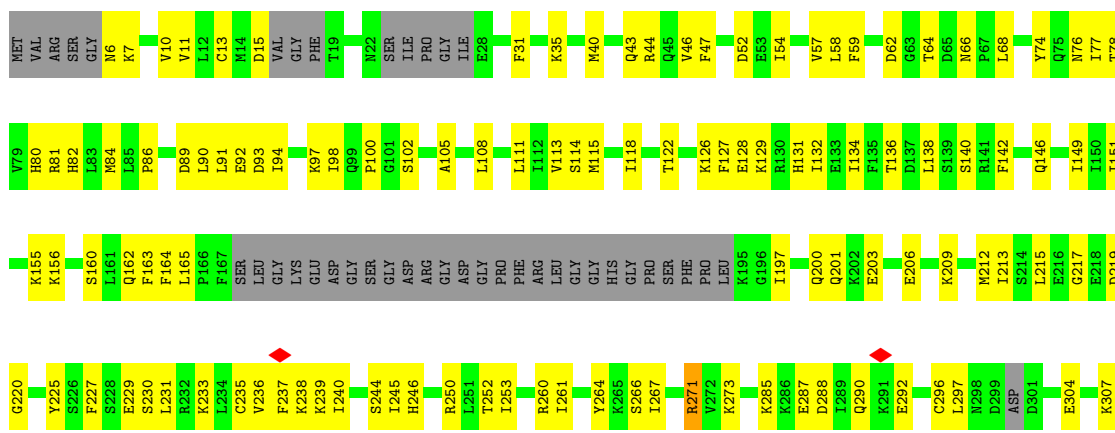
A3834	G3754	G3548	E3429	E3140	S3015	P2873	V2769	THR	E2576	H2479
P3835	G3755	D3563	ASN	V3155	S3018	C2880	R2773	ALA	F2586	L2460
E3838	D3757	I3568	ALA	P3156	N3023	C2886	R2774	ASP	Y2589	Y2464
Y3839	L3758	I3569	SER	R3159	D3026	Q2889	Y2775	GLY	R2896	R2465
K3845	L3759	D3570	ILE	L3160	L3027	R2891	R2776	ARG	H2896	D2466
K3846	F3571	F3571	ASP	L3161	N3028	L2892	H2777	SER	PHE	D2492
SER	Q3762	I3572	SER	M3162	K3029	L2893	D2782	ASP	ARG	S2495
GLY	R3763	M3573	ALA	T3163	L3030	L2894	Q2783	TRP	ARG	K2500
LYS	R3763	M3573	L3439	W3164	W3031	E2894	I2785	LEU	SER	L2501
HIS	Q3766	L3575	L3445	T3165	Q3037	E2895	K2786	THR	VAL	L2502
D3851	D3660	D3576	L3445	R3167	R2899	R2899	H2787	LEU	LEU	K2502
A3854	D3661	Q3577	K3449	F3168	LEU	LEU	S2788	THR	THR	K2503
Y3855	M3770	L3578	M3450	P3169	LEU	LEU	S2789	THR	THR	D2504
M3856	N3664	L3583	L3451	D3170	ALA	ALA	L2790	PRO	PRO	V2505
L3857	G3772	L3583	K3455	D3174	GLY	GLY	I2791	ASP	PHE	Q2508
M3858	L3774	W3588	K3455	P3175	GLU	LEU	T2792	PRO	VAL	L2517
Y3859	K3669	K3588	K3455	R3176	ALA	LEU	Q2795	LEU	VAL	D2512
N3863	K3672	R3593	M3459	M3177	GLU	LEU	Q2799	LEU	GLN	E2513
E3866	E3682	K3598	E3460	I3178	ASP	ALA	Q2800	THR	ALA	N2514
T3867	W3686	PRO	L3463	I3182	GLY	ARG	Q2800	PRO	GLN	L2517
V3868	F3694	VAL	P3466	I3183	GLY	ARG	T2803	THR	GLY	H2527
K3877	R3784	ASN	R3474	R3186	F3064	GLN	T2806	THR	THR	E2528
V3878	L3785	K3603	R3474	R3186	I3065	ASP	K2806	GLN	LEU	T2529
R3879	F3694	K3604	R3480	L3190	Y3082	ARG	Q2807	THR	THR	R2530
P3879	L3695	K3604	L3480	L3190	S3083	LEU	L2808	LEU	THR	L2531
A3880	R3696	M3483	L3480	L3197	L3086	PRO	S2814	THR	THR	P2532
D3881	E3700	M3483	M3483	L3197	L3086	PRO	S2814	GLN	ALA	D2537
L3882	E3709	R3609	E3486	THR	D3097	TYR	K2818	GLY	GLY	L2538
K3883	K3710	F3610	E3486	LEU	R2922	R2922	E2819	LEU	LEU	R2537
L3884	P3711	E3811	S3489	LEU	W2923	W2923	E2819	GLY	GLY	L2539
K3885	L3800	R3612	S3489	PRO	K3100	ALA	M2820	ARG	ARG	L2540
R3885	G3801	M3613	V3490	GLU	Y3101	ARG	M2820	LEU	SER	L2540
A3886	R3718	M3613	P3491	ASP	Y3102	LYS	T2825	THR	ALA	S2544
F3887	F3722	A3616	C3492	ASP	I3103	VAL	T2825	ARG	ARG	S2544
V3888	L3617	L3617	W3494	SER	Q3104	ALA	K2829	LEU	TRP	S2547
R3889	L3625	L3625	F3495	MET	N3105	GLU	K2829	PRO	PRO	P2548
M3890	L3625	L3625	F3495	ASN	M3113	GLN	L2832	ALA	VAL	K2549
S3891	T3727	T3727	I3499	VAL	R2962	LYS	L2832	PRO	ALA	L2550
P3894	V3726	F3626	T3499	ASP	R2967	ARG	K2885	LEU	GLY	H2553
E3895	V3728	F3628	M3502	GLN	E2967	GLU	D2839	GLN	GLN	L2553
A3896	R3733	R3629	M3502	ASP	E2967	LYS	D2839	LEU	ILE	L2557
F3897	R3734	R3630	TRP	ASP	E2967	LYS	F2840	GLY	SER	L2557
S3901	P3735	K3631	Q3510	GLY	K2970	ILE	M2841	VAL	ARG	L2557
E3902	K3736	F3632	CYS	ASP	E2990	LYS	R2842	PRO	THR	L2562
H3903	R3737	L3633	A3513	PRO	E2990	SER	F2843	ASP	ASP	L2562
K3909	F3636	F3636	E3520	SER	L3129	GLU	F2843	PHE	GLN	L2563
P3894	G3637	A3407	A3407	ASP	Q3130	GLU	L2844	GLU	GLN	L2563
E3895	R3628	A3407	A3407	ARG	S3131	LEU	L2844	LEU	GLN	L2563
A3896	R3629	R3630	I3328	MET	S3131	LEU	W2994	LEU	GLN	L2566
F3897	R3629	R3630	I3328	GLU	S3131	MET	W2994	LEU	GLN	L2566
S3921	F3632	K3631	L3330	VAL	Q3133	MET	V2855	LEU	HIS	L2566
E3922	L3633	L3633	L3330	VAL	A3134	LYS	S2856	LEU	ASP	S2567
E3823	K3736	K3736	A3412	GLN	L3135	LYS	C2857	LEU	ARG	S2567
E3824	R3737	R3737	A3412	GLN	L3135	GLN	I2888	LEU	THR	Y2572
K3925	I3740	I3740	L3416	GLN	T3136	ASP	Q2859	LEU	GLY	F2573
Y3928	D3744	D3744	L3416	GLU	Q3139	ASP	Q2859	LEU	THR	F2573
L3912	E3745	E3745	I3410	GLU	S3131	ASP	Q2859	LEU	THR	F2573
I3913	R3746	F3640	R3411	VAL	S3131	ASP	Q2859	LEU	THR	F2573
W3916	B3841	B3841	A3412	GLN	L3135	GLN	I2888	LEU	THR	F2573
	K3642	K3642	L3416	GLU	T3136	ASP	Q2859	LEU	THR	F2573
	F3644	F3644	T3547	GLU	Q3139	ASP	Q2859	LEU	THR	F2573
	K3753	K3753	T3547	GLU	Q3139	ASP	Q2859	LEU	THR	F2573

