



## wwPDB EM Validation Summary Report ⓘ

Nov 19, 2022 – 08:46 AM EST

PDB ID : 2AKH  
EMDB ID : EMD-1143  
Title : Normal mode-based flexible fitted coordinates of a non-translocating SecYEG protein-conducting channel into the cryo-EM map of a SecYEG-nascent chain-70S ribosome complex from *E. coli*  
Authors : Mitra, K.M.; Schaffitzel, C.; Shaikh, T.; Tama, F.; Jenni, S.; Brooks III, C.L.; Ban, N.; Frank, J.  
Deposited on : 2005-08-03  
Resolution : 14.90 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)

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>.

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

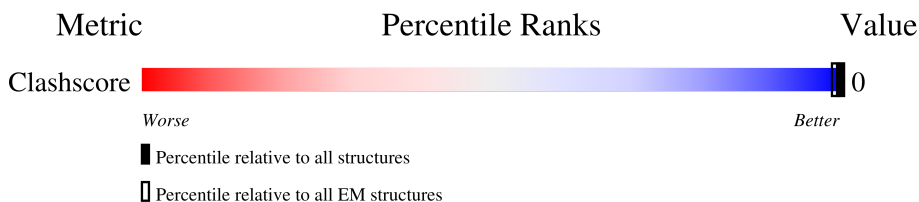
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 14.90 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297

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	77	97%
			100%
1	X	77	100%
			100%
2	B	400	97%
			100%
2	Y	400	93%
			100%
3	C	111	96%
			100%
3	Z	111	100%
			100%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 1176 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 Protein-export membrane protein secG.

Mol	Chain	Residues	Atoms	AltConf	Trace
1	X	77	Total C 77 77	0	77
1	A	77	Total C 77 77	0	77

- Molecule 2 is a protein called Preprotein translocase secY subunit.

Mol	Chain	Residues	Atoms	AltConf	Trace
2	Y	400	Total C 400 400	0	400
2	B	400	Total C 400 400	0	400

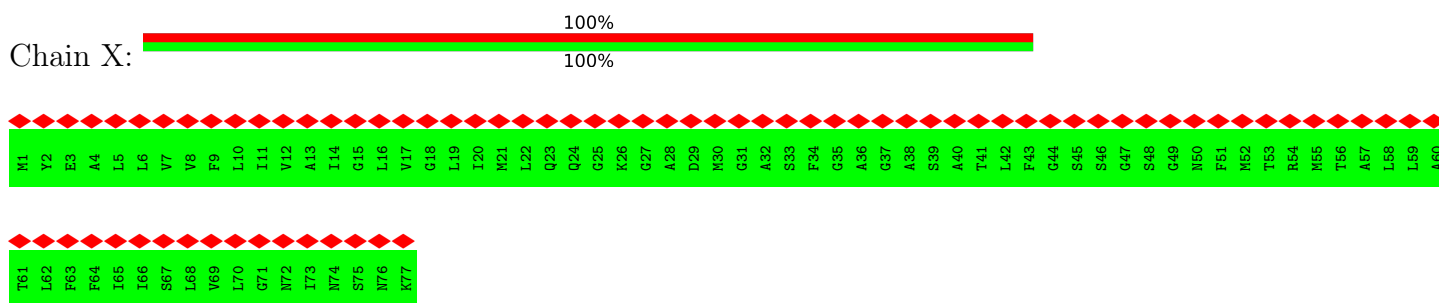
- Molecule 3 is a protein called Preprotein translocase secE subunit.

Mol	Chain	Residues	Atoms	AltConf	Trace
3	Z	111	Total C 111 111	0	111
3	C	111	Total C 111 111	0	111

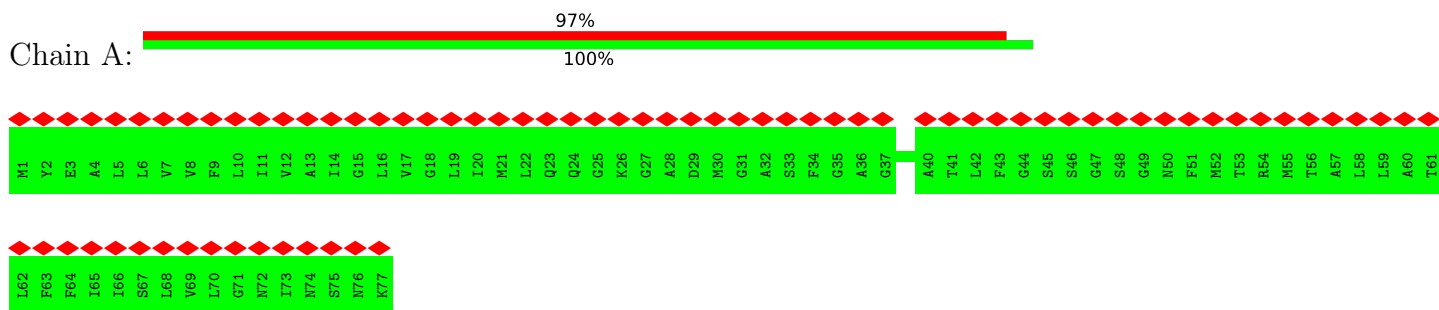
### 3 Residue-property plots

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.

