



## wwPDB EM Validation Summary Report ⓘ

Jun 26, 2025 – 08:31 AM JST

PDB ID : 7CPX / pdb\_00007cpx  
EMDB ID : EMD-30434  
Title : Lovastatin nonaketide synthase  
Authors : Wang, J.; Wang, Z.  
Deposited on : 2020-08-08  
Resolution : 2.91 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](mailto:validation@mail.wwpdb.org)

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<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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev118  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0rc1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

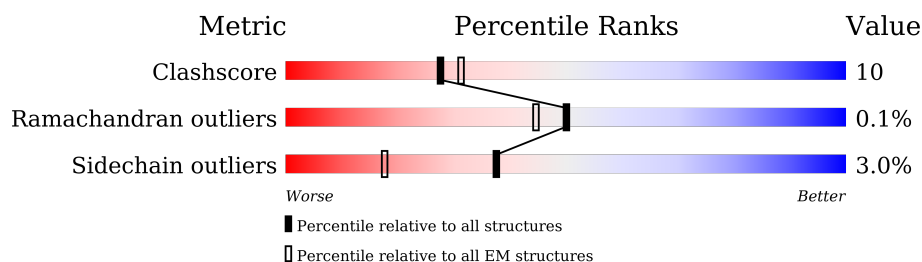
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.91 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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  $\geq 3$ , 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	3046	
1	B	3046	

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 70118 atoms, of which 34718 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 Lovastatin nonaketide synthase, polyketide synthase component.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	2262	Total	C	H	N	O	S	0	0
			34986	11177	17334	3061	3325	89		
1	B	2262	Total	C	H	N	O	S	0	0
			34986	11177	17334	3061	3325	89		

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1884	GLN	GLY	engineered mutation	UNP Q9Y8A5
A	1885	ALA	GLN	engineered mutation	UNP Q9Y8A5
A	3039	HIS	-	expression tag	UNP Q9Y8A5
A	3040	VAL	-	expression tag	UNP Q9Y8A5
A	3041	HIS	-	expression tag	UNP Q9Y8A5
A	3042	HIS	-	expression tag	UNP Q9Y8A5
A	3043	HIS	-	expression tag	UNP Q9Y8A5
A	3044	HIS	-	expression tag	UNP Q9Y8A5
A	3045	HIS	-	expression tag	UNP Q9Y8A5
A	3046	HIS	-	expression tag	UNP Q9Y8A5
B	1884	GLN	GLY	engineered mutation	UNP Q9Y8A5
B	1885	ALA	GLN	engineered mutation	UNP Q9Y8A5
B	3039	HIS	-	expression tag	UNP Q9Y8A5
B	3040	VAL	-	expression tag	UNP Q9Y8A5
B	3041	HIS	-	expression tag	UNP Q9Y8A5
B	3042	HIS	-	expression tag	UNP Q9Y8A5
B	3043	HIS	-	expression tag	UNP Q9Y8A5
B	3044	HIS	-	expression tag	UNP Q9Y8A5
B	3045	HIS	-	expression tag	UNP Q9Y8A5
B	3046	HIS	-	expression tag	UNP Q9Y8A5

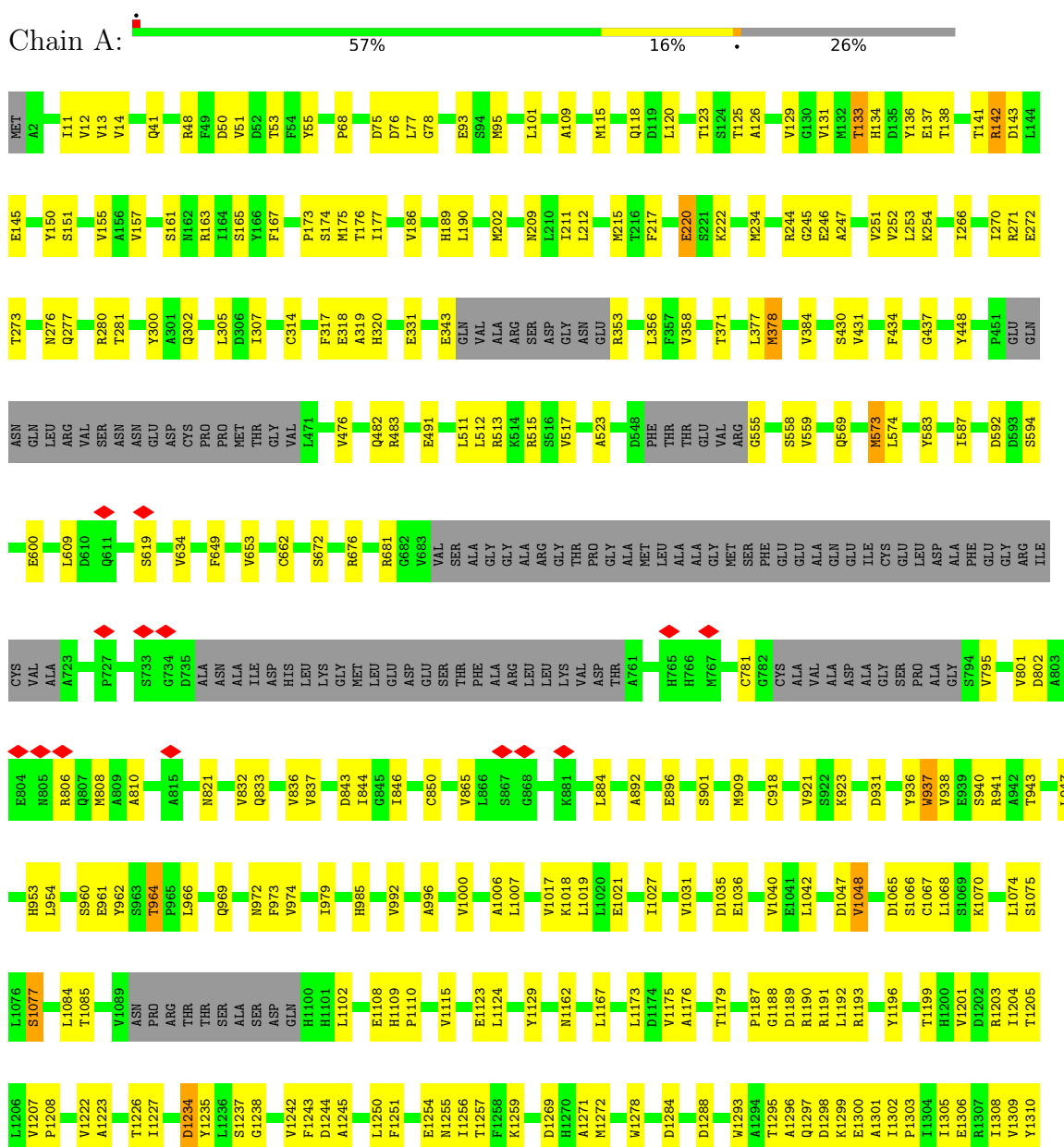
- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NAP) (formula:  $C_{21}H_{28}N_7O_{17}P_3$ ) (labeled as "Ligand of Interest" by depositor).



