



## wwPDB EM Validation Summary Report ⓘ

Aug 16, 2021 – 01:04 pm BST

PDB ID : 7PEL  
EMDB ID : EMD-11052  
Title : CryoEM structure of simian T-cell lymphotropic virus intasome in complex with PP2A regulatory subunit B56 gamma  
Authors : Barski, M.; Pye, V.E.; Nans, A.; Cherepanov, P.; Maertens, G.N.  
Deposited on : 2021-08-10  
Resolution : 3.34 Å (reported)  
Based on initial models : 5JJA, 6TJU, 6TOQ, 6QBW

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)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

---

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

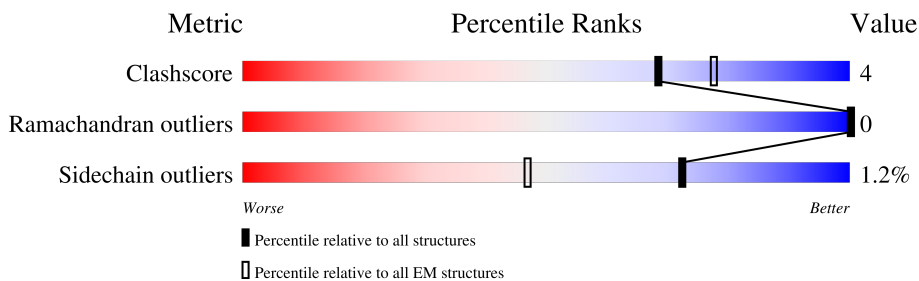
EMDB validation analysis : 0.0.0.dev97  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.23.1

# 1 Overall quality at a glance

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

The reported resolution of this entry is 3.34 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.



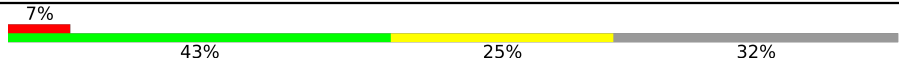
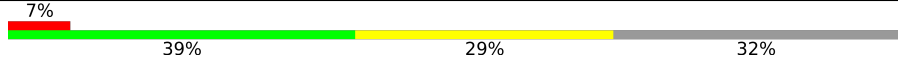
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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	301	
1	B	301	
1	D	301	
1	E	301	
2	C	697	
2	F	697	
3	K	30	
3	M	30	

Continued on next page...

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
4	L	28	 <p>7% 43% 25% 32%</p>
4	N	28	 <p>7% 39% 29% 32%</p>

## 2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 14998 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 Pol protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	258	2053	1307	384	355	7	0	0
1	B	278	2208	1399	417	384	8	0	0
1	D	258	2053	1307	384	355	7	0	0
1	E	278	2208	1399	417	384	8	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP Q4QY51
A	-2	PRO	-	expression tag	UNP Q4QY51
A	-1	GLU	-	expression tag	UNP Q4QY51
A	0	PHE	-	expression tag	UNP Q4QY51
B	-3	GLY	-	expression tag	UNP Q4QY51
B	-2	PRO	-	expression tag	UNP Q4QY51
B	-1	GLU	-	expression tag	UNP Q4QY51
B	0	PHE	-	expression tag	UNP Q4QY51
D	-3	GLY	-	expression tag	UNP Q4QY51
D	-2	PRO	-	expression tag	UNP Q4QY51
D	-1	GLU	-	expression tag	UNP Q4QY51
D	0	PHE	-	expression tag	UNP Q4QY51
E	-3	GLY	-	expression tag	UNP Q4QY51
E	-2	PRO	-	expression tag	UNP Q4QY51
E	-1	GLU	-	expression tag	UNP Q4QY51
E	0	PHE	-	expression tag	UNP Q4QY51

- Molecule 2 is a protein called Isoform 3 of PC4 and SFRS1-interacting protein,Isoform Gamma-2 of Serine/threonine-protein phosphatase 2A 56 kDa regulatory subunit gamma isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	296	Total	C	N	O	S	0	0
			2423	1593	397	425	8		
2	F	296	Total	C	N	O	S	0	0
			2423	1593	397	425	8		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-316	SER	-	expression tag	UNP O75475
C	10	PHE	-	linker	UNP O75475
F	-316	SER	-	expression tag	UNP O75475
F	10	PHE	-	linker	UNP O75475

- Molecule 3 is a DNA chain called DNA (5'-D(\*AP\*CP\*TP\*GP\*TP\*GP\*TP\*TP\*TP\*GP\*GP\*CP\*GP\*CP\*TP\*TP\*CP\*TP\*CP\*TP\*C)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
3	K	21	Total	C	N	O	P	0	0
			422	204	66	132	20		
3	M	21	Total	C	N	O	P	0	0
			422	204	66	132	20		