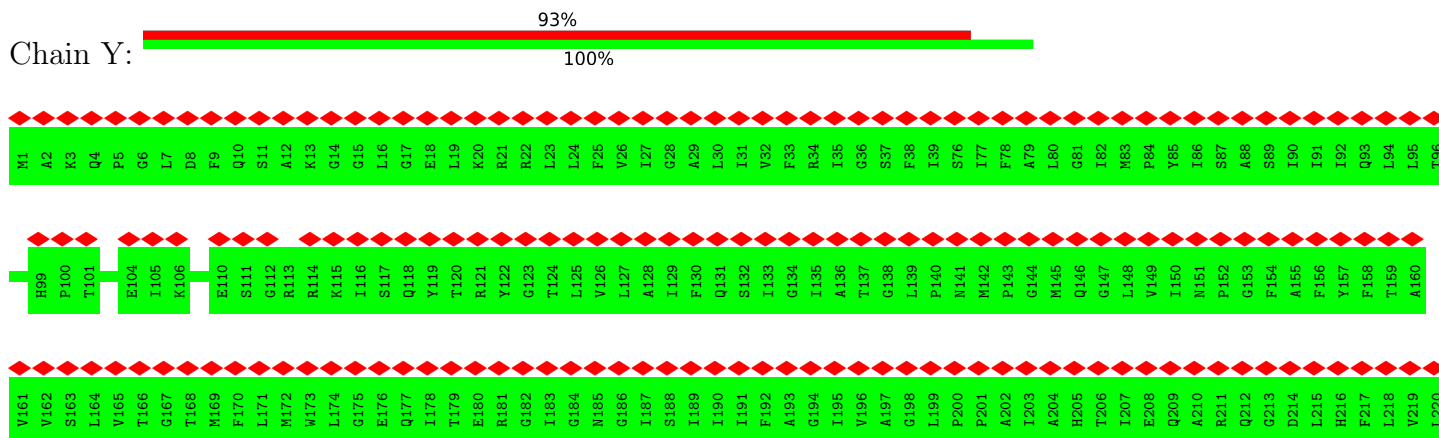
- Molecule 1: Protein-export membrane protein secG