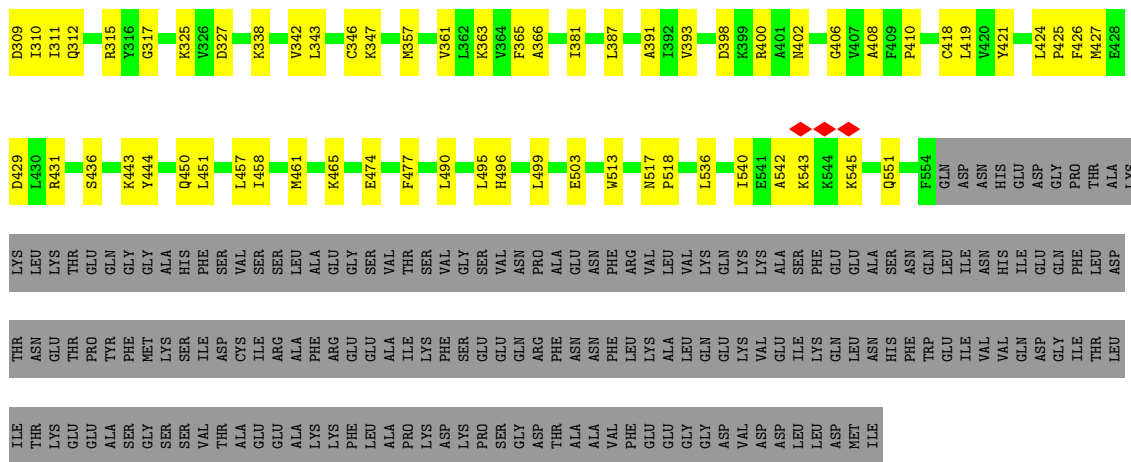


• Molecule 2: X-ray repair cross-complementing protein 6

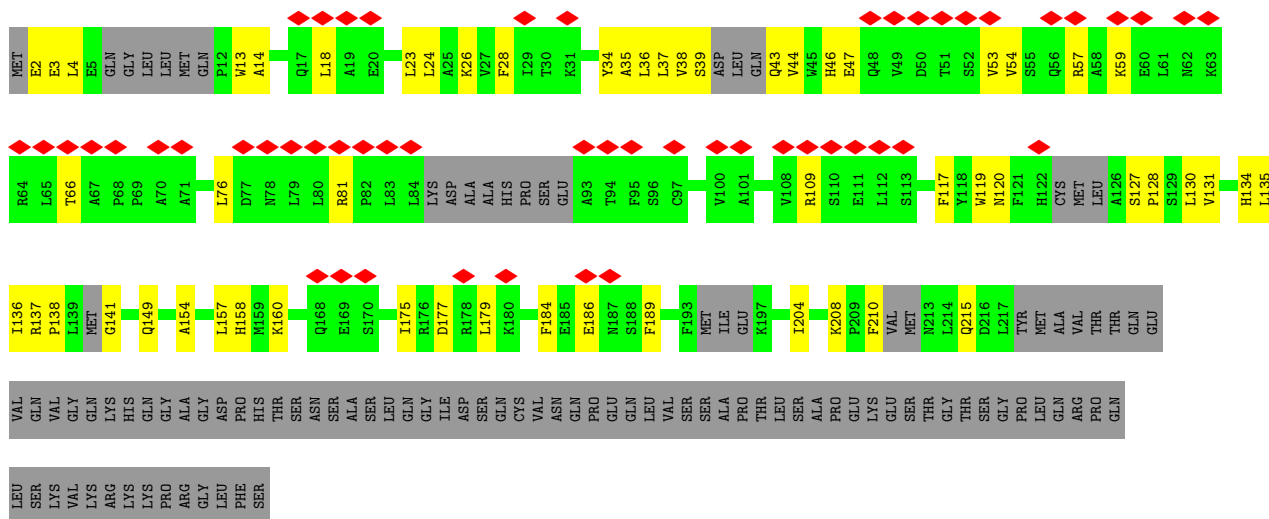
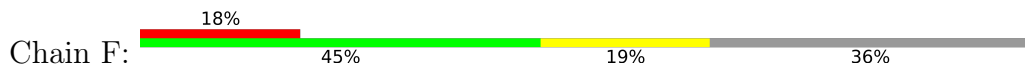


• Molecule 3: X-ray repair cross-complementing protein 5

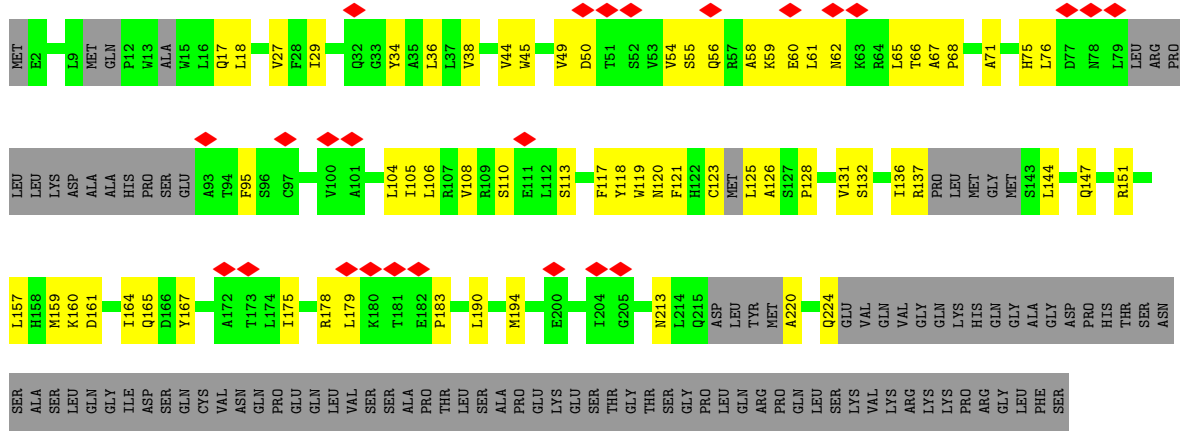
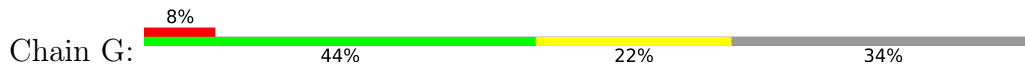