- Molecule 4 is a DNA chain called DNA (5'-D(\*GP\*AP\*GP\*AP\*GP\*AP\*AP\*GP\*CP\*GP\*CP\*CP\*AP\*AP\*AP\*CP\*AP\*CP\*A)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
4	L	19	Total	C	N	O	P	0	0
			391	185	85	103	18		
4	N	19	Total	C	N	O	P	0	0
			391	185	85	103	18		

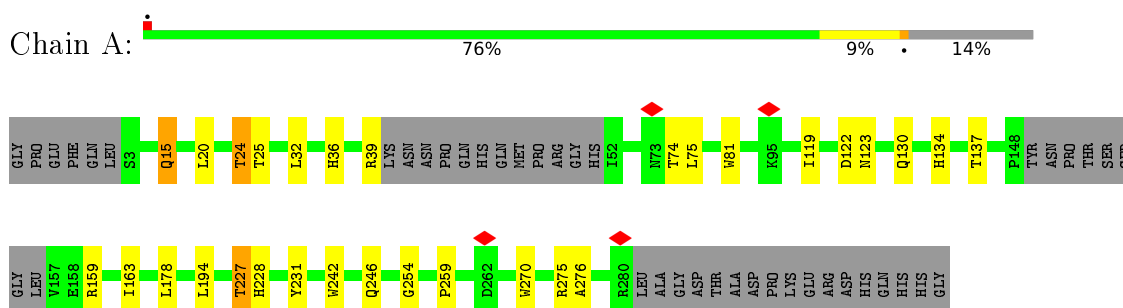
- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
5	A	1	Total	Zn	0
			1	1	
5	B	1	Total	Zn	0
			1	1	
5	D	1	Total	Zn	0
			1	1	
5	E	1	Total	Zn	0
			1	1	

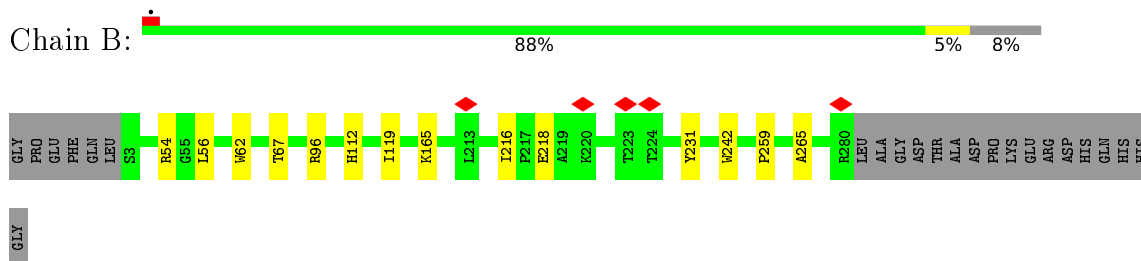
### 3 Residue-property plots

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.

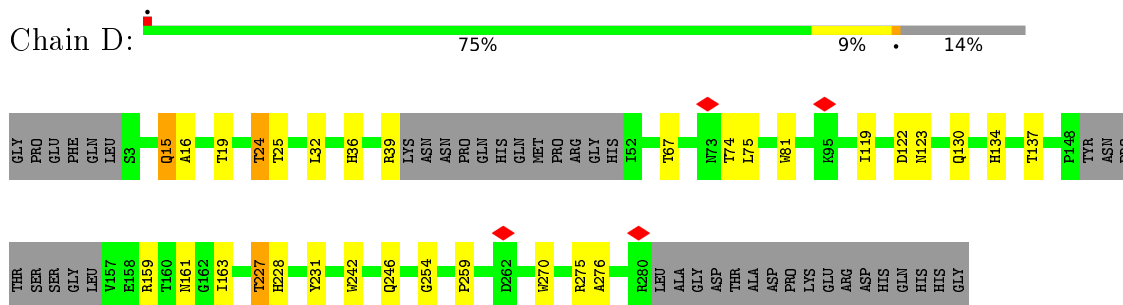
- Molecule 1: Pol protein



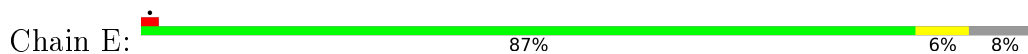
- Molecule 1: Pol protein



- Molecule 1: Pol protein



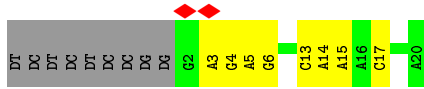
- Molecule 1: Pol protein











## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	161921	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 ( $e^-/\text{\AA}^2$ )	50.4	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	3.889	Depositor
Minimum map value	-2.467	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.249	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	123.170006, 149.33, 82.840004	wwPDB
Map dimensions	76, 137, 113	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.09, 1.09, 1.09	Depositor

## 5 Model quality

### 5.1 Standard geometry

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

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	0.26	0/2116	0.43	0/2886
1	B	0.27	0/2279	0.44	0/3111
1	D	0.26	0/2116	0.43	0/2886
1	E	0.27	0/2279	0.44	0/3111
2	C	0.25	0/2488	0.40	0/3380
2	F	0.25	0/2488	0.40	0/3380
3	K	0.65	0/469	1.04	0/722
3	M	0.65	0/469	1.04	0/722
4	L	0.63	0/442	0.77	0/680
4	N	0.63	0/442	0.77	0/680
All	All	0.33	0/15588	0.52	0/21558

There are no bond length outliers.