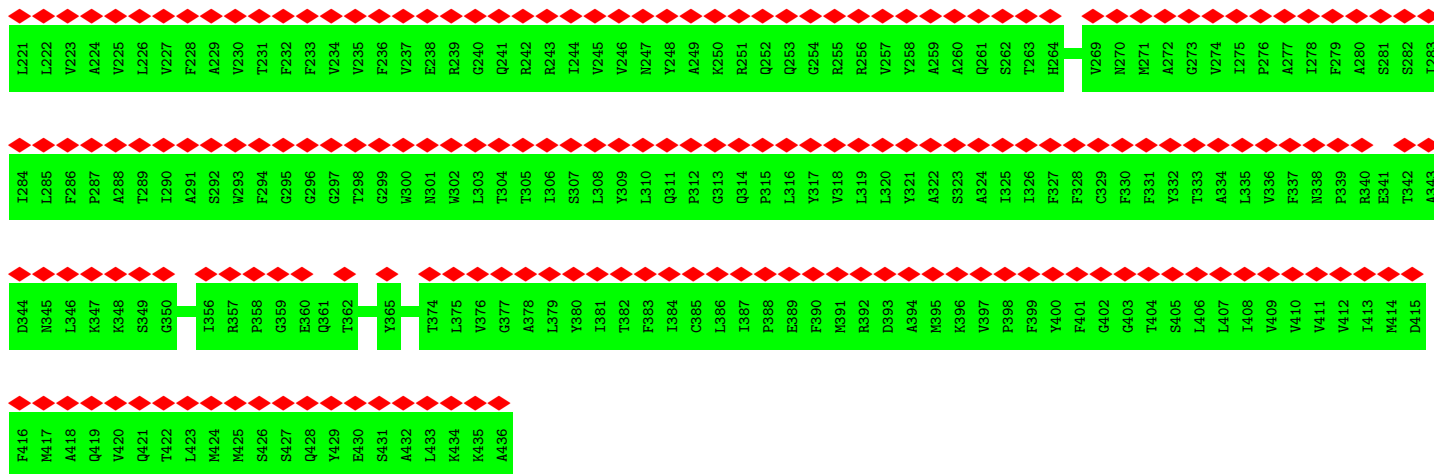


- Molecule 1: Protein-export membrane protein secG

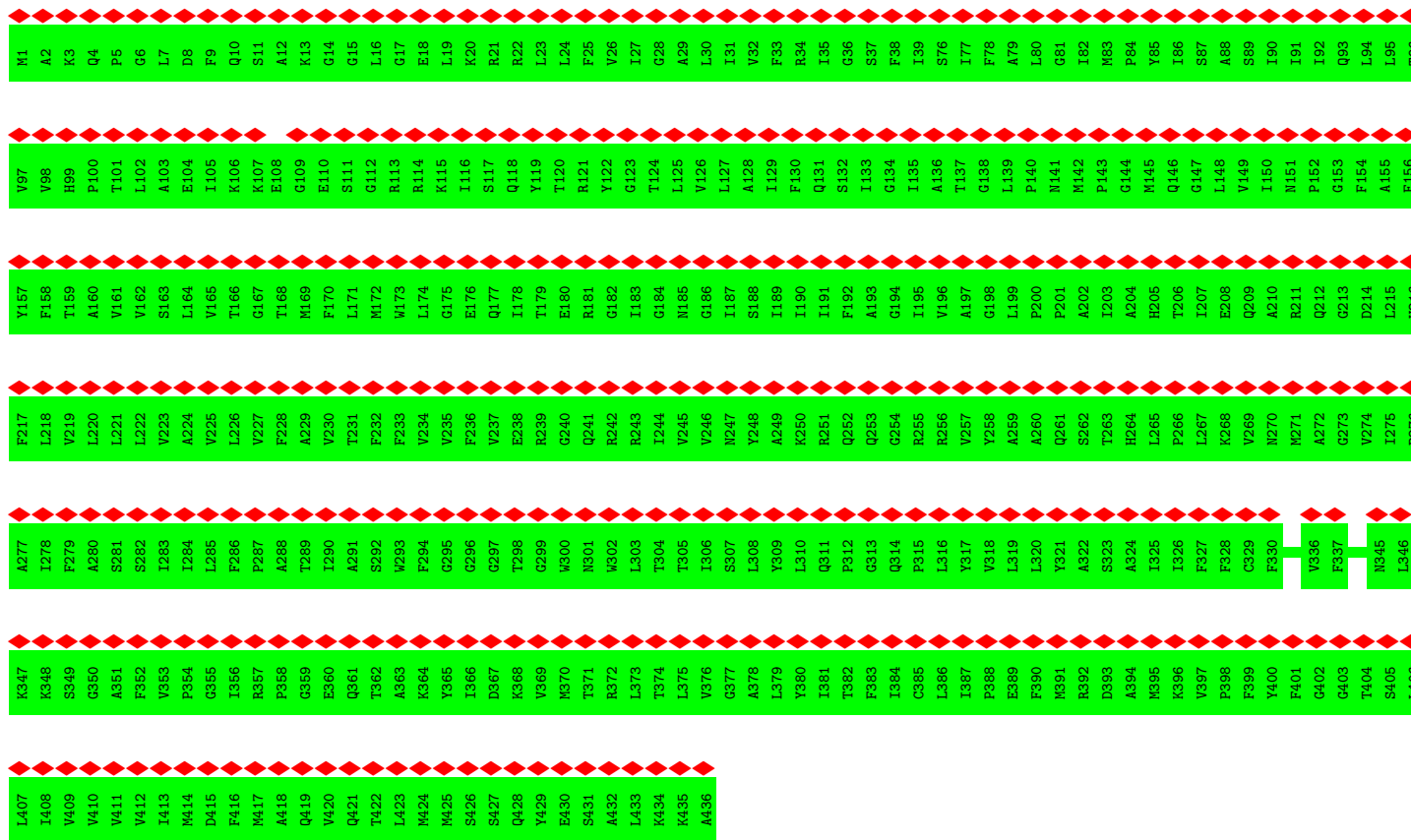


- Molecule 2: Preprotein translocase secY subunit

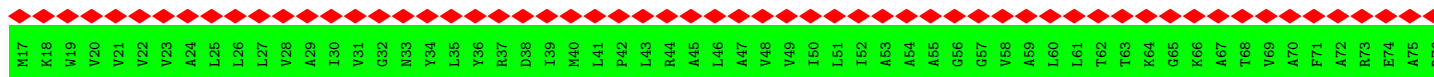




• Molecule 2: Preprotein translocase secY subunit



• Molecule 3: Preprotein translocase secE subunit



T77 E78 V79 R80 K81 V82 I83 W84 P85 T86 R87 Q88 E89 T90 L91 H92 H93 T94 T95 L96 I96 V97 A98 A99 V100 T101 A102 V103 M104 S105 L106 I107 L108 W109 G110 L111 D112 G113 I114 L115 V116 R117 L118 V119 S120 F121 I122 T123 G124 L125 R126 F127

• Molecule 3: Preprotein translocase secE subunit

Chain C:  96%  
100%

M17 K18 W19 V20 V22 V23 A24 L25 L26 L27 V28 A29 I30 V31 G32 N33 Y34 L35 Y36 R37 D38 T39 M40 L41 P42 L43 R44 A45 L46 A47 V48 V49 I50 L51 I52 A53 A54 A55 G56 G57 V58 A59 L60 L61 T62 T63 K64 G65 V69 A70 F71 A72 R73 E74 A75 R76 T77 E78

V79 R80 K81 V82 I83 W84 P85 T86 R87 Q88 E89 T90 L91 H92 H93 T94 T95 L96 I96 V97 A98 A99 V100 T101 A102 V103 S105 L106 I107 L108 W109 G110 L111 D112 G113 I114 L115 V116 R117 L118 V119 S120 F121 I122 T123 G124 L125 R126 F127

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	53325	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	defocus groups	Depositor
Microscope	FEI TECNAI F30	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	11	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	4300	Depositor
Magnification	39000	Depositor
Image detector	KODAK SO-163 FILM	Depositor
Maximum map value	454.815	Depositor
Minimum map value	-299.714	Depositor
Average map value	5.836	Depositor
Map value standard deviation	33.806	Depositor
Recommended contour level	46.1	Depositor
Map size ( $\text{\AA}$ )	341.22, 341.22, 341.22	wwPDB
Map dimensions	121, 121, 121	wwPDB
Map angles ( $^\circ$ )	90, 90, 90	wwPDB
Pixel spacing ( $\text{\AA}$ )	2.82, 2.82, 2.82	Depositor

## 5 Model quality

### 5.1 Standard geometry

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

There are no protein, RNA or DNA chains available to summarize Z scores of covalent bonds and angles.

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	77	0	0	0	0
1	X	77	0	0	0	0
2	B	400	0	0	0	0
2	Y	400	0	0	0	0
3	C	111	0	0	0	0
3	Z	111	0	0	0	0
All	All	1176	0	0	0	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 0.

There are no clashes within the asymmetric unit.

There are no symmetry-related clashes.



## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

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

There are no protein residues with a non-rotameric sidechain to report in this entry.

### 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](#)

There are no chain breaks in this entry.