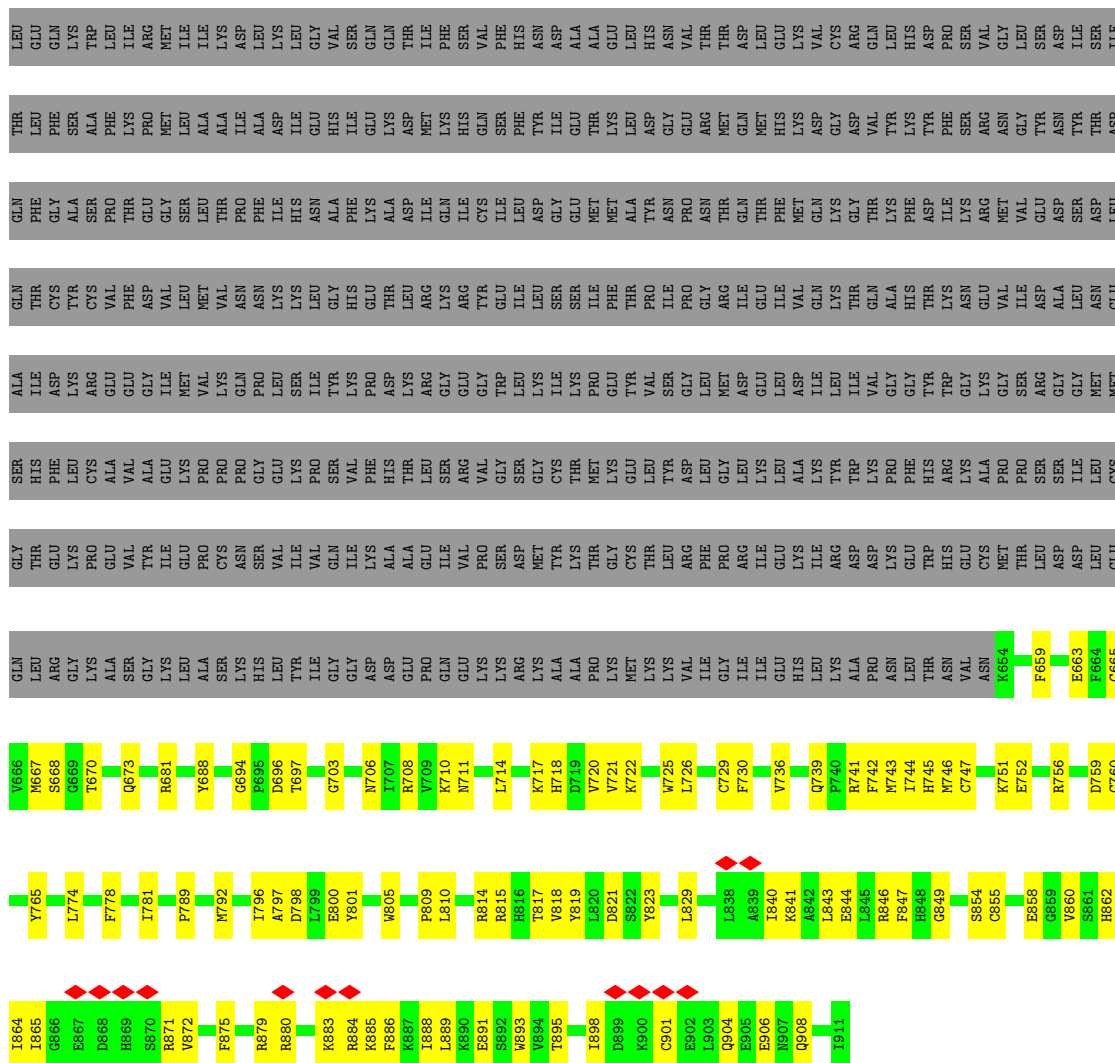


● Molecule 4: Non-homologous end-joining factor 1



● Molecule 4: Non-homologous end-joining factor 1

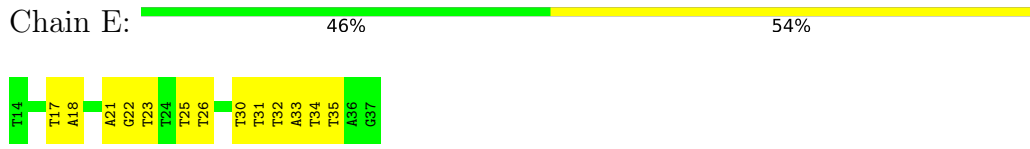




• Molecule 7: DNA (5'-D(P*AP*AP*TP*AP*AP*AP*CP*TP*AP*AP*AP*AP*AP*CP*TP*A P*TP*TP*AP*TP*TP*AP*TP*G)-3')



• Molecule 8: DNA (5'-D(P*TP*AP*AP*TP*AP*AP*TP*AP*GP*TP*TP*TP*TP*TP*AP*G P*TP*TP*TP*AP*TP*TP*AP*G)-3')



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	45943	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 ($e^-/\text{\AA}^2$)	46.8	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	130000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.753	Depositor
Minimum map value	-0.224	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.018	Depositor
Recommended contour level	0.175	Depositor
Map size (Å)	704.16003, 704.16003, 704.16003	wwPDB
Map dimensions	540, 540, 540	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.304, 1.304, 1.304	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.25	0/28219	0.46	1/38230 (0.0%)
2	B	0.25	0/3740	0.48	0/5053
3	C	0.25	0/4075	0.47	0/5509
4	F	0.24	0/1488	0.48	0/2015
4	G	0.24	0/1522	0.51	0/2064
5	H	0.24	0/1602	0.47	0/2159
5	I	0.24	0/1546	0.47	0/2082
6	J	0.24	0/2073	0.46	0/2807
7	D	0.43	0/554	0.88	0/852
8	E	0.56	0/552	1.09	0/851
All	All	0.26	0/45371	0.49	1/61622 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	2277	LEU	CA-CB-CG	5.12	127.07	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	27806	0	27233	715	0
2	B	3673	0	3652	124	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	3999	0	3899	136	0
4	F	1465	0	1432	47	0
4	G	1502	0	1439	61	0
5	H	1575	0	1514	57	0
5	I	1521	0	1440	46	0
6	J	2026	0	1895	72	0
7	D	493	0	273	11	0
8	E	494	0	278	15	0
All	All	44554	0	43055	1205	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 14.

The worst 5 of 1205 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:3365:SER:HB3	1:A:3376:GLY:HA3	1.61	0.82
2:B:337:LEU:HD11	3:C:490:LEU:HA	1.67	0.77
4:G:128:PRO:O	4:G:132:SER:HB2	1.85	0.77
6:J:814:ARG:HD2	6:J:849:GLY:H	1.50	0.77
4:G:132:SER:HB3	4:G:137:ARG:HH21	1.51	0.76

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	3483/4156 (84%)	3321 (95%)	160 (5%)	2 (0%)	51 85
2	B	465/609 (76%)	440 (95%)	25 (5%)	0	100 100
3	C	503/732 (69%)	479 (95%)	23 (5%)	1 (0%)	47 81

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	F	174/299 (58%)	159 (91%)	15 (9%)	0	100	100
4	G	183/299 (61%)	164 (90%)	19 (10%)	0	100	100
5	H	199/336 (59%)	192 (96%)	7 (4%)	0	100	100
5	I	189/336 (56%)	178 (94%)	11 (6%)	0	100	100
6	J	256/911 (28%)	237 (93%)	19 (7%)	0	100	100
All	All	5452/7678 (71%)	5170 (95%)	279 (5%)	3 (0%)	54	85

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	333	MET
1	A	3563	ASP
3	C	229	GLU

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	2961/3671 (81%)	2942 (99%)	19 (1%)	86	92
2	B	392/548 (72%)	391 (100%)	1 (0%)	92	95
3	C	428/649 (66%)	423 (99%)	5 (1%)	71	84
4	F	157/262 (60%)	156 (99%)	1 (1%)	86	92
4	G	159/262 (61%)	159 (100%)	0	100	100
5	H	166/303 (55%)	166 (100%)	0	100	100
5	I	161/303 (53%)	161 (100%)	0	100	100
6	J	212/808 (26%)	212 (100%)	0	100	100
All	All	4636/6806 (68%)	4610 (99%)	26 (1%)	86	92

5 of 26 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3845	LYS
1	A	3860	LYS
3	C	271	ARG
1	A	3858	MET
1	A	4041	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
5	I	137	ASN
5	H	141	ASN
2	B	360	HIS
5	H	137	ASN
1	A	3863	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](#)

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	4128:MET	C	5009:UNK	N	97.03
1	A	5016:UNK	C	6004:UNK	N	48.85

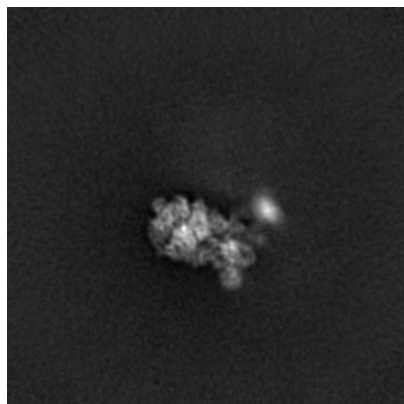
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12301. These allow visual inspection of the internal detail of the map and identification of artifacts.