### 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: Lovastatin nonaketide synthase, polyketide synthase component







SER	ASN	ALA	ALA	ALA	ALA	ALA	ARG	ASP	ALA	ALA	VAL	VAL	R2378	L2344	SER	L1953	E1797	GLY	LEU	GLY	GLY	THR	S1954	L1563	R1436
GLN	MET	GLY	VAL	ASP	ASP	ASP	VAL	GLU	ASP	VAL	ILE	ASP	Q2387	V2245	L2083	S1954	E1800	THR	LEU	LEU	LYS	THR	W1567	E1444	
PRO	ALA	THR	LEU	ASP	THR	THR	ARG	ASP	THR	THR	GLY	GLY	Q2387	M2250	Y2087	ALA	C1801	ALA	ALA	LYS	LYS	W1567	E1444		
PRO	ALA	LEU	ARG	THR	THR	THR	ARG	GLU	THR	THR	LEU	LEU	T2392	N2251	W2088	LYS	R1804	CYS	CYS	CYS	CYS	C1576	G1448		
LEU	ALA	LEU	HIS	PRO	PRO	PRO	HIS	PRO	PRO	PRO	ALA	ALA	T2393	N2253	H2090	LEU	T1807	LEU	LEU	LEU	LEU	T1577	G1448		
PHE	ASN	VAL	GLU	GLY	GLY	GLY	GLU	GLY	GLY	GLY	LYS	LYS	T2394	N2254	L2094	GLY	T1807	GLY	GLY	GLY	GLY	F1583	T1453		
LEU	VAL	VAL	PHE	ASP	ASP	ASP	PHE	ASP	ASP	ASP	ALA	ALA	L2395	E2255	P1809	GLY	P1809	GLY	GLY	GLY	GLY	Y1455	T1453		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	M2396	L2256	R1809	GLY	R1809	GLY	GLY	GLY	GLY	Y1456	T1453		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	L2399	M2261	R1812	GLY	R1812	GLY	GLY	GLY	GLY	F1595	L1462		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	E2400	V2262	D1813	GLY	D1813	GLY	GLY	GLY	GLY	S1600	L1462		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	L2401	L2263	R1816	GLY	R1816	GLY	GLY	GLY	GLY	Y1469	Y1469		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	T2402	V2267	C1824	GLY	C1824	GLY	GLY	GLY	GLY	T1470	T1470		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	G2404	V2270	R1824	GLY	R1824	GLY	GLY	GLY	GLY	D1604	D1471		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	P2422	H2274	I1827	GLY	I1827	GLY	GLY	GLY	GLY	R1605	I1472		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	R2423	S2278	M1830	GLY	M1830	GLY	GLY	GLY	GLY	F1467	F1467		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	L2424	S2278	T1840	GLY	T1840	GLY	GLY	GLY	GLY	F1610	R1490		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	N2426	D2287	L1844	GLY	L1844	GLY	GLY	GLY	GLY	T1611	M1491		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	K2428	L2295	R1856	GLY	R1856	GLY	GLY	GLY	GLY	F1615	I1498		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	E2431	V2296	T1859	GLY	T1859	GLY	GLY	GLY	GLY	S1616	R1499		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	Y2432	A2297	T1740	GLY	T1740	GLY	GLY	GLY	GLY	T1617	I1516		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	GLY	G2300	V1863	GLY	V1863	GLY	GLY	GLY	GLY	D1621	A1622		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	N2311	Q1864	GLY	Q1864	GLY	GLY	GLY	GLY	A1622	T1623		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	Q2315	Q1865	GLY	Q1865	GLY	GLY	GLY	GLY	H1521	H1521		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	A2316	Q1866	GLY	Q1866	GLY	GLY	GLY	GLY	H1522	H1522		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	Q2319	L2168	GLY	L2168	GLY	GLY	GLY	GLY	A1523	A1523		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	R2170	G2169	GLY	G2169	GLY	GLY	GLY	GLY	T1524	T1524		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	Q2319	R2170	GLY	R2170	GLY	GLY	GLY	GLY	P1525	P1525		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	Q2320	R2171	GLY	R2171	GLY	GLY	GLY	GLY	D1526	D1526		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	R2321	Q1884	GLY	Q1884	GLY	GLY	GLY	GLY	T1530	T1530		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	V2322	F1888	GLY	F1888	GLY	GLY	GLY	GLY	R1535	R1535		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	T2330	L1891	GLY	L1891	GLY	GLY	GLY	GLY	L1538	L1538		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	T2331	R1911	GLY	R1911	GLY	GLY	GLY	GLY	GLY	P1540	P1540	
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	D2332	R1919	GLY	R1919	GLY	GLY	GLY	GLY	G1541	G1541		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	R2355	R1919	GLY	R1919	GLY	GLY	GLY	GLY	Q1543	Q1543		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	D2359	A1927	GLY	A1927	GLY	GLY	GLY	GLY	Y1641	Y1641		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	S2360	L1938	GLY	L1938	GLY	GLY	GLY	GLY	P1642	P1642		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	V2361	M1939	GLY	M1939	GLY	GLY	GLY	GLY	L1547	L1547		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	E2362	V1940	GLY	V1940	GLY	GLY	GLY	GLY	E1548	E1548		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	E2365	T1941	GLY	T1941	GLY	GLY	GLY	GLY	H1551	H1551		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	E2368	V1942	GLY	V1942	GLY	GLY	GLY	GLY	Q1655	Q1655		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	T2368	L1943	GLY	L1943	GLY	GLY	GLY	GLY	R1656	R1656		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	A2371	L1948	GLY	L1948	GLY	GLY	GLY	GLY	I1657	I1657		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	E2372	V1952	GLY	V1952	GLY	GLY	GLY	GLY	L1658	L1658		
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA	V2375		GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY	GLY	GLY	GLY				
LEU	VAL	VAL	THR	ASP	ASP	ASP	THR	ASP	ASP	ASP	VAL	VAL	ALA			GLY		GLY							



LEU  
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## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	205047	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60.8	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.177	Depositor
Minimum map value	-0.104	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0075	Depositor
Map size ( $\text{\AA}$ )	350.0, 350.0, 350.0	wwPDB
Map dimensions	350, 350, 350	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.0, 1.0, 1.0	Depositor

## 5 Model quality

### 5.1 Standard geometry

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

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	0.12	0/18071	0.32	6/24587 (0.0%)
1	B	0.12	0/18071	0.32	6/24587 (0.0%)
All	All	0.12	0/36142	0.32	12/49174 (0.0%)

There are no bond length outliers.

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1622	ALA	CA-C-N	5.96	132.91	121.54
1	B	1622	ALA	C-N-CA	5.96	132.91	121.54
1	A	1622	ALA	CA-C-N	5.93	132.87	121.54
1	A	1622	ALA	C-N-CA	5.93	132.87	121.54
1	B	947	LEU	CA-C-N	5.13	131.15	122.12

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	A	17652	17334	17276	340	0
1	B	17652	17334	17276	342	0
2	A	48	25	25	0	0
2	B	48	25	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	35400	34718	34602	665	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 10.

The worst 5 of 665 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:B:1234:ASP:OD1	1:B:1844:ARG:NH1	2.12	0.82
1:A:1234:ASP:OD1	1:A:1844:ARG:NH1	2.12	0.82
1:B:1176:ALA:O	1:B:1179:THR:OG1	2.01	0.78
1:A:2315:GLN:NE2	1:A:2332:ASP:OD2	2.17	0.78
1:A:2431:GLU:OE1	1:A:2432:TYR:N	2.17	0.78

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	2236/3046 (73%)	2121 (95%)	113 (5%)	2 (0%)	48	76
1	B	2236/3046 (73%)	2121 (95%)	113 (5%)	2 (0%)	48	76
All	All	4472/6092 (73%)	4242 (95%)	226 (5%)	4 (0%)	50	76

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1623	THR
1	B	1623	THR
1	A	1577	THR
1	B	1577	THR

### 5.3.2 Protein sidechains ⓘ

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	1904/2547 (75%)	1847 (97%)	57 (3%)	36	69
1	B	1904/2547 (75%)	1847 (97%)	57 (3%)	36	69
All	All	3808/5094 (75%)	3694 (97%)	114 (3%)	37	69

5 of 114 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	41	GLN
1	B	2387	GLN
1	B	573	MET
1	B	2378	ARG
1	B	1807	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 33 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1841	GLN
1	B	1988	GLN
1	B	2387	GLN
1	A	1988	GLN
1	A	1841	GLN

### 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 [i](#)

There are no oligosaccharides 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
2	NAP	A	3500	-	45,52,52	2.66	15 (33%)	56,80,80	1.58	8 (14%)
2	NAP	B	3500	-	45,52,52	2.66	15 (33%)	56,80,80	1.58	8 (14%)

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
2	NAP	A	3500	-	-	8/31/67/67	0/5/5/5
2	NAP	B	3500	-	-	8/31/67/67	0/5/5/5

The worst 5 of 30 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	3500	NAP	O4B-C1B	8.66	1.53	1.41
2	A	3500	NAP	O4B-C1B	8.66	1.53	1.41
2	A	3500	NAP	C7N-N7N	6.57	1.45	1.33
2	B	3500	NAP	C7N-N7N	6.57	1.45	1.33
2	B	3500	NAP	C2N-N1N	6.49	1.42	1.35

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	3500	NAP	C6N-N1N-C2N	-6.22	116.30	121.97

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	3500	NAP	C6N-N1N-C2N	-6.19	116.33	121.97
2	B	3500	NAP	C3D-C2D-C1D	3.95	106.93	100.98
2	A	3500	NAP	C3D-C2D-C1D	3.93	106.89	100.98
2	B	3500	NAP	PN-O3-PA	-2.85	123.04	132.83

There are no chirality outliers.