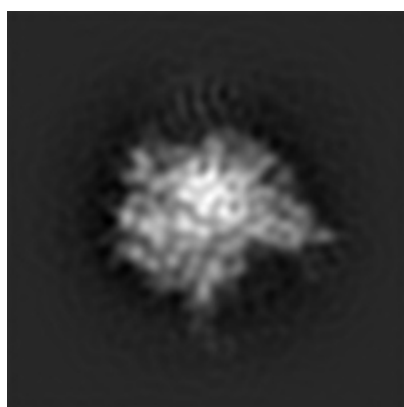
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-1143. These allow visual inspection of the internal detail of the map and identification of artifacts.

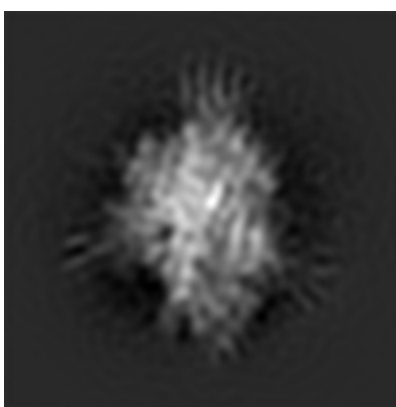
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

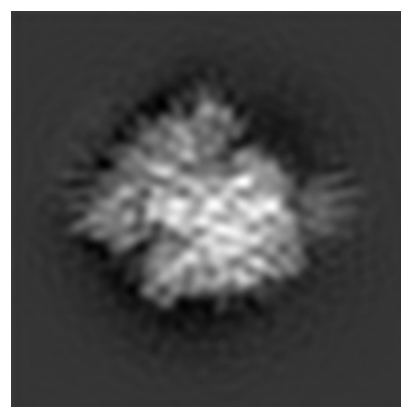
#### 6.1.1 Primary map



X



Y

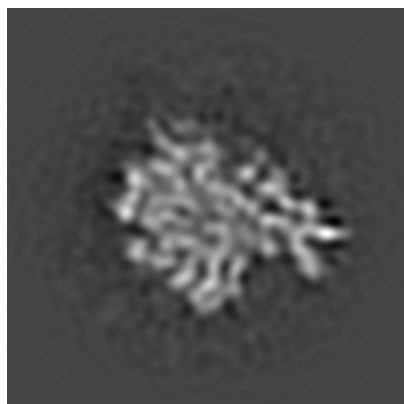


Z

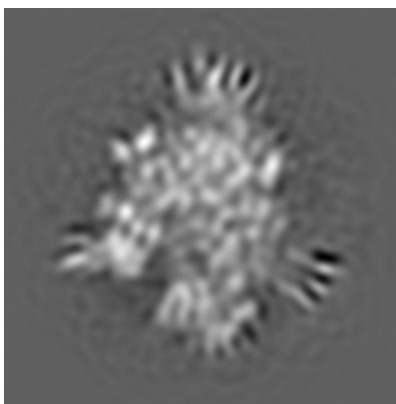
The images above show the map projected in three orthogonal directions.

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

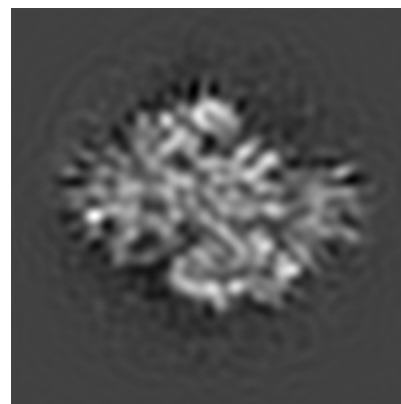
#### 6.2.1 Primary map



X Index: 60



Y Index: 60

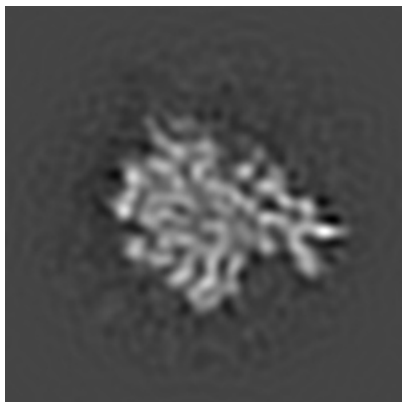


Z Index: 60

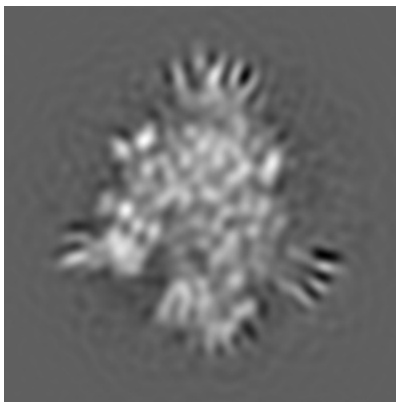
The images above show central slices of the map in three orthogonal directions.

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

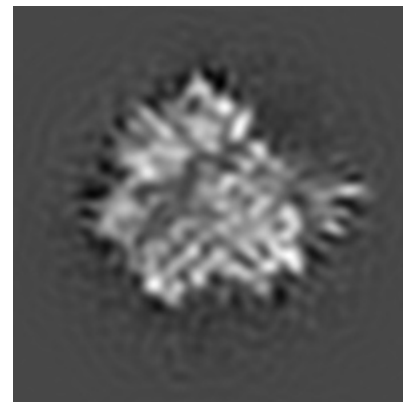
### 6.3.1 Primary map



X Index: 60



Y Index: 60

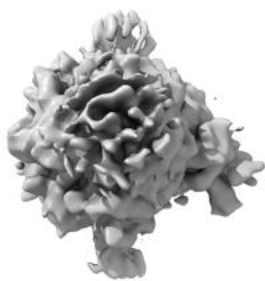


Z Index: 55

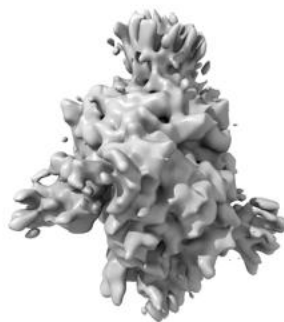
The images above show the largest variance slices of the map in three orthogonal directions.