There are no bond angle outliers.

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	2053	0	2040	17	0
1	B	2208	0	2180	8	0
1	D	2053	0	2040	16	0

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	2208	0	2180	10	0
2	C	2423	0	2422	20	0
2	F	2423	0	2422	18	0
3	K	422	0	242	6	0
3	M	422	0	242	7	0
4	L	391	0	211	6	0
4	N	391	0	211	7	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	D	1	0	0	0	0
5	E	1	0	0	0	0
All	All	14998	0	14190	111	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 4.

The worst 5 of 111 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:244:LYS:HD3	2:C:281:LEU:HD13	1.63	0.81
2:F:244:LYS:HD3	2:F:281:LEU:HD13	1.63	0.81
1:E:218:GLU:OE1	2:F:31:ARG:NH1	2.26	0.69
1:B:218:GLU:OE1	2:C:31:ARG:NH1	2.26	0.68
1:B:54:ARG:NH2	3:K:6:DG:OP1	2.28	0.67

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	252/301 (84%)	240 (95%)	12 (5%)	0	<b>100</b> <b>100</b>

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	276/301 (92%)	269 (98%)	7 (2%)	0	100	100
1	D	252/301 (84%)	240 (95%)	12 (5%)	0	100	100
1	E	276/301 (92%)	269 (98%)	7 (2%)	0	100	100
2	C	292/697 (42%)	277 (95%)	15 (5%)	0	100	100
2	F	292/697 (42%)	277 (95%)	15 (5%)	0	100	100
All	All	1640/2598 (63%)	1572 (96%)	68 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	222/258 (86%)	219 (99%)	3 (1%)	67	83
1	B	239/258 (93%)	237 (99%)	2 (1%)	81	90
1	D	222/258 (86%)	219 (99%)	3 (1%)	67	83
1	E	239/258 (93%)	237 (99%)	2 (1%)	81	90
2	C	265/628 (42%)	261 (98%)	4 (2%)	65	82
2	F	265/628 (42%)	261 (98%)	4 (2%)	65	82
All	All	1452/2288 (64%)	1434 (99%)	18 (1%)	72	84

5 of 18 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	F	88	THR
2	F	274	PHE
2	F	233	ASN
2	C	274	PHE
1	E	112	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 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.

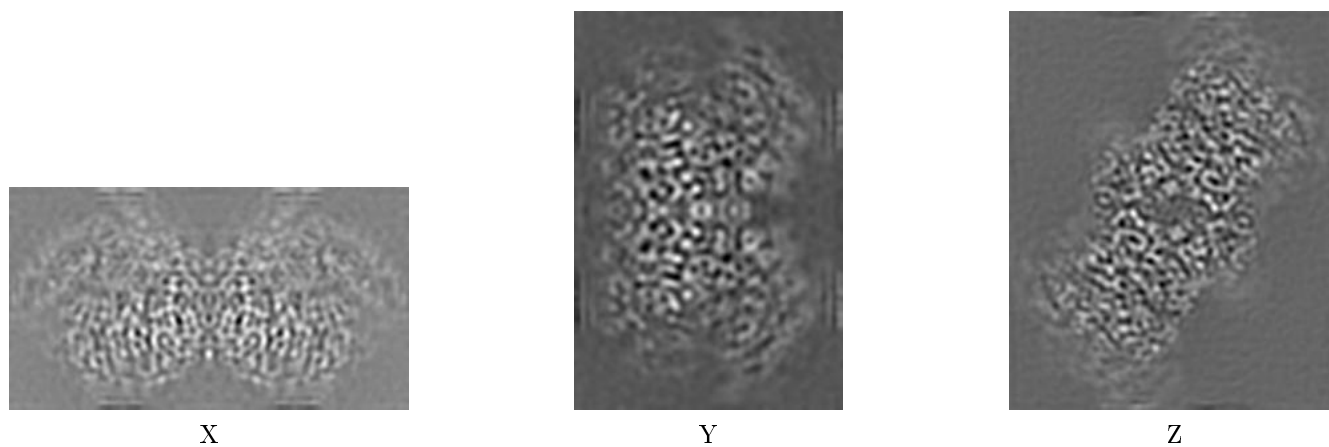
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-11052. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