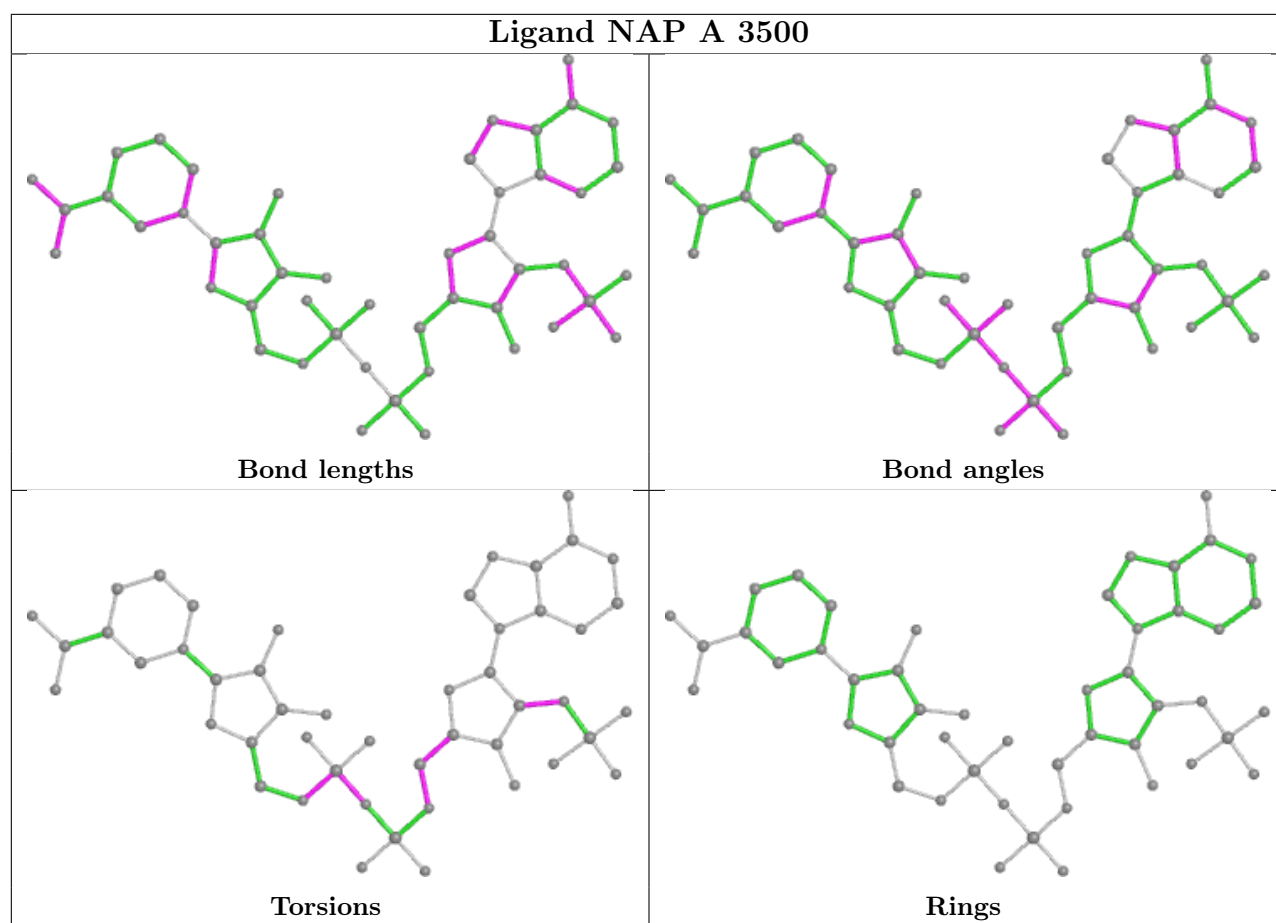
5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	3500	NAP	O4B-C4B-C5B-O5B
2	B	3500	NAP	O4B-C4B-C5B-O5B
2	A	3500	NAP	C1B-C2B-O2B-P2B
2	B	3500	NAP	C1B-C2B-O2B-P2B
2	A	3500	NAP	C3B-C4B-C5B-O5B

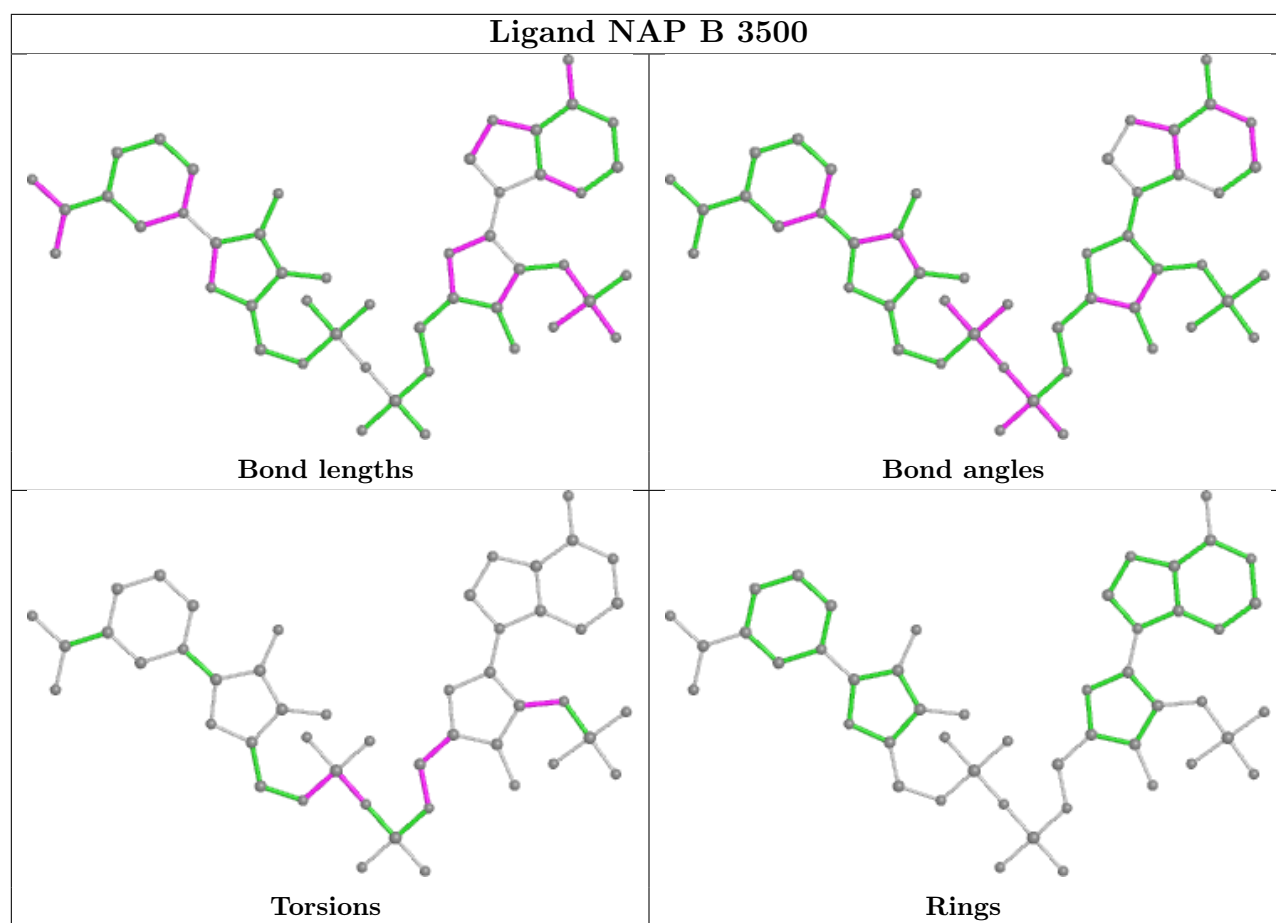
There are no ring outliers.