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

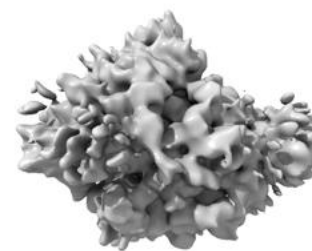
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 46.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

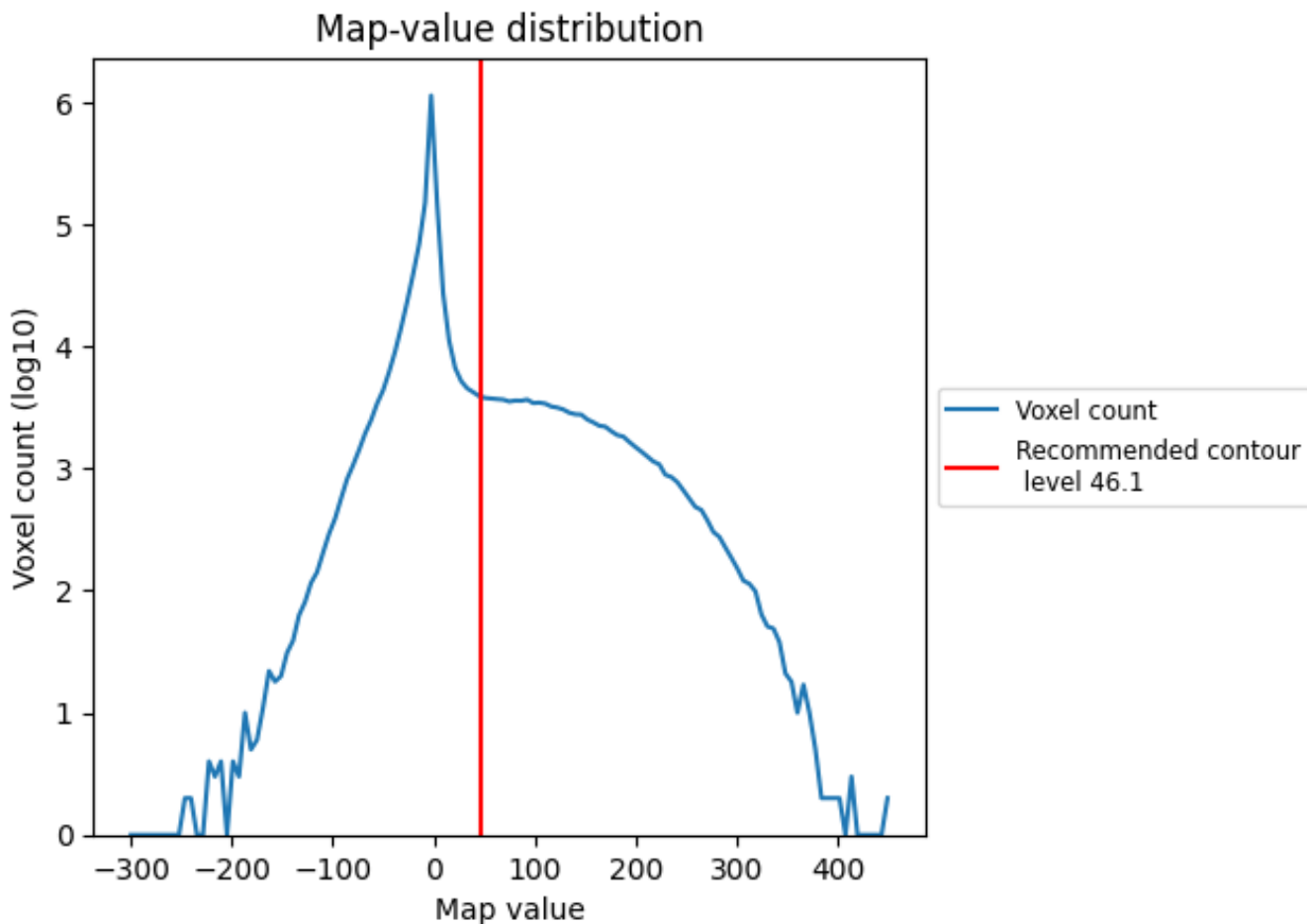
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