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

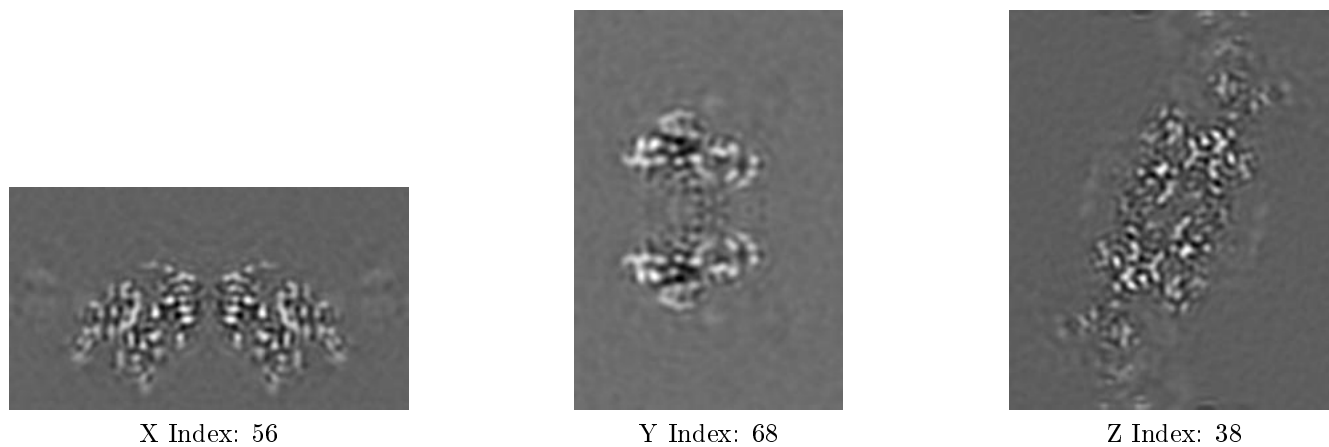
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

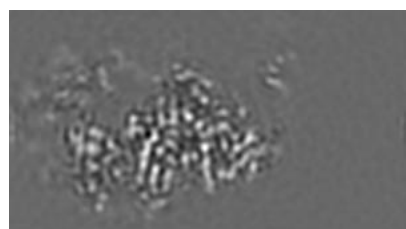
#### 6.2.1 Primary map



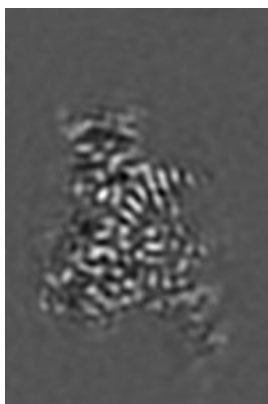
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

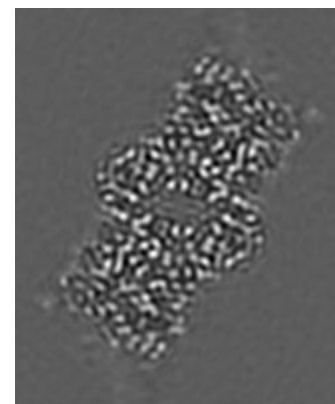
### 6.3.1 Primary map



X Index: 42



Y Index: 55

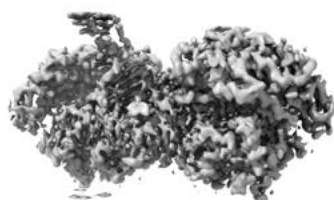


Z Index: 26

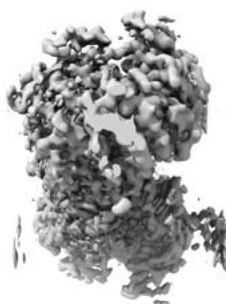
The images above show the largest variance slices of the map in three orthogonal directions.

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



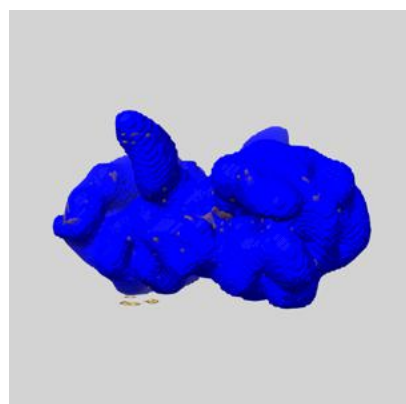
## 6.5 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

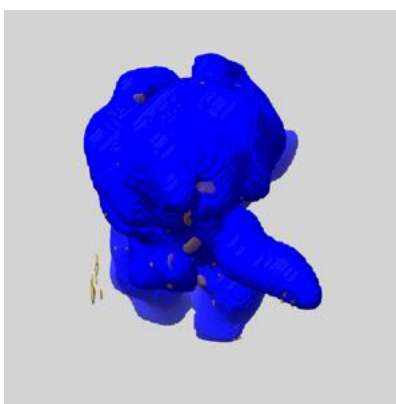
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