No monomer is involved in short contacts.

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 than 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.







## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

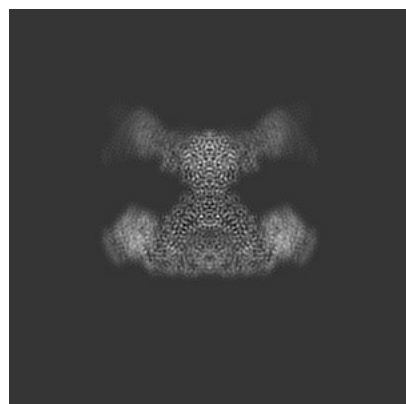
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-30434. These allow visual inspection of the internal detail of the map and identification of artifacts.

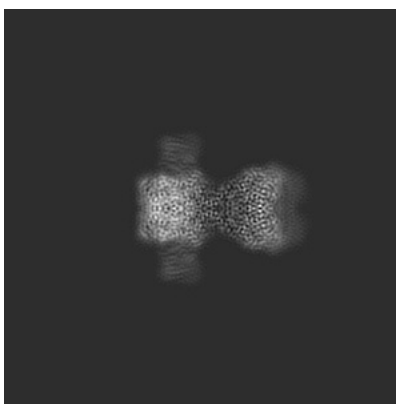
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

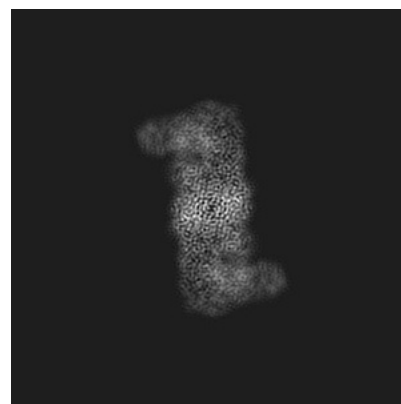
#### 6.1.1 Primary map



X

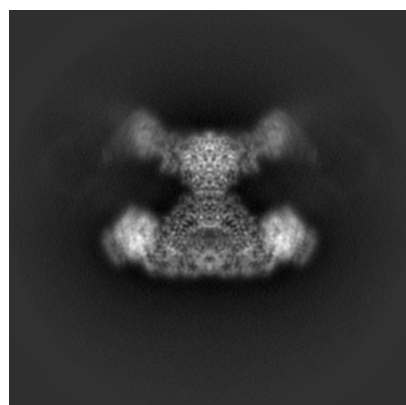


Y

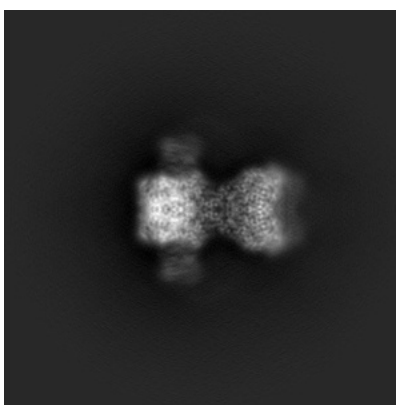


Z

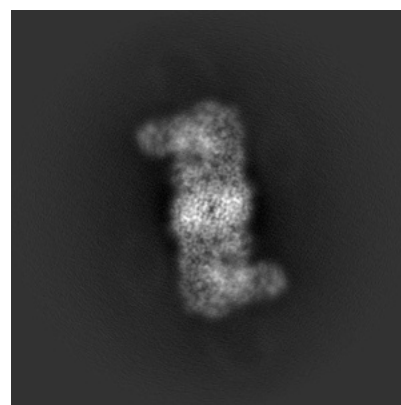
#### 6.1.2 Raw map



X



Y

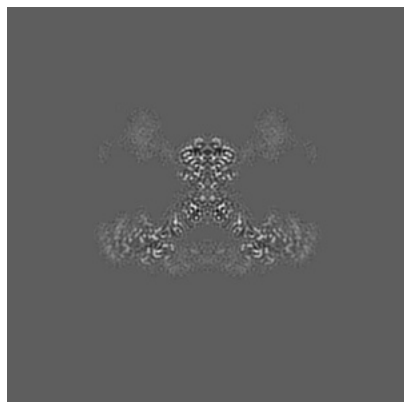


Z

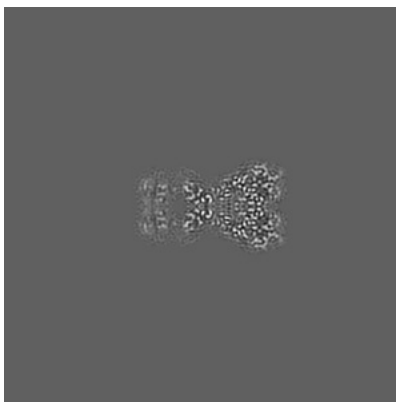
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