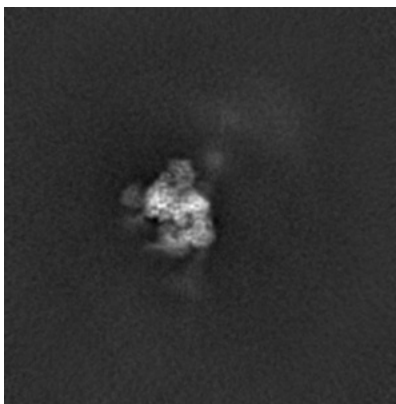
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

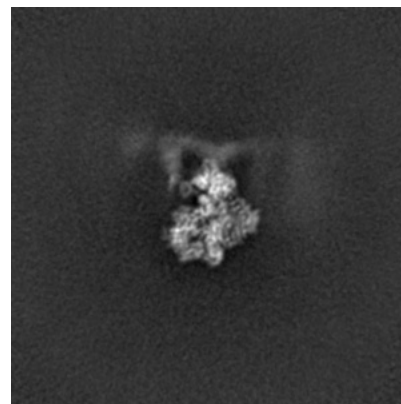
6.1.1 Primary map



X

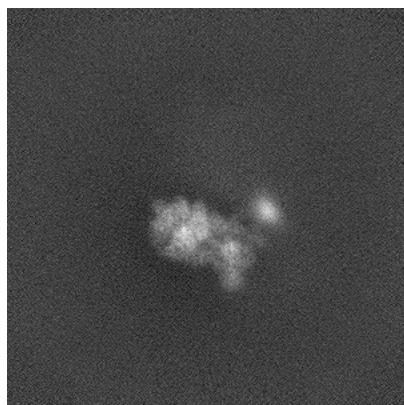


Y

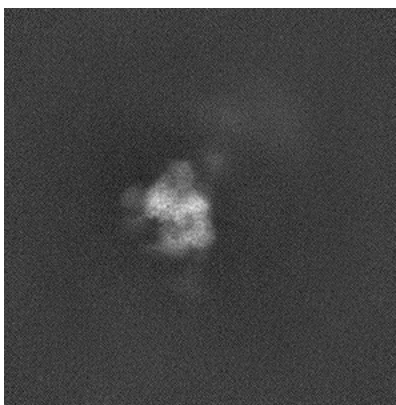


Z

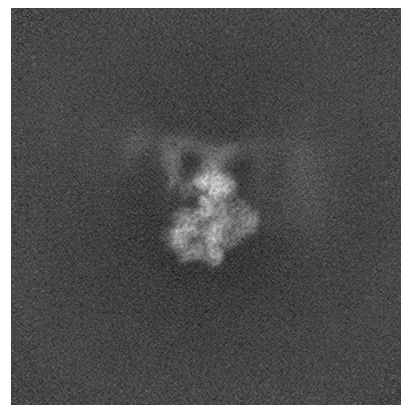
6.1.2 Raw map



X



Y

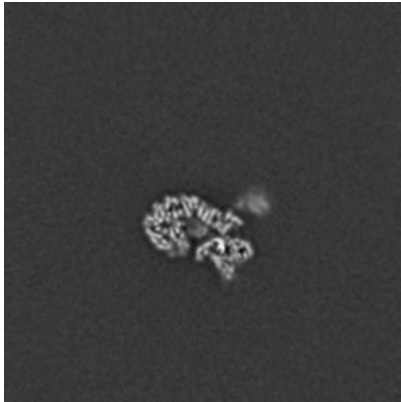


Z

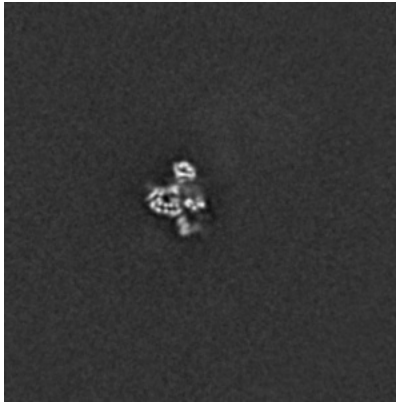
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

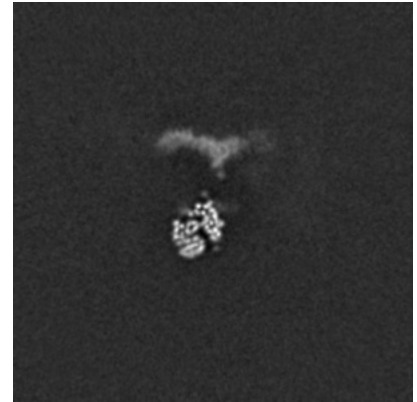
6.2.1 Primary map



X Index: 270

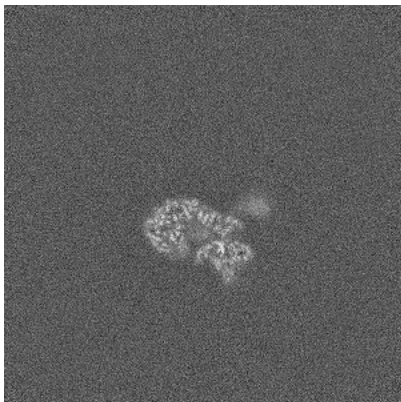


Y Index: 270

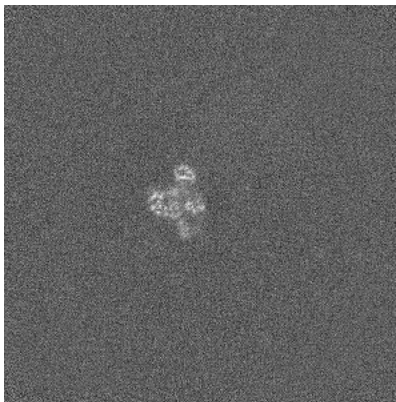


Z Index: 270

6.2.2 Raw map



X Index: 270



Y Index: 270

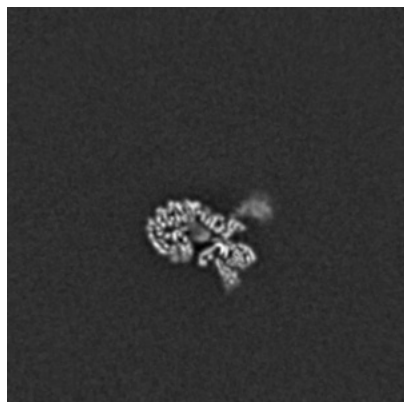


Z Index: 270

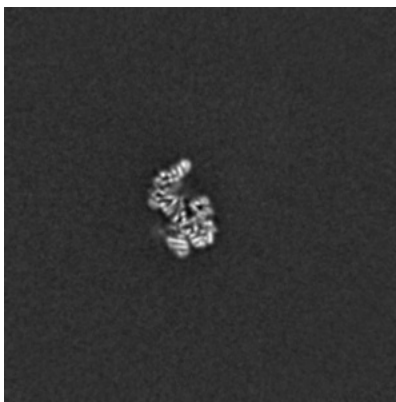
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