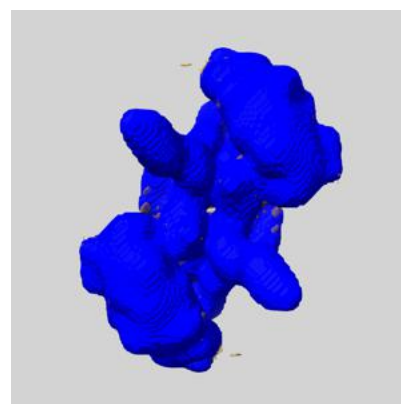
### 6.5.1 emd\_11052\_msk\_1.map [i](#)



X



Y

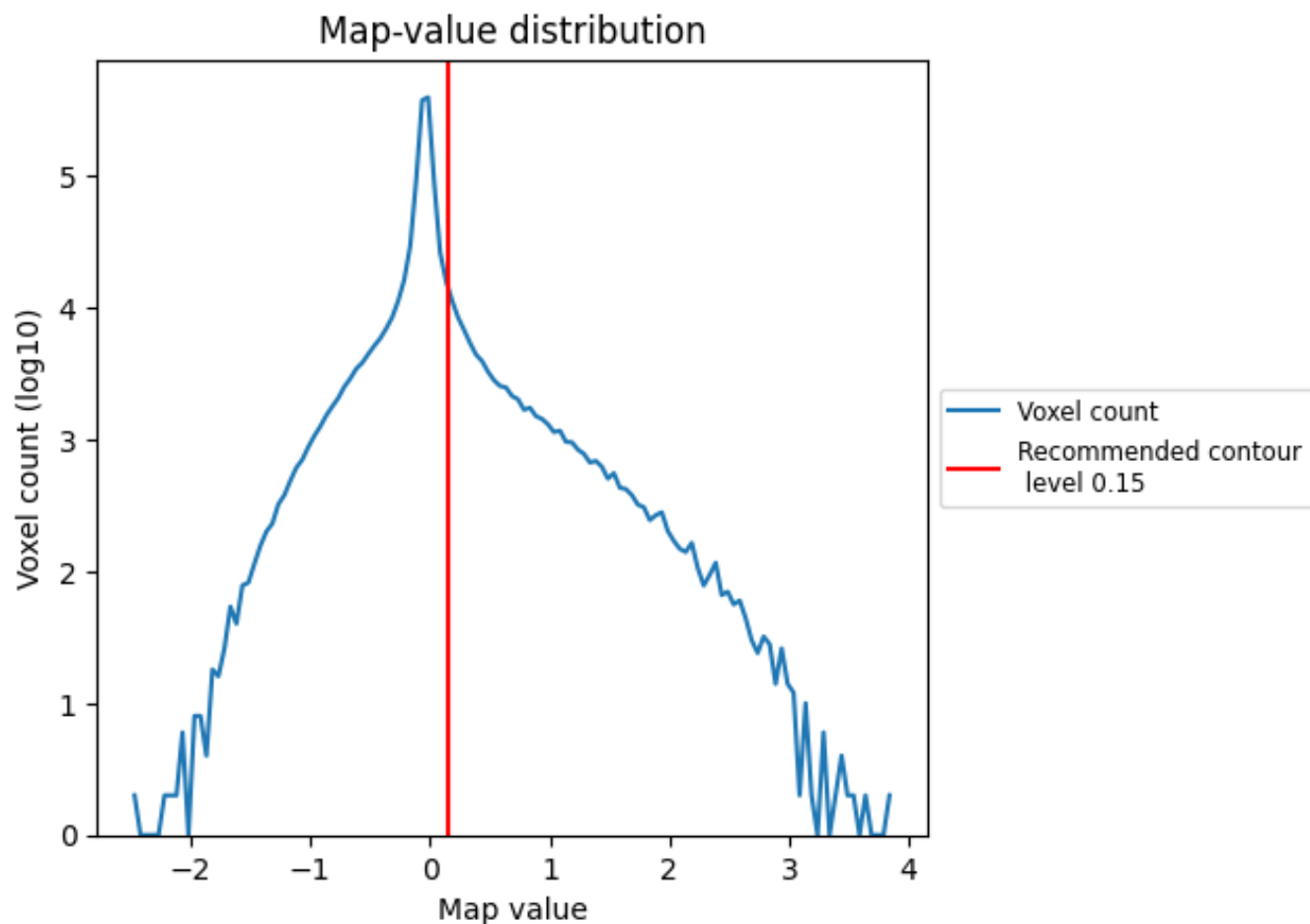


Z

## 7 Map analysis [i](#)

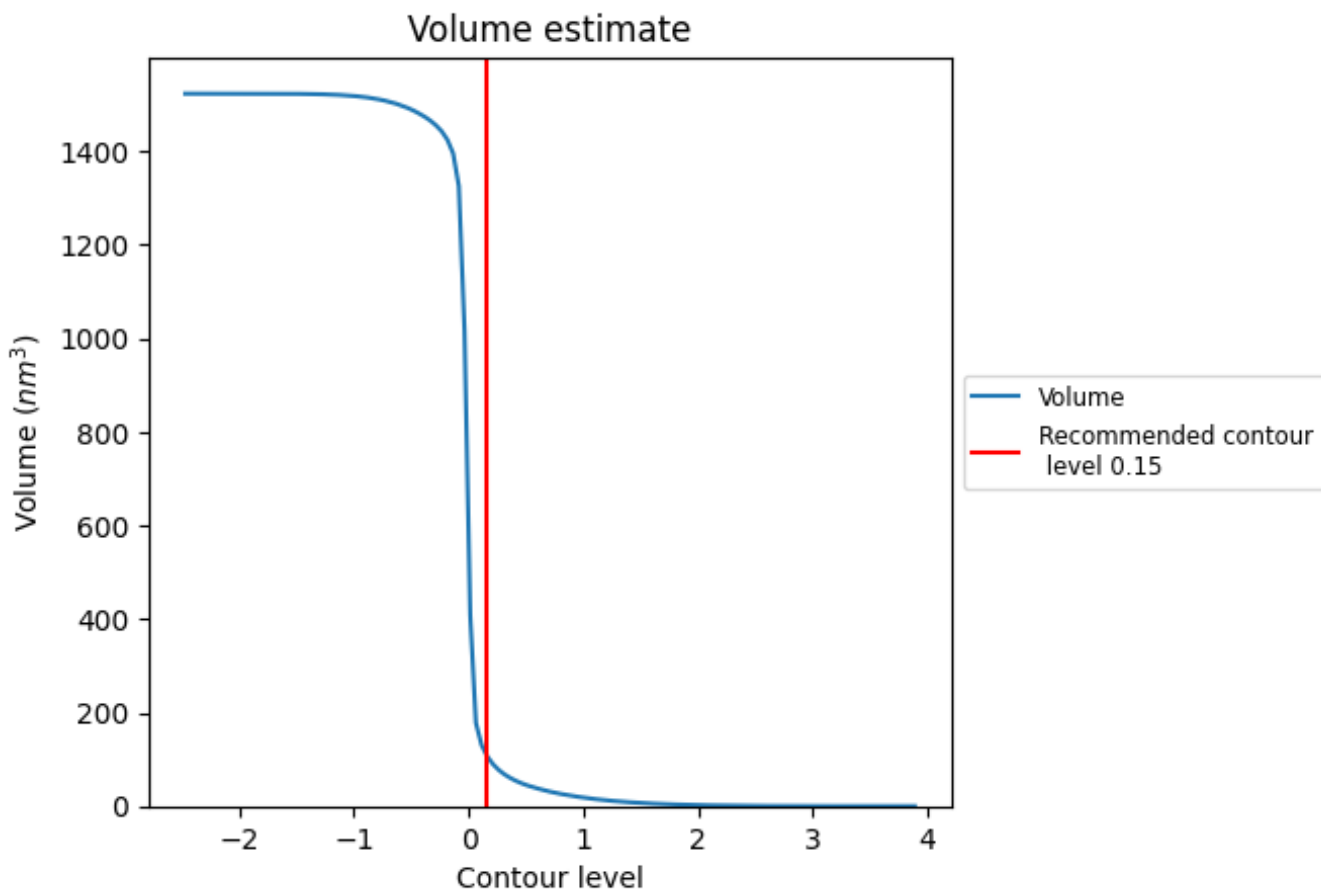
This section contains the results of statistical analysis of the map.

### 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 113 nm<sup>3</sup>; this corresponds to an approximate mass of 102 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.