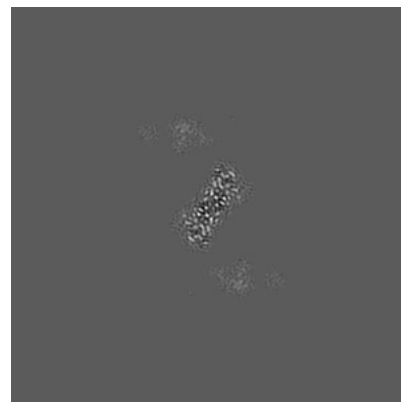
### 6.2.1 Primary map



X Index: 175

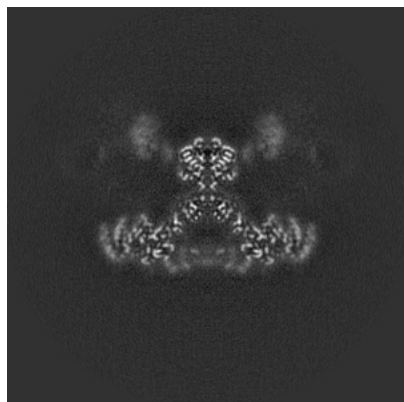


Y Index: 175

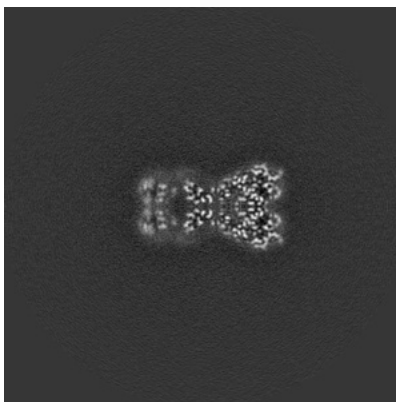


Z Index: 175

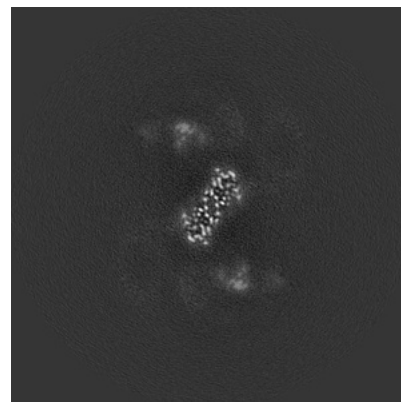
### 6.2.2 Raw map



X Index: 175



Y Index: 175

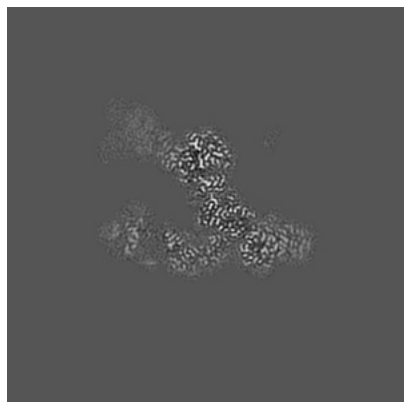


Z Index: 175

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: 185

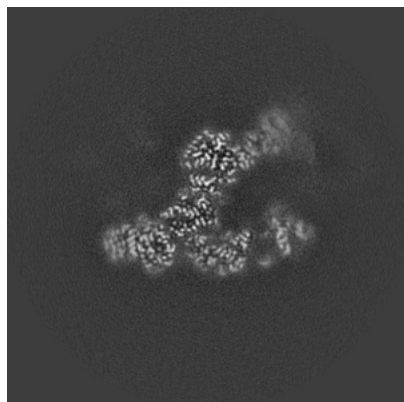


Y Index: 169

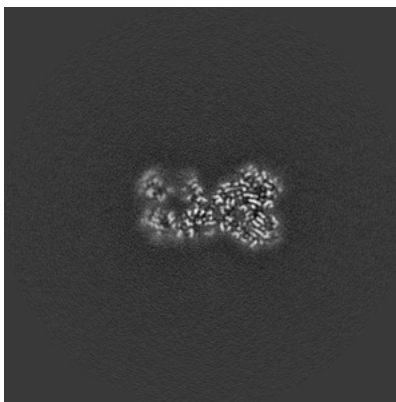


Z Index: 224

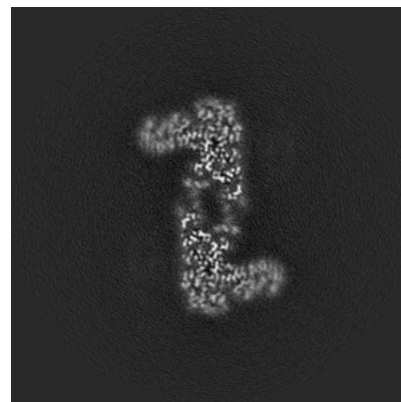
### 6.3.2 Raw map



X Index: 165



Y Index: 169

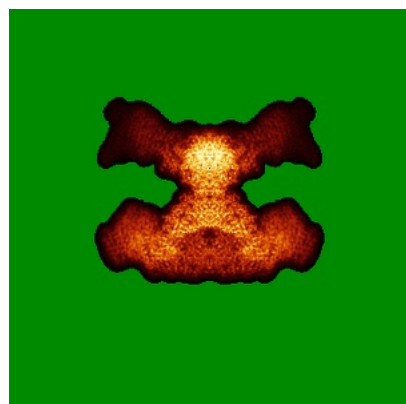


Z Index: 150

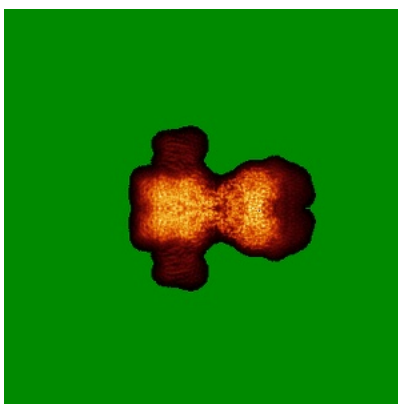
The images above show the largest variance slices of the map in three orthogonal directions.

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

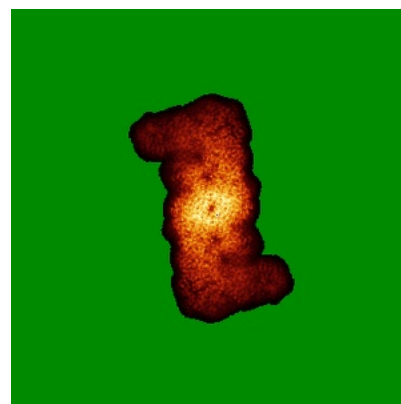
### 6.4.1 Primary map



X

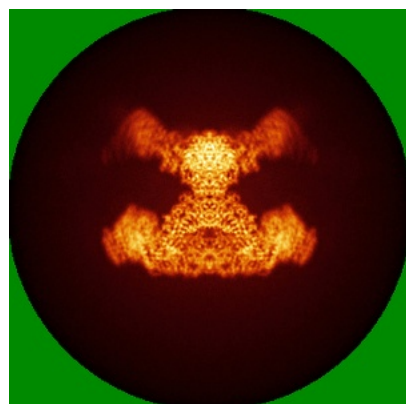


Y

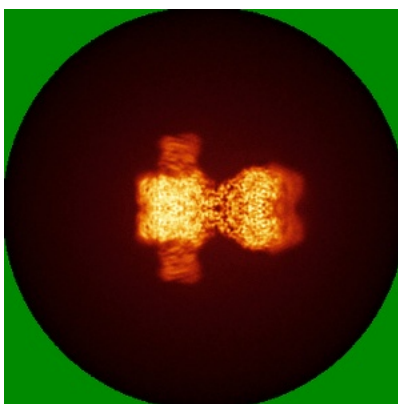


Z

### 6.4.2 Raw map



X



Y

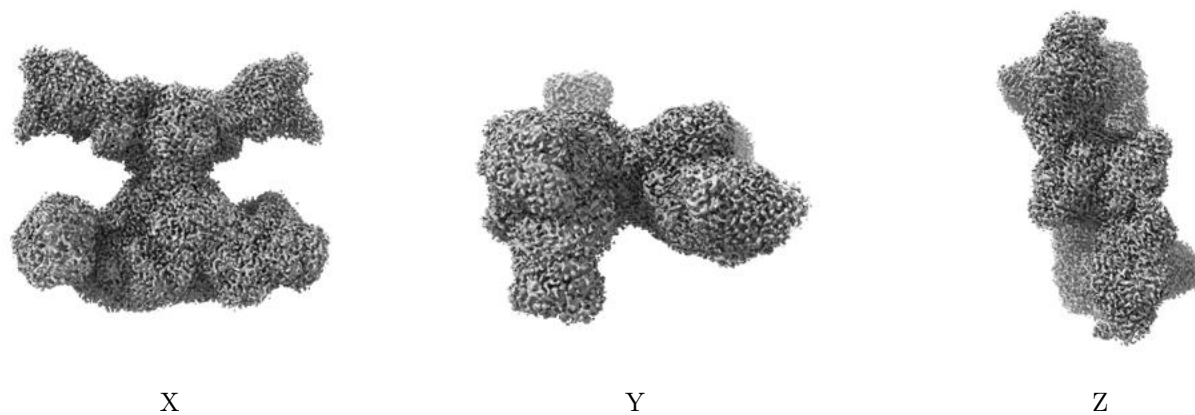


Z

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.

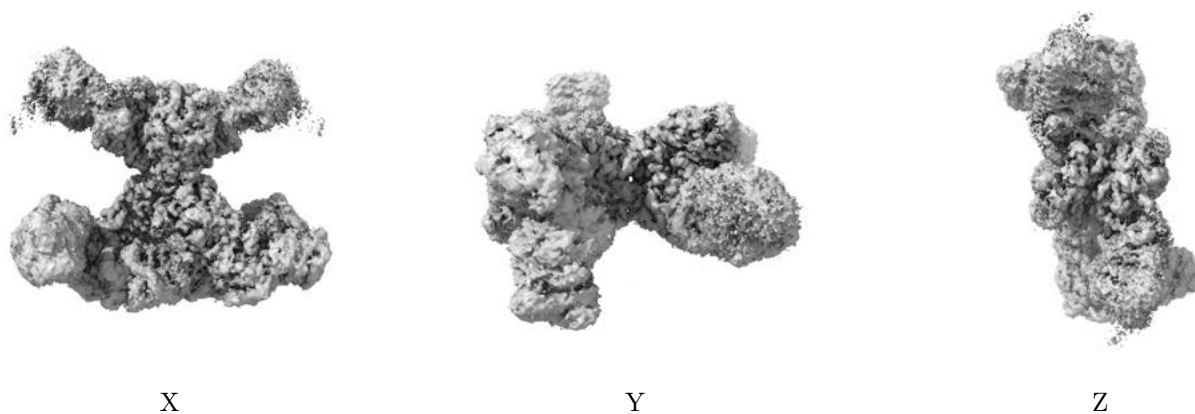
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0075. 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.