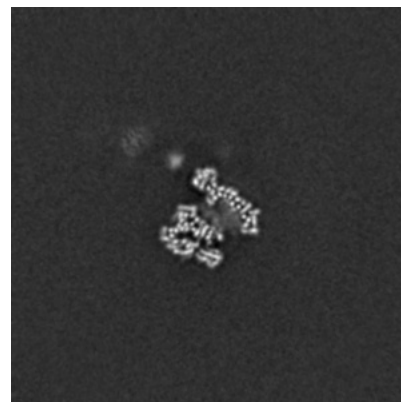
6.3.1 Primary map



X Index: 272

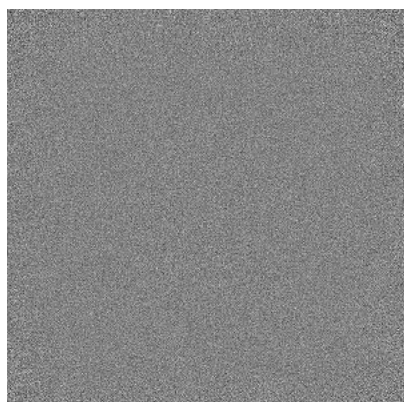


Y Index: 238

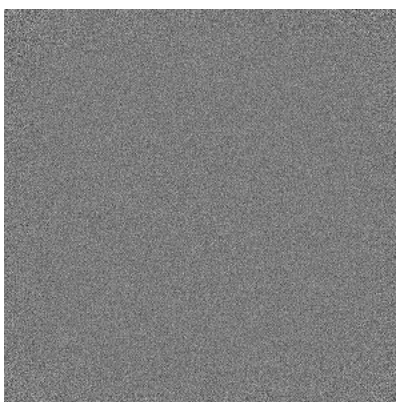


Z Index: 241

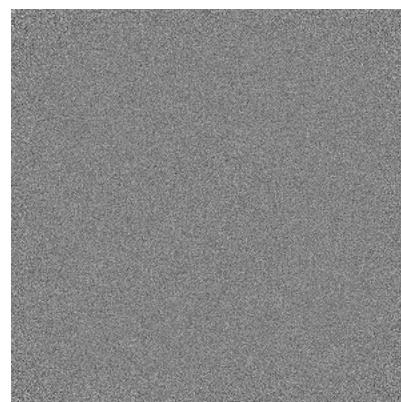
6.3.2 Raw map



X Index: 0



Y Index: 0



Z Index: 0

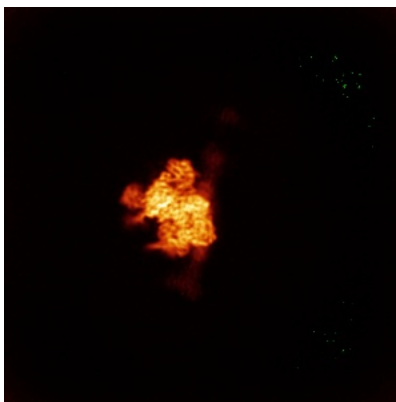
The images above show the largest variance slices of the map in three orthogonal directions.

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

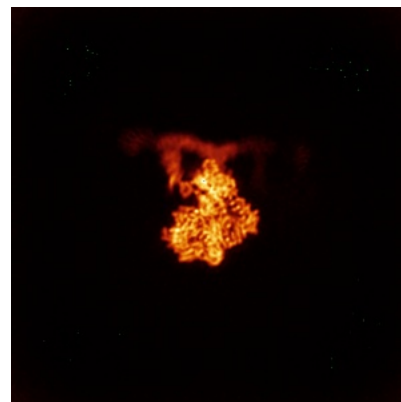
6.4.1 Primary map



X

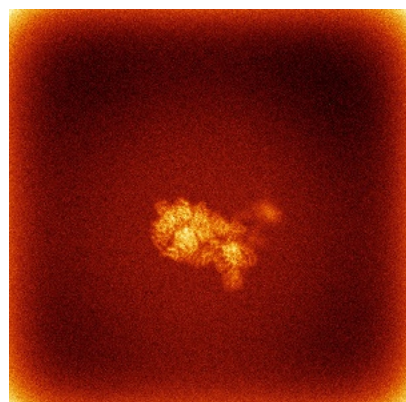


Y

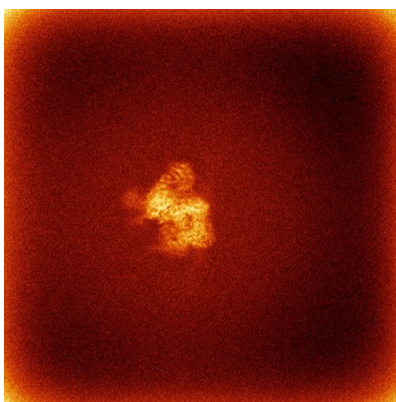


Z

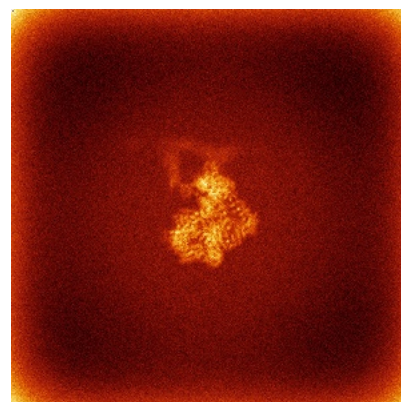
6.4.2 Raw map



X



Y

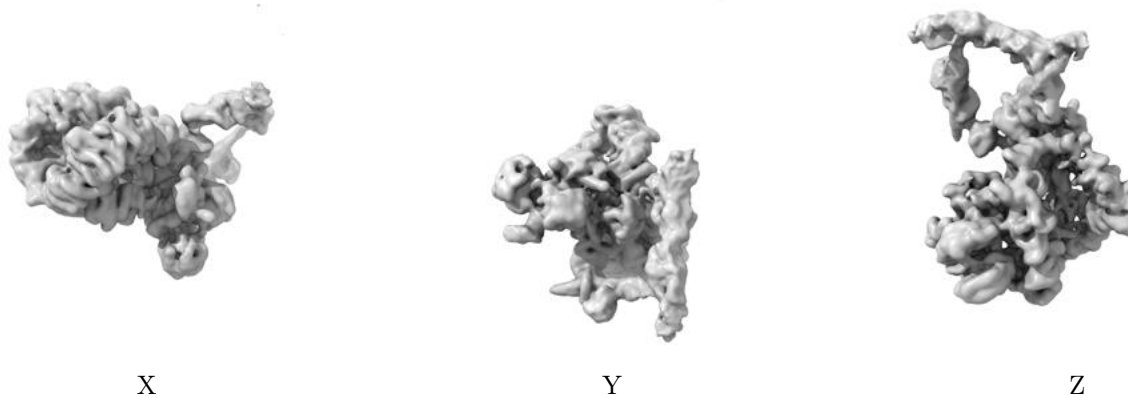


Z

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.

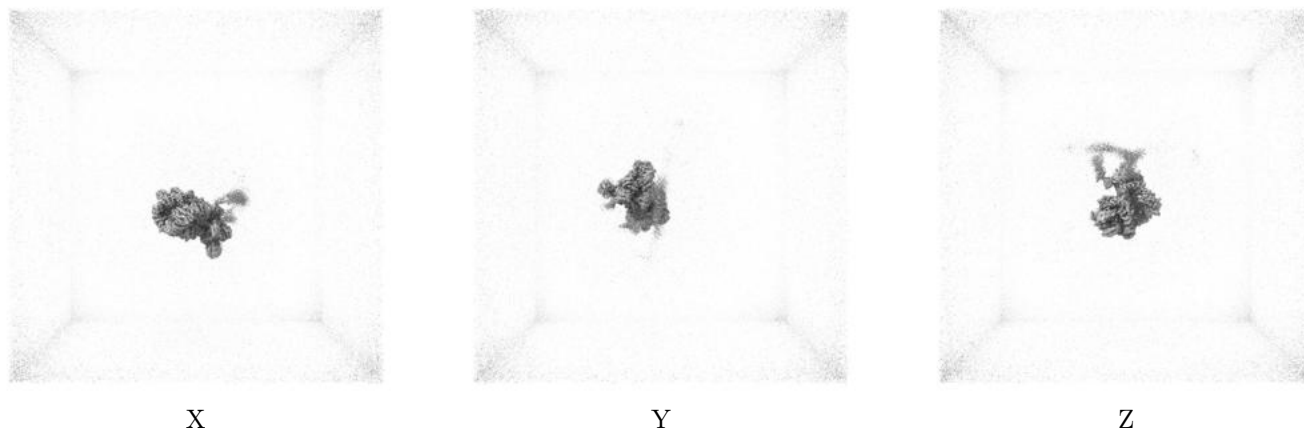
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.175. 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



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.