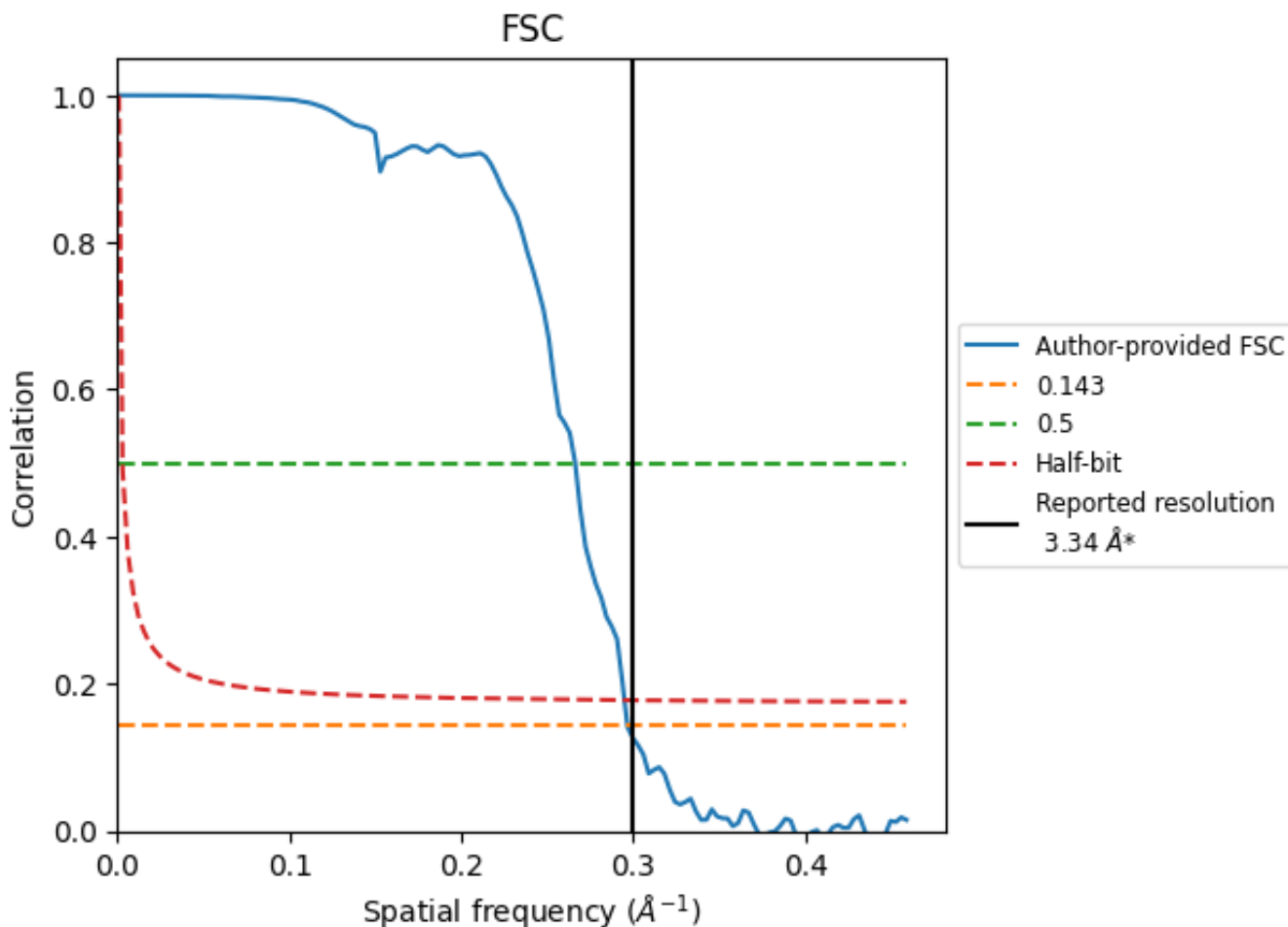
## 7.3 Rotationally averaged power spectrum [i](#)

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

## 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 0.299 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

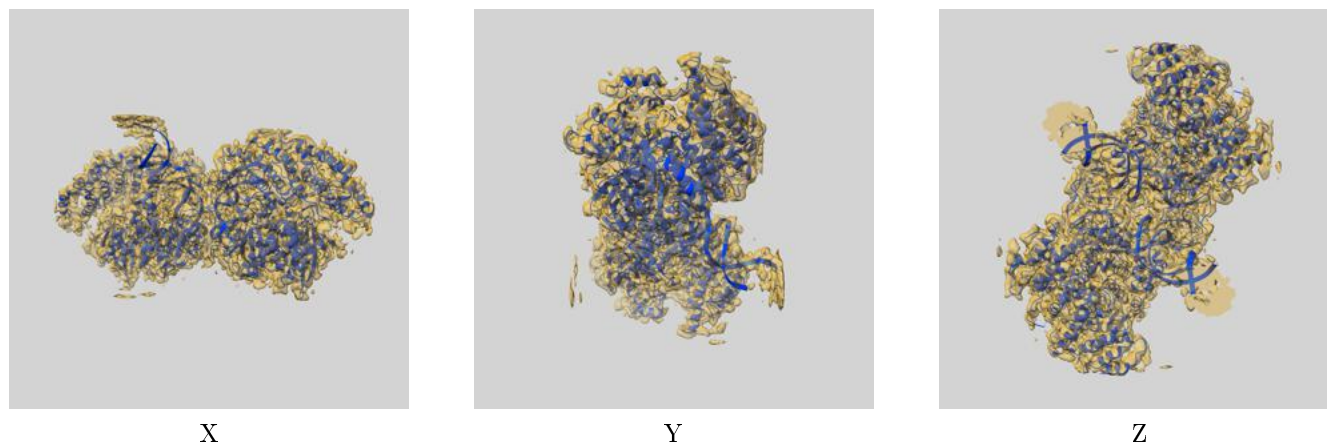
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.34	-	-
Author-provided FSC curve	3.37	3.76	3.39
Unmasked-calculated*	-	-	-