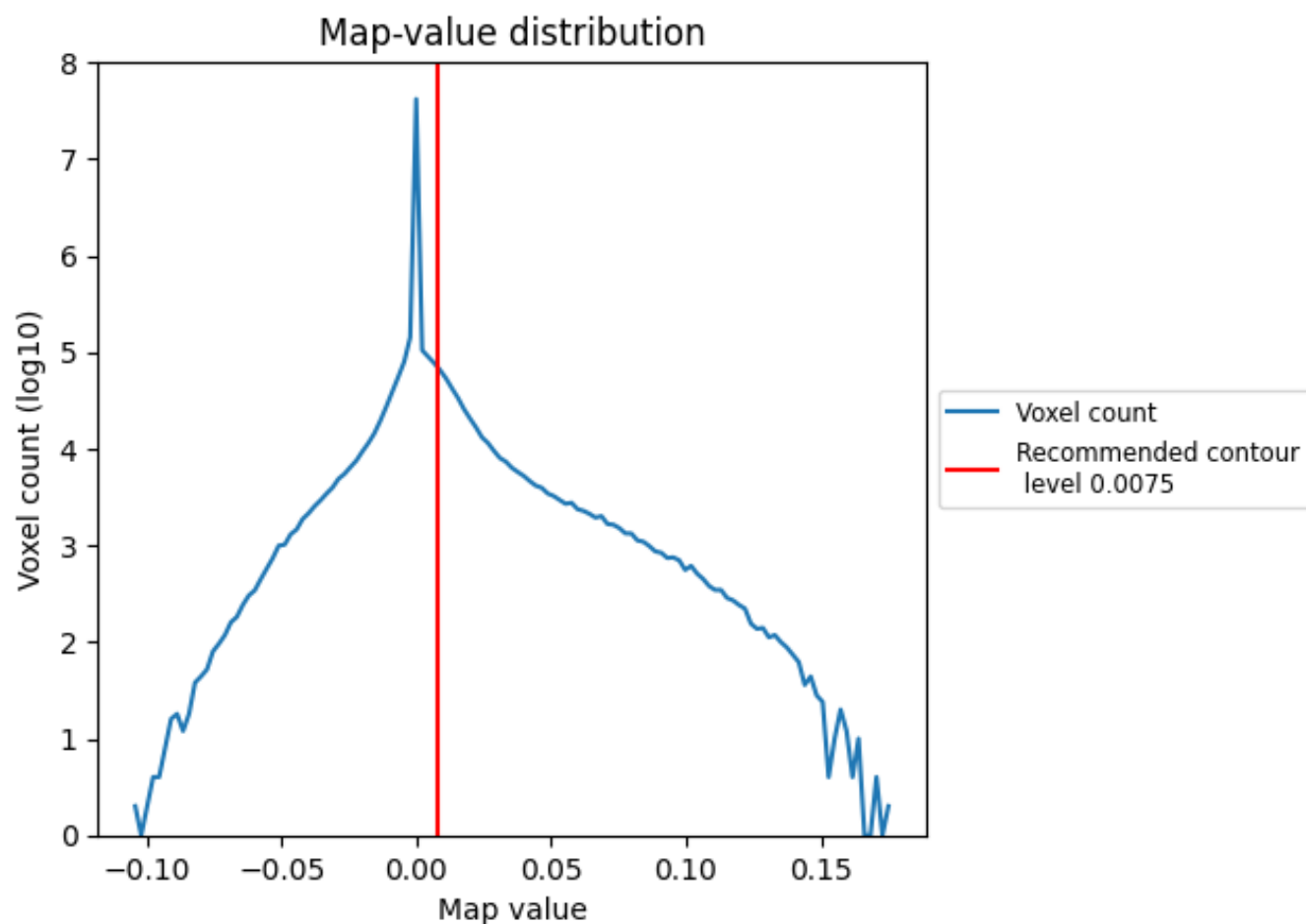
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

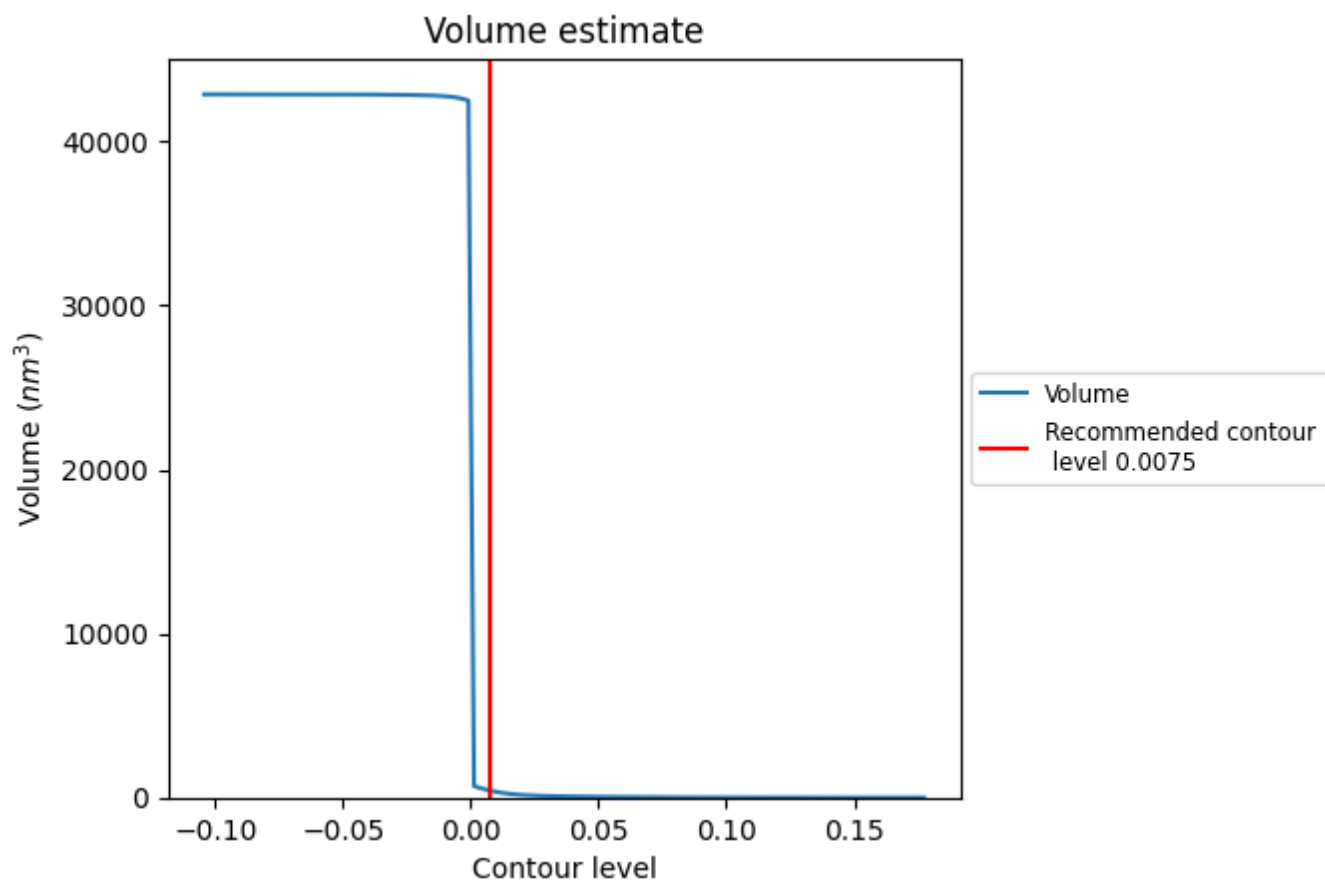
This section contains the results of statistical analysis of the map.