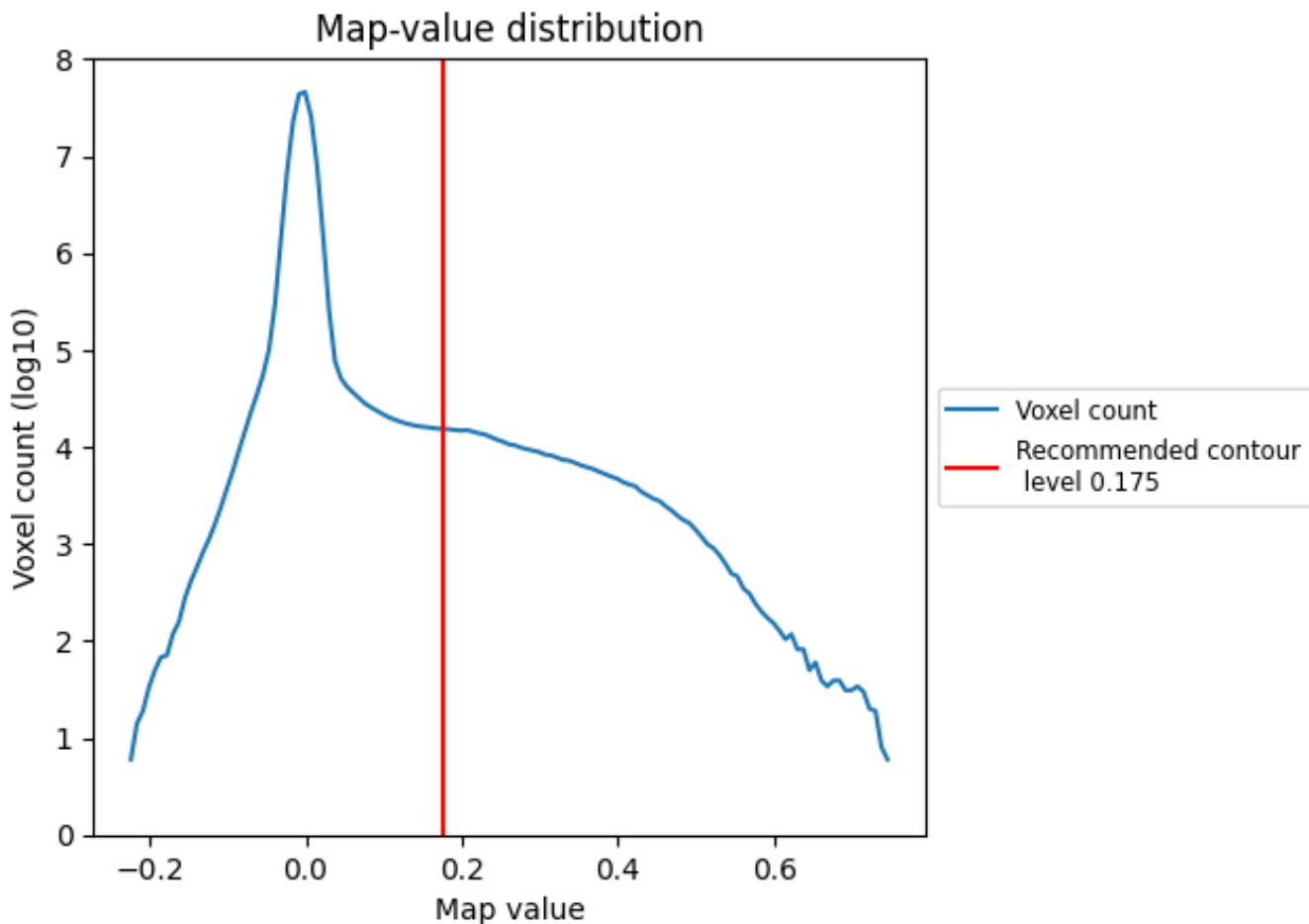
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

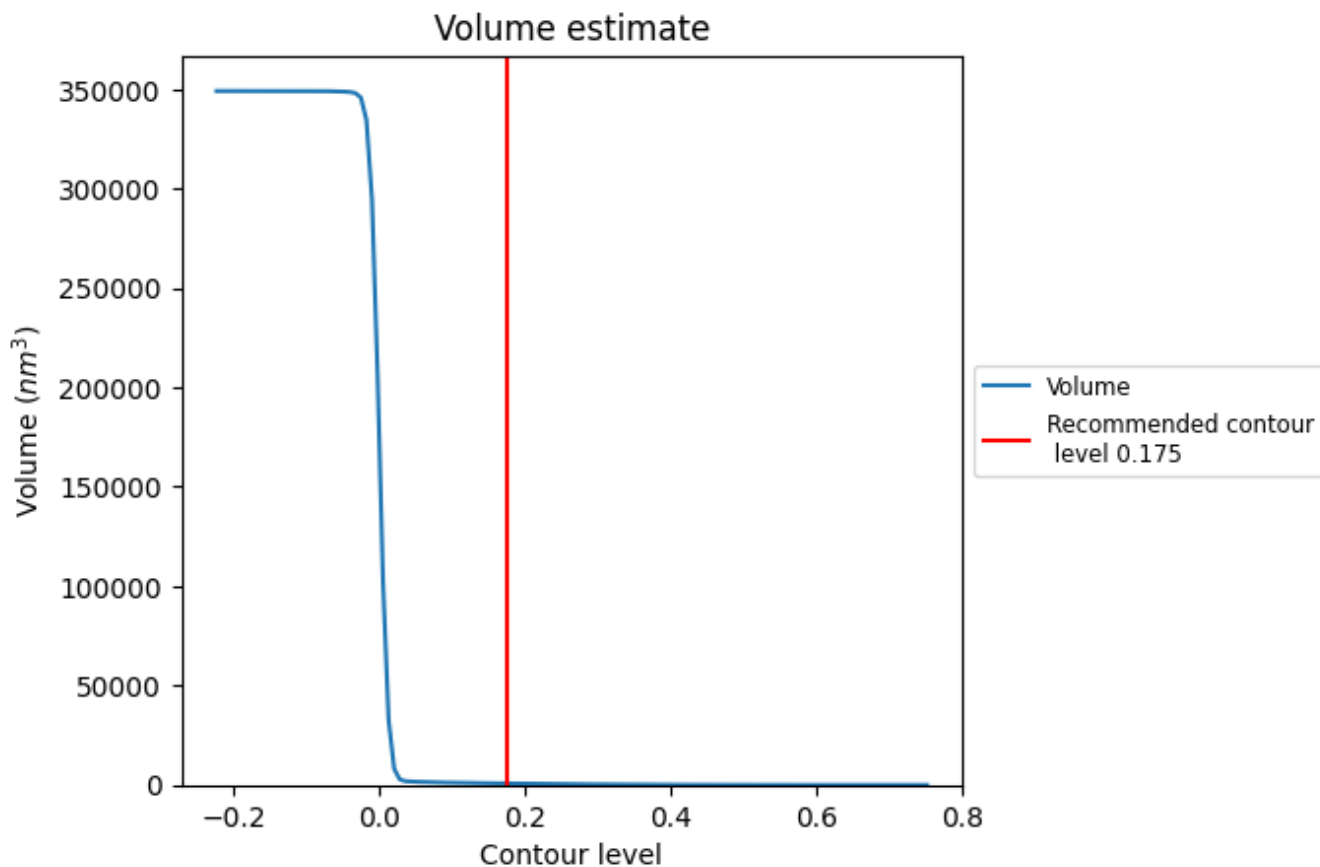
This section contains the results of statistical analysis of the map.

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.