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

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

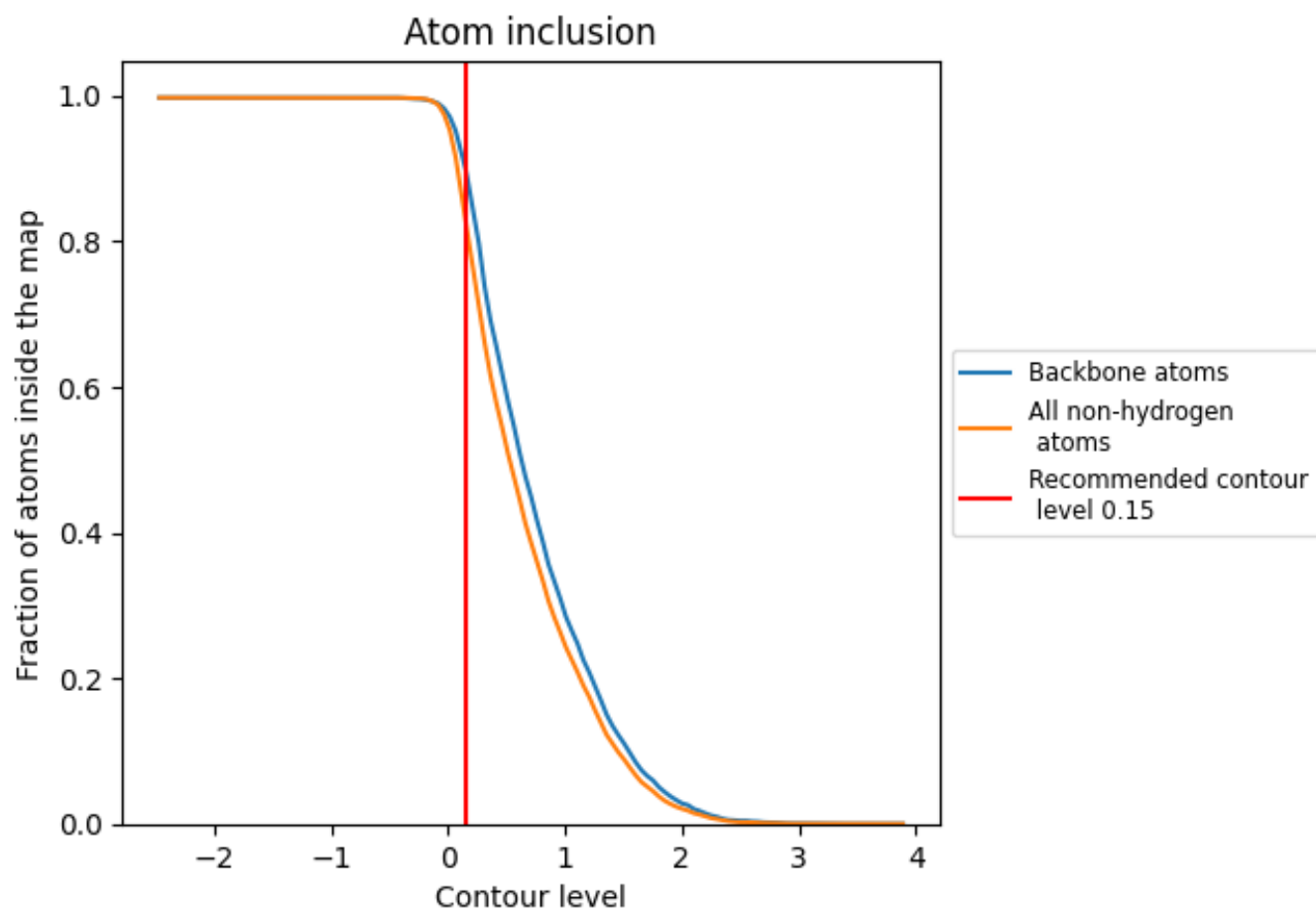
This section contains information regarding the fit between EMDB map EMD-11052 and PDB model 7PEL. Per-residue inclusion information can be found in section 3 on page 6.

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



The images above show the 3D surface view of the map at the recommended contour level 0.15 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 Atom inclusion [i](#)



At the recommended contour level, 90% of all backbone atoms, 83% of all non-hydrogen atoms, are inside the map.