### 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](#)

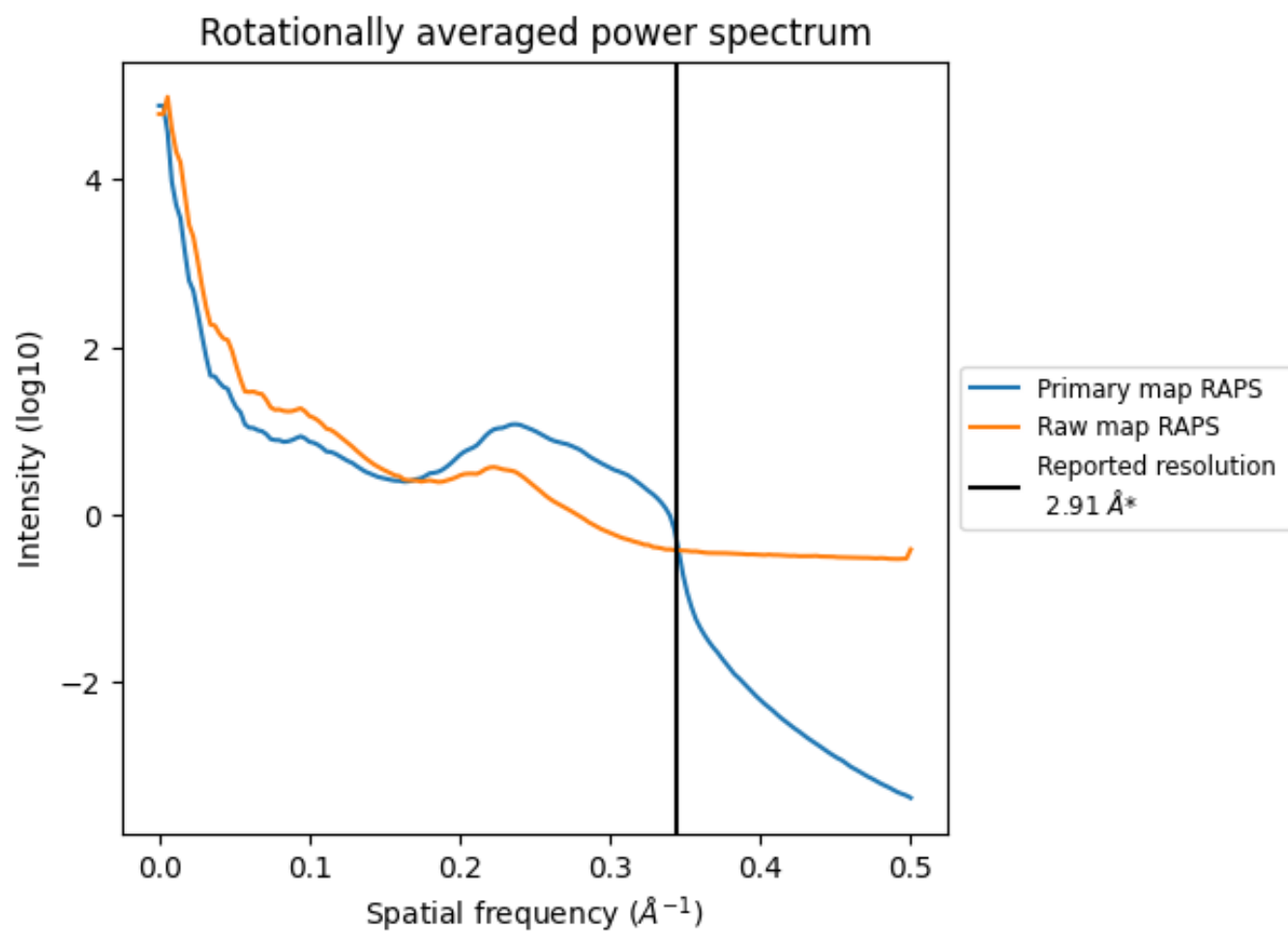


The volume at the recommended contour level is 428 nm<sup>3</sup>; this corresponds to an approximate mass of 387 kDa.

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 ⓘ

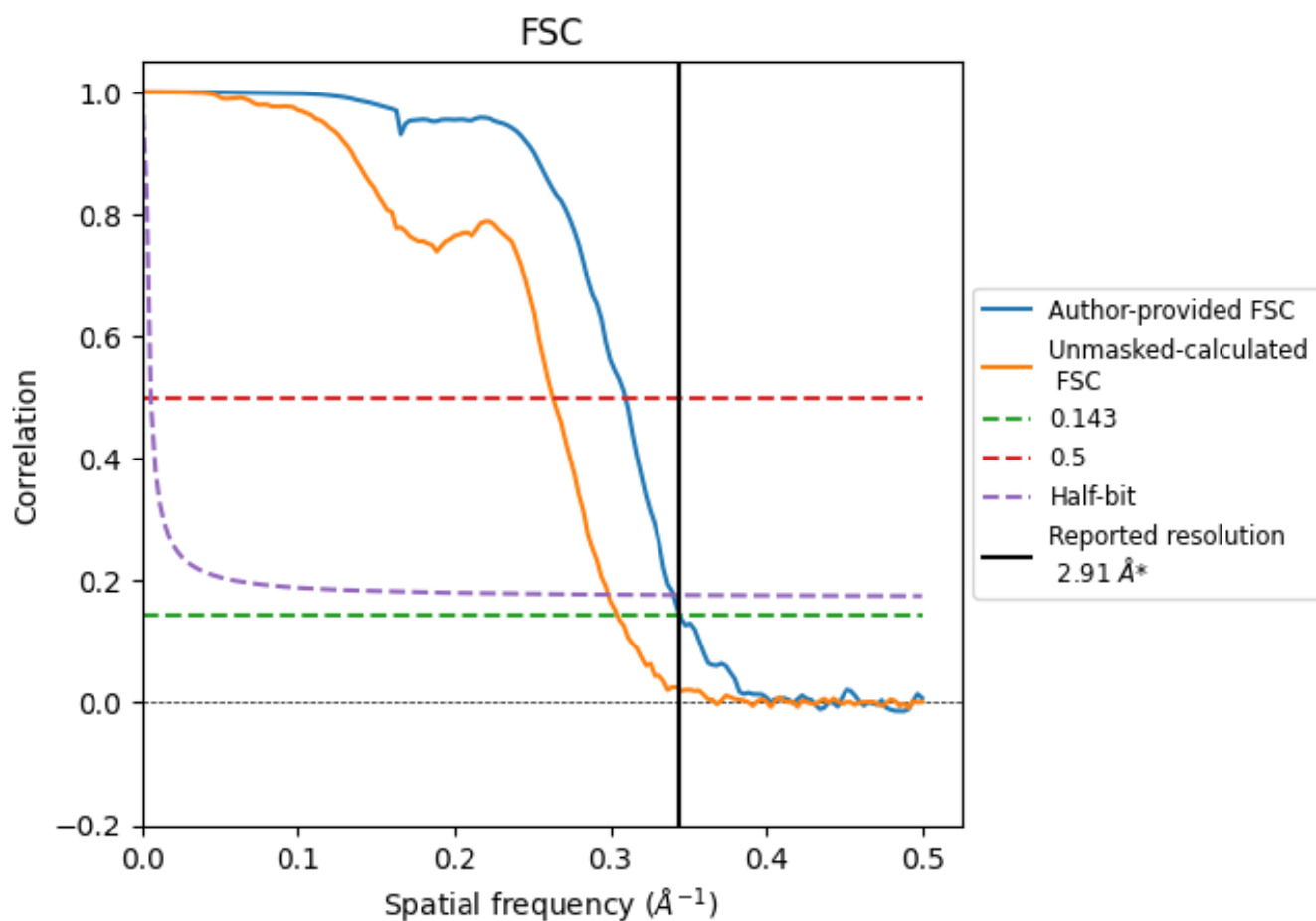


\*Reported resolution corresponds to spatial frequency of 0.344 Å<sup>-1</sup>

## 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 0.344  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

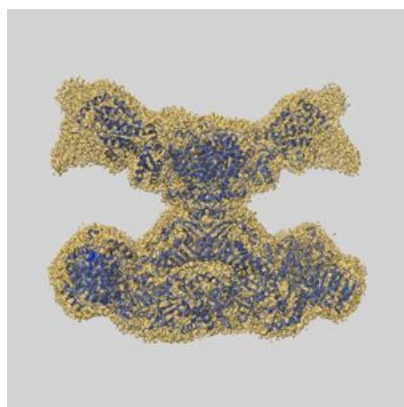
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.91	-	-
Author-provided FSC curve	2.90	3.23	2.94
Unmasked-calculated*	3.28	3.80	3.35

\*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 3.28 differs from the reported value 2.91 by more than 10 %

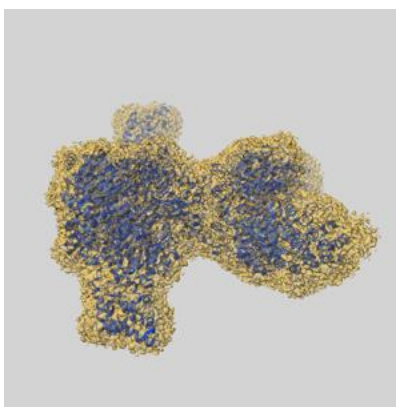
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-30434 and PDB model 7CPX. Per-residue inclusion information can be found in section [3](#) on page [5](#).