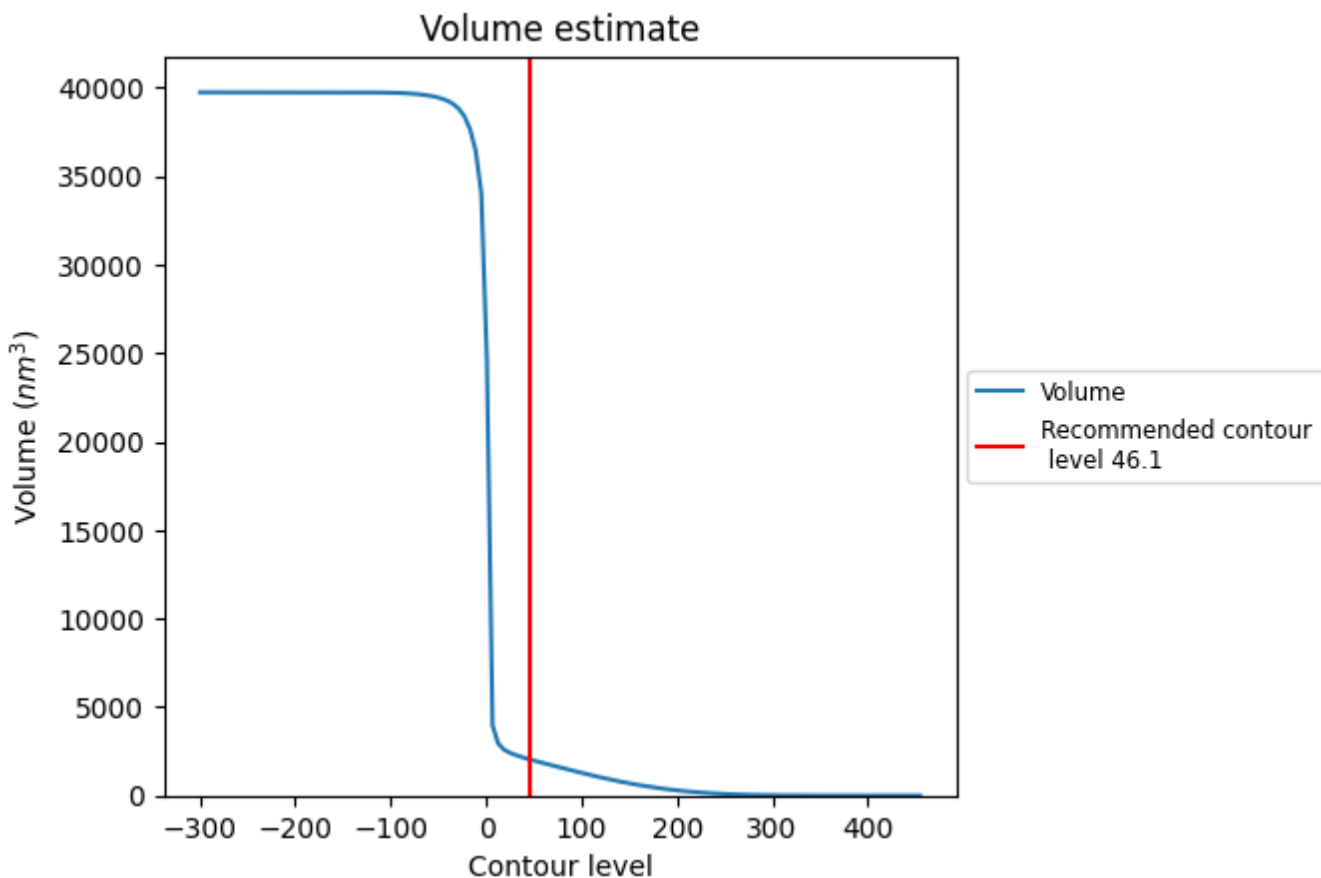
This section contains the results of statistical analysis of the map.

### 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.

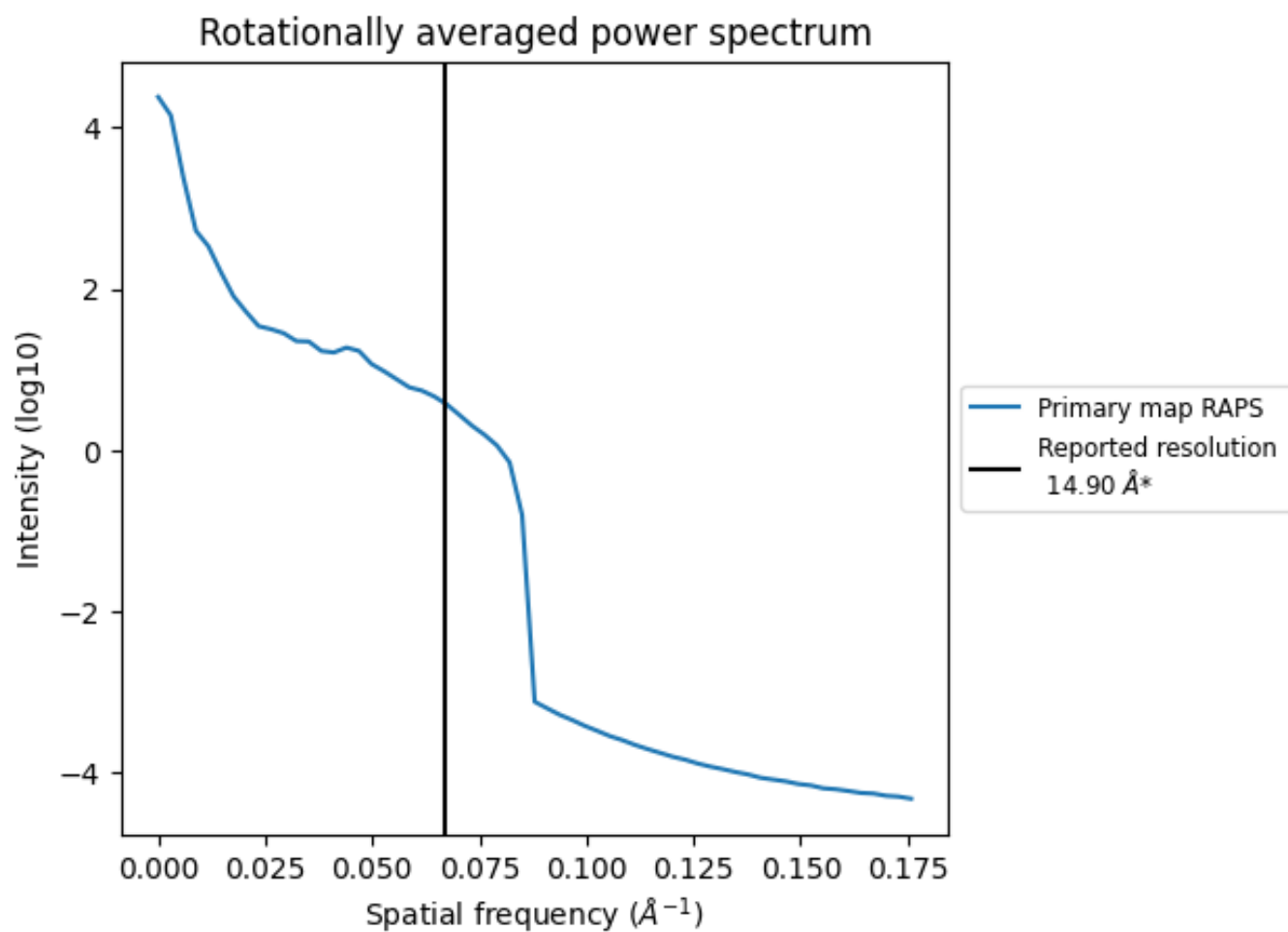
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 2036 nm<sup>3</sup>; this corresponds to an approximate mass of 1839 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 0.067 Å<sup>-1</sup>