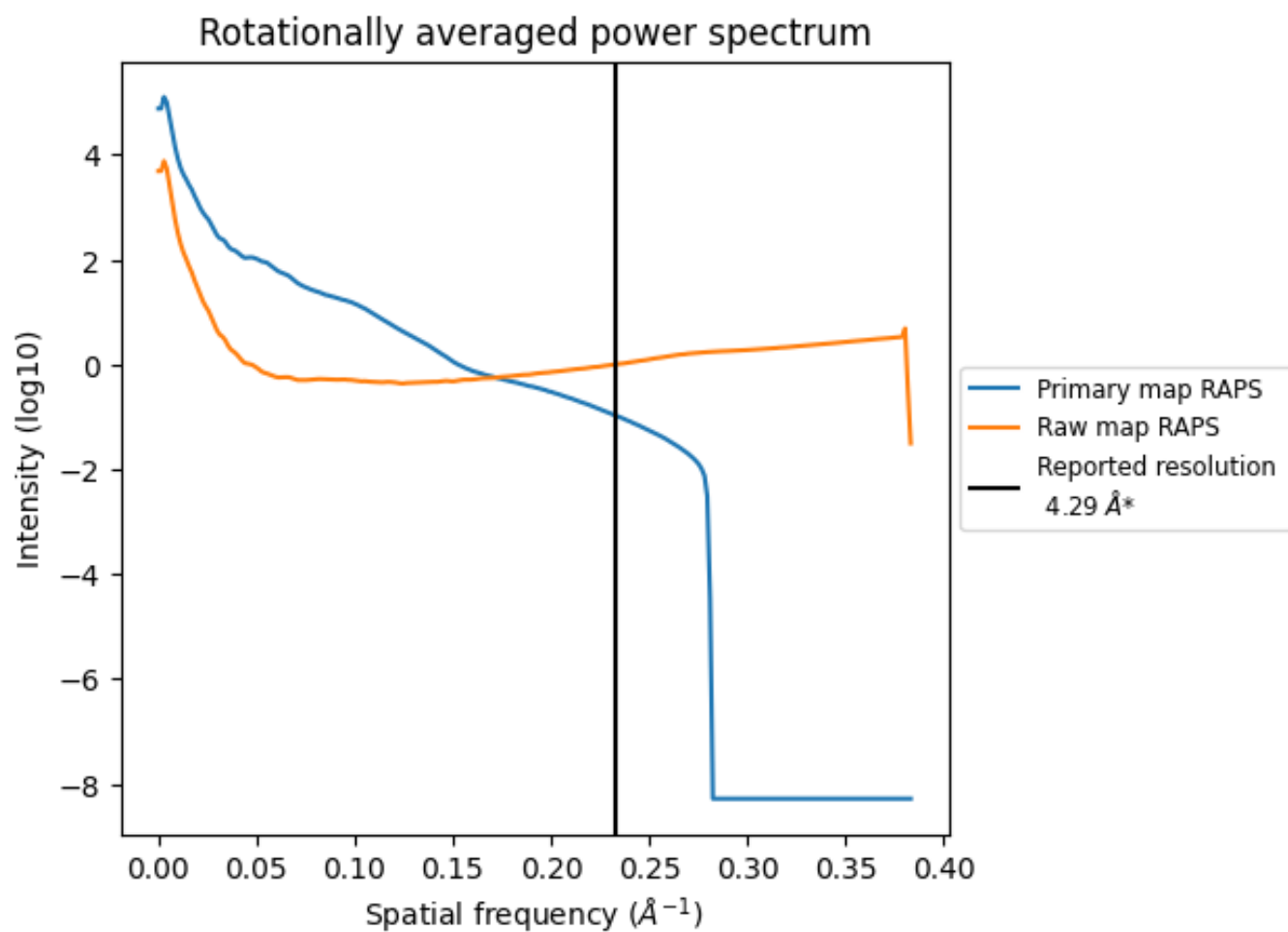
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 758 nm³; this corresponds to an approximate mass of 685 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](#)

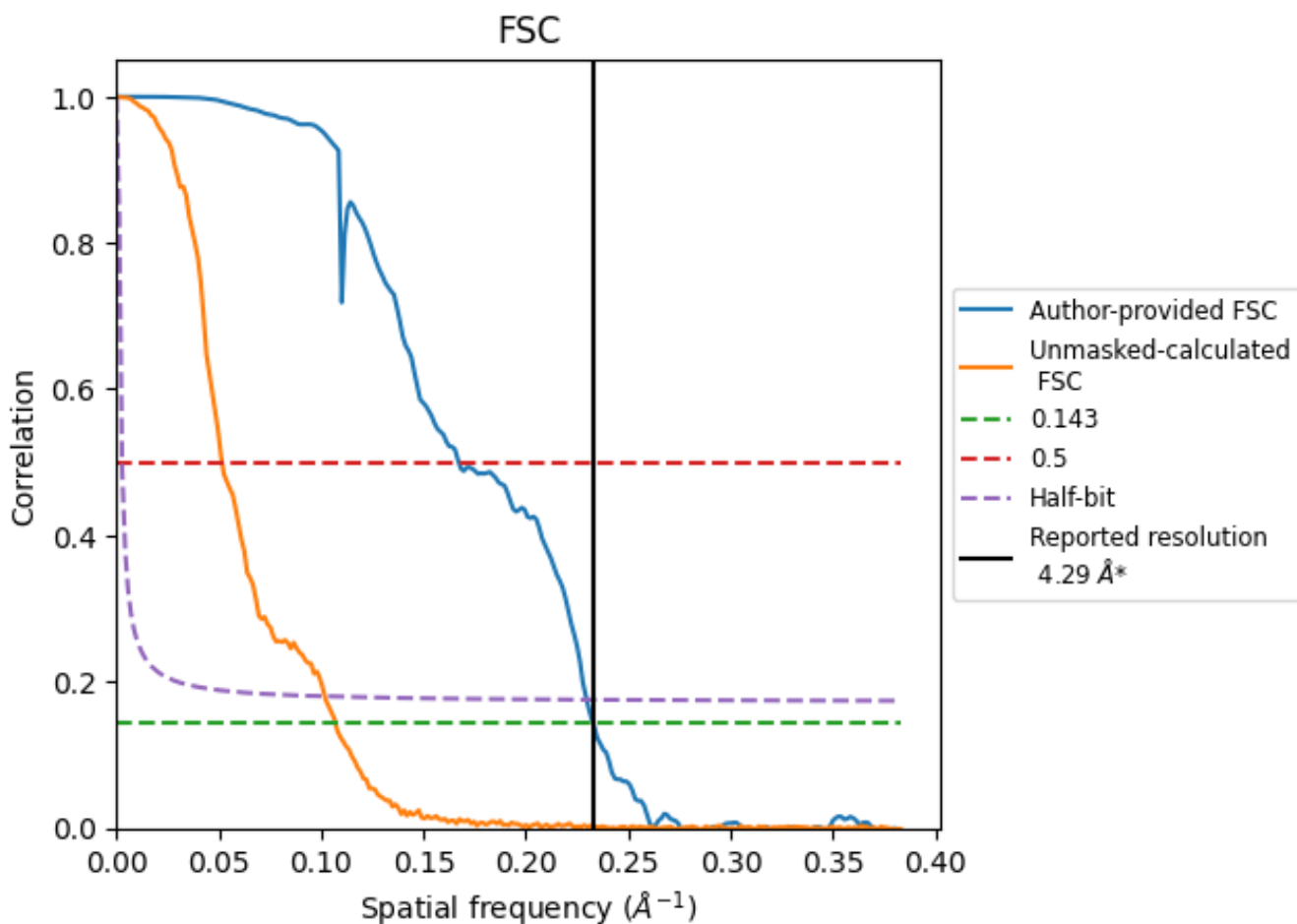


*Reported resolution corresponds to spatial frequency of 0.233 Å⁻¹

8 Fourier-Shell correlation [i](#)

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 [i](#)



*Reported resolution corresponds to spatial frequency of 0.233 Å⁻¹

8.2 Resolution estimates

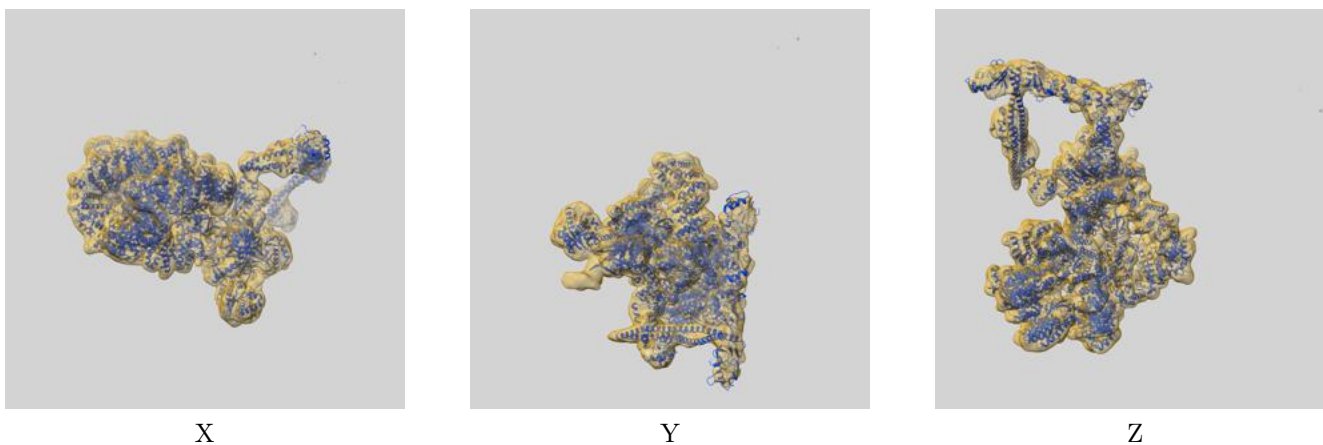
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.29	-	-
Author-provided FSC curve	4.29	5.98	4.35
Unmasked-calculated*	9.34	19.38	9.81