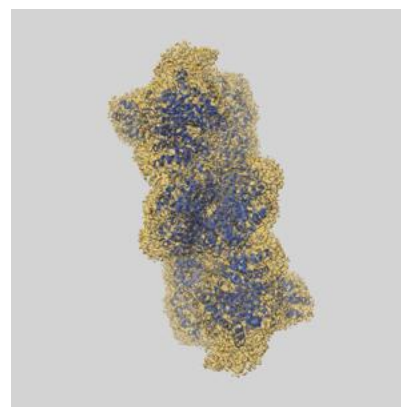
### 9.1 Map-model overlay [i](#)



X



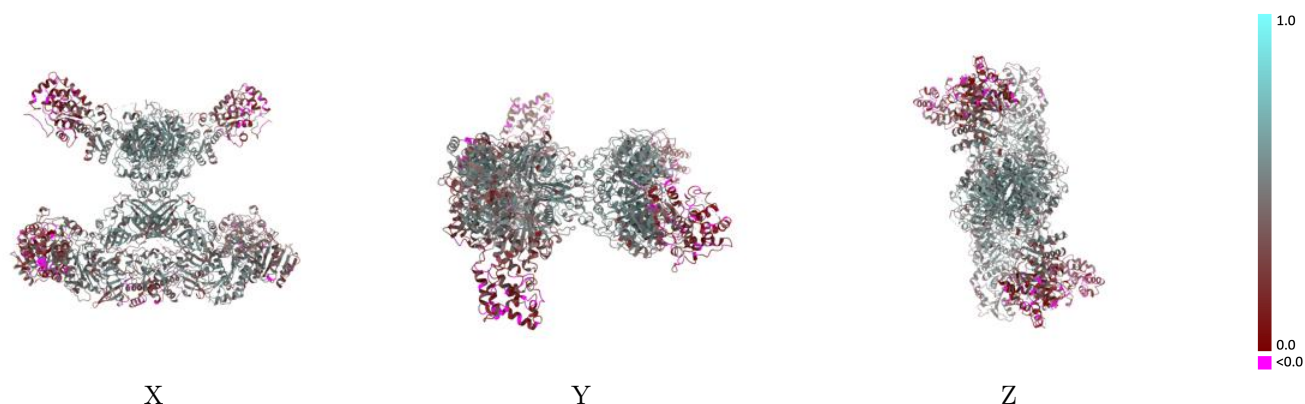
Y



Z

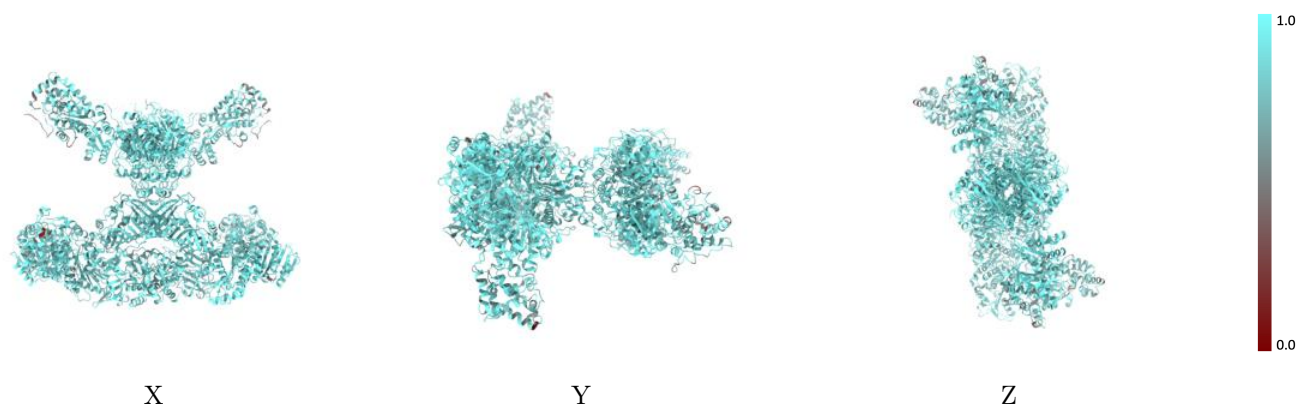
The images above show the 3D surface view of the map at the recommended contour level 0.0075 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



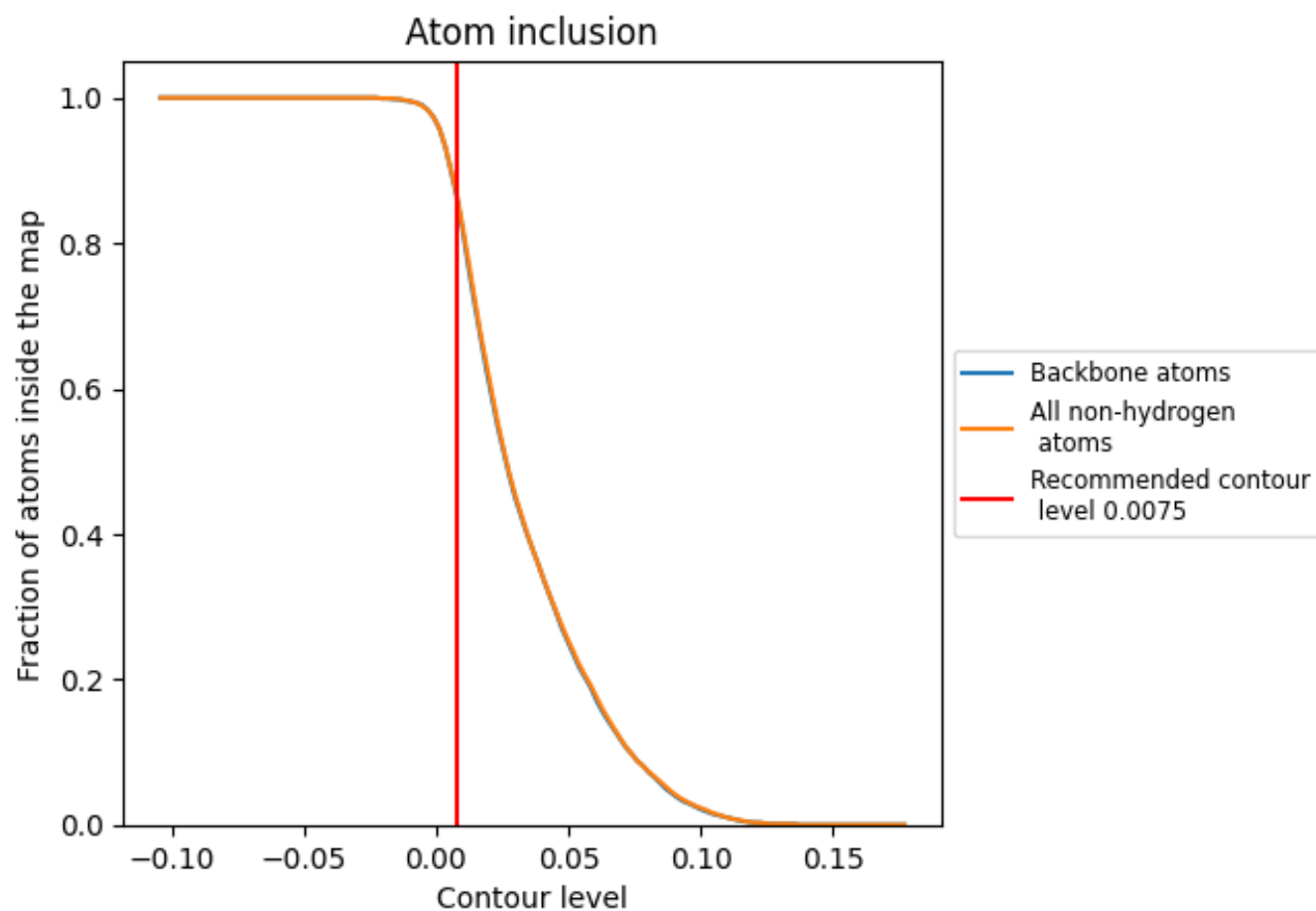
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.0075).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 87% of all backbone atoms, 87% 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 (0.0075) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.8730	<div></div> 0.4060
A	<div></div> 0.8770	<div></div> 0.4060
B	<div></div> 0.8770	<div></div> 0.4070