## 8 Fourier-Shell correlation

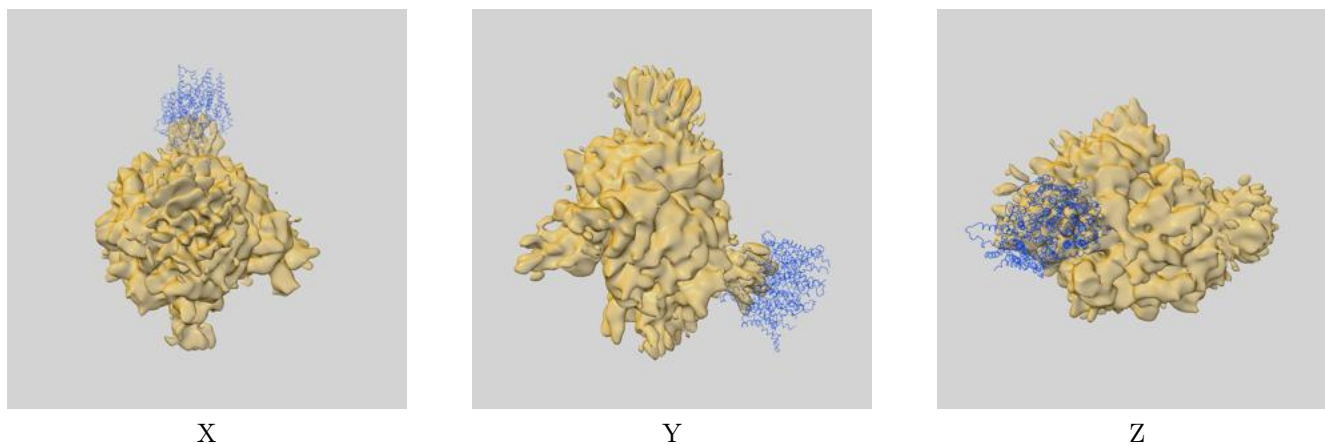
This section was not generated. No FSC curve or half-maps provided.



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

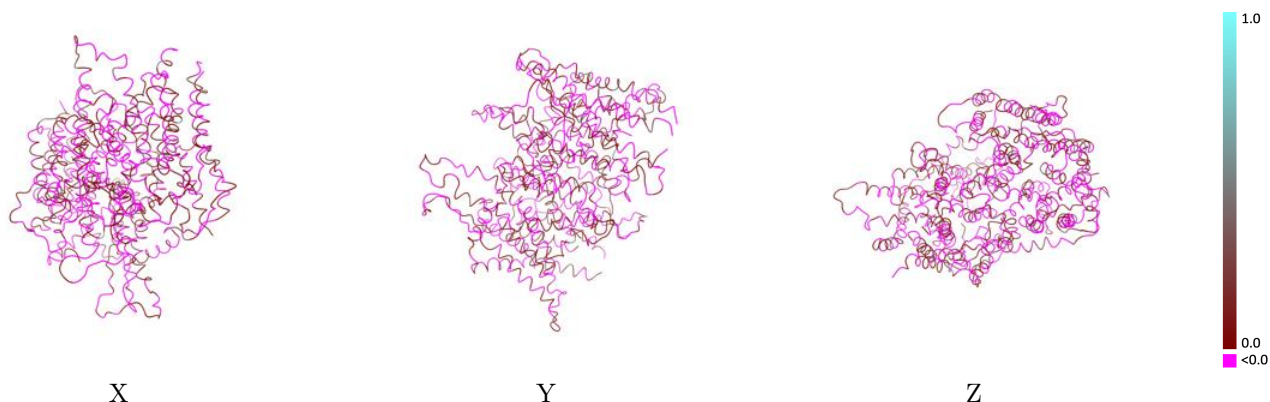
This section contains information regarding the fit between EMDB map EMD-1143 and PDB model 2AKH. Per-residue inclusion information can be found in section [3](#) on page [4](#).