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 9.34 differs from the reported value 4.29 by more than 10 %

9 Map-model fit [i](#)

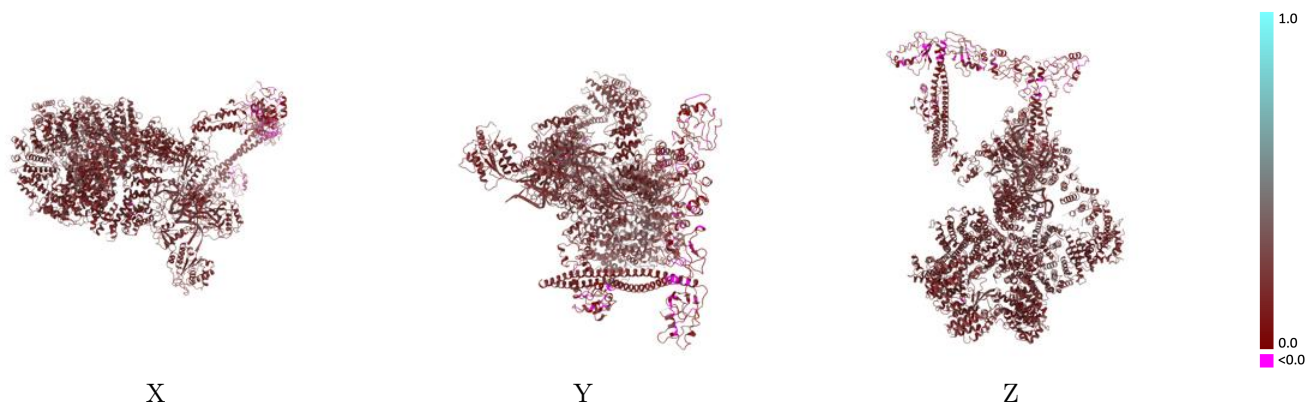
This section contains information regarding the fit between EMDB map EMD-12301 and PDB model 7NFE. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlay [i](#)



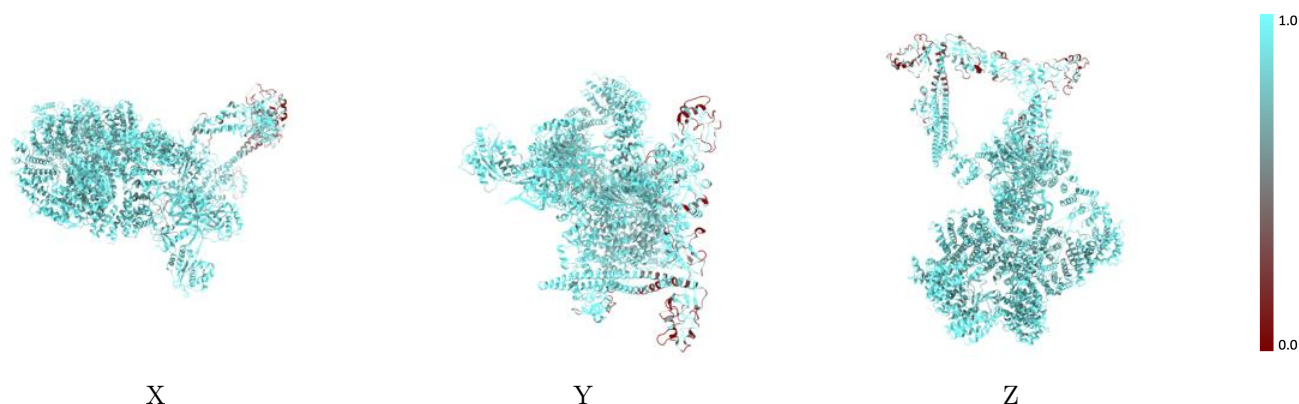
The images above show the 3D surface view of the map at the recommended contour level 0.175 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



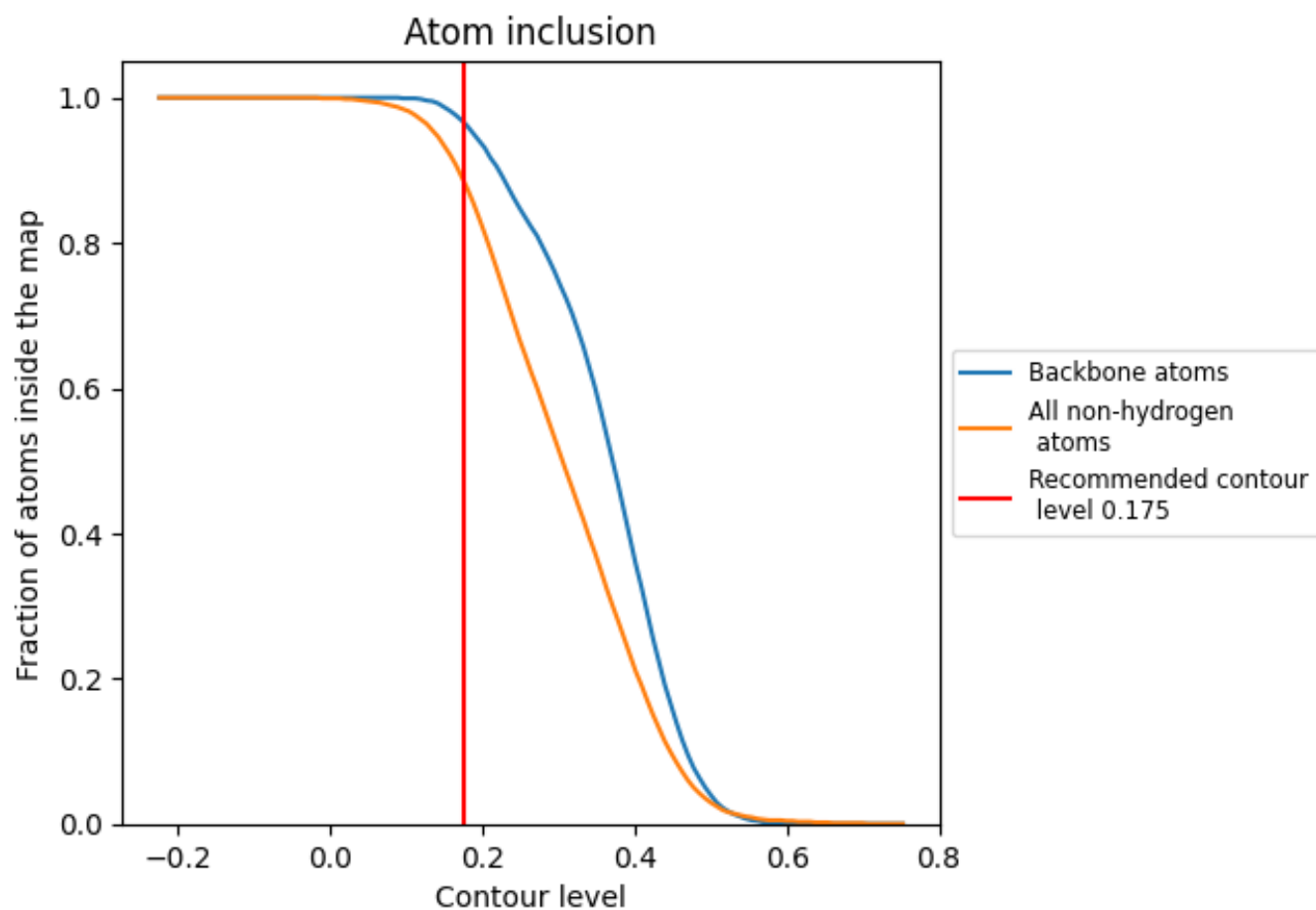
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.175).























9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 89% 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 (0.175) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8870	 0.2030
A	 0.9110	 0.2140
B	 0.9100	 0.2270
C	 0.9210	 0.2180
D	 0.9820	 0.2580
E	 0.9920	 0.2600
F	 0.6520	 0.1300
G	 0.8050	 0.1390
H	 0.7620	 0.1350
I	 0.6490	 0.1360
J	 0.8950	 0.1560