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



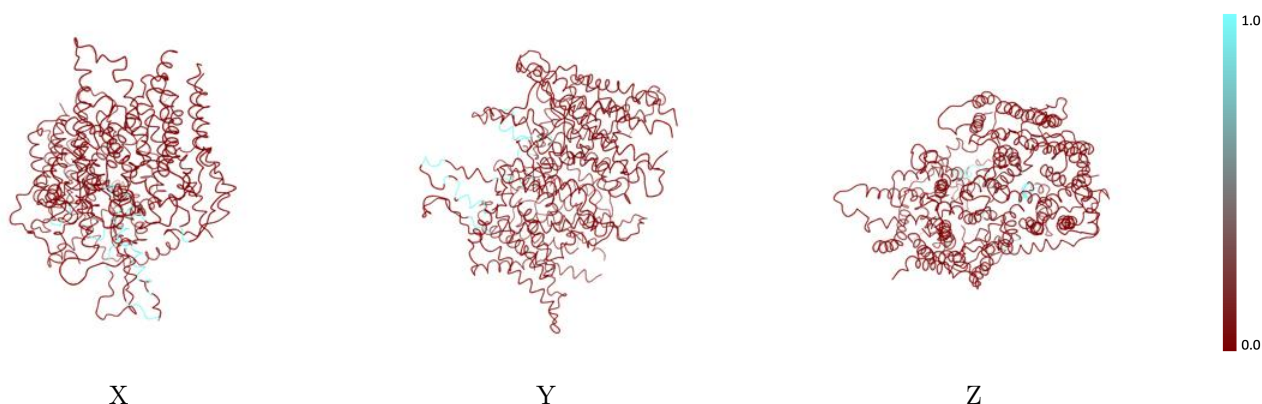
The images above show the 3D surface view of the map at the recommended contour level 46.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



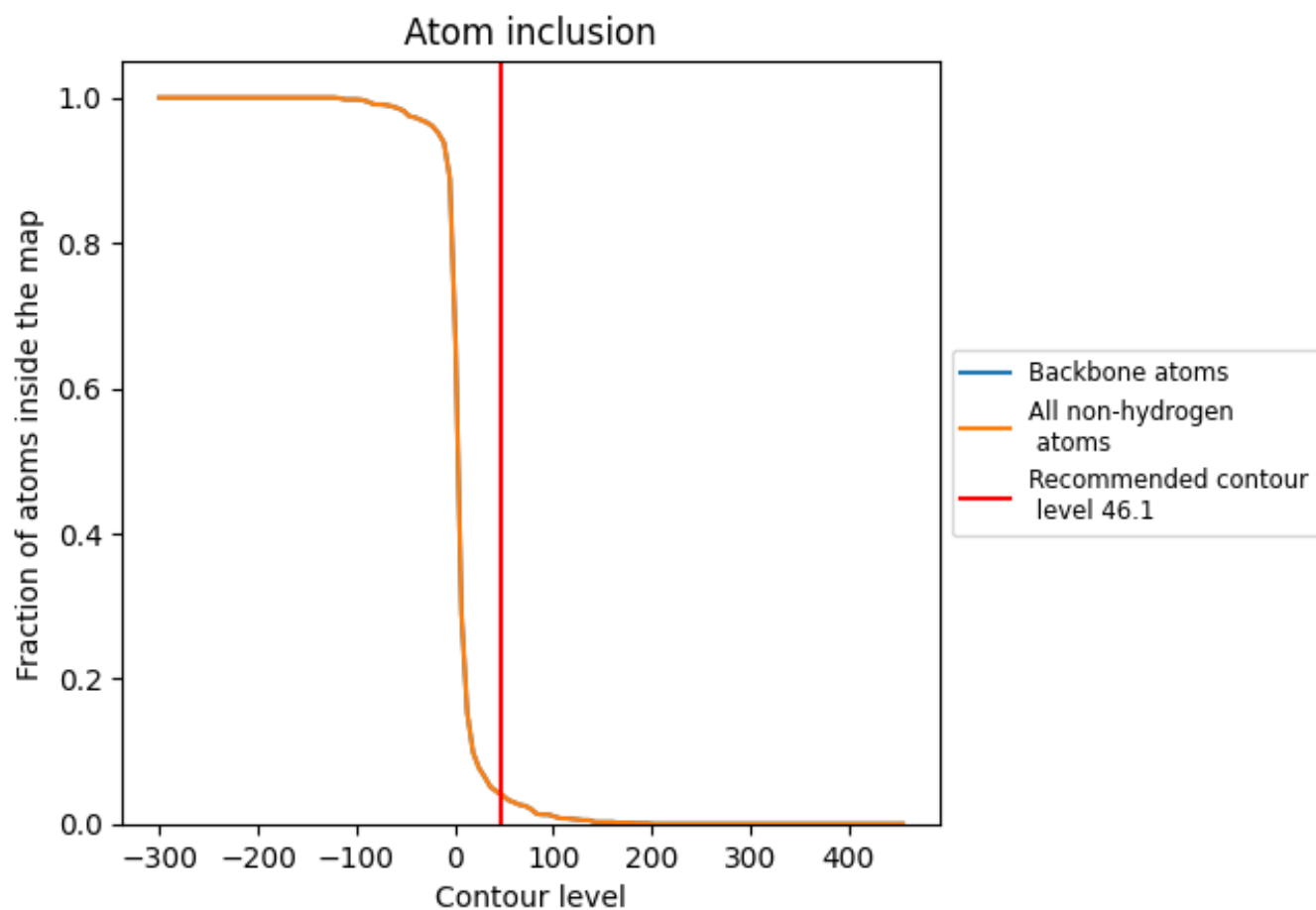
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (46.1).















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 4% of all backbone atoms, 4% 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 (46.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.0408	 0.0030
A	 0.0260	 0.0130
B	 0.0325	 -0.0010
C	 0.0360	 0.0310
X	 0.0000	 -0.0180
Y	 0.0725	 0.0010
Z	 0.0000	 -0.0010

