



## Full wwPDB EM Validation Report ⓘ

Oct 21, 2024 – 03:39 AM EDT

PDB ID : 8EJC  
EMDB ID : EMD-28177  
Title : Structure of FFAR1-Gq complex bound to TAK-875  
Authors : Kumari, P.; Inoue, A.; Chapman, K.; Lian, P.; Rosenbaum, D.M.  
Deposited on : 2022-09-16  
Resolution : 3.00 Å(reported)

This is a Full wwPDB EM Validation 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.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
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) : 2.39

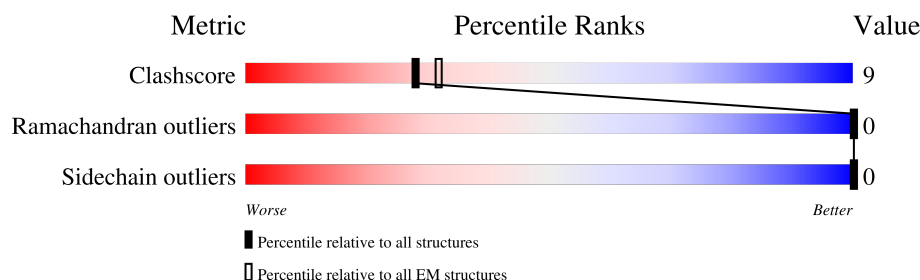
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.00 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	238	<div> <div>7%</div> <div>82%</div> <div>16%</div> <div>.</div> </div>
2	B	340	<div> <div>5%</div> <div>74%</div> <div>25%</div> <div>.</div> </div>
3	C	82	<div> <div>20%</div> <div>50%</div> <div>21%</div> <div>29%</div> </div>
4	E	318	<div> <div>5%</div> <div>57%</div> <div>16%</div> <div>27%</div> </div>
5	R	501	<div> <div>8%</div> <div>44%</div> <div>10%</div> <div>46%</div> </div>

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 8659 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 A modified Guanine nucleotide-binding protein G(q) subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	234	Total	C	N	O	S	0	0
			1877	1184	332	354	7		

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	337	Total	C	N	O	S	0	0
			2572	1588	463	500	21		

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	58	Total	C	N	O	S	0	0
			406	256	71	77	2		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-10	MET	-	expression tag	UNP P59768
C	-9	GLY	-	expression tag	UNP P59768
C	-8	HIS	-	expression tag	UNP P59768
C	-7	HIS	-	expression tag	UNP P59768
C	-6	HIS	-	expression tag	UNP P59768
C	-5	HIS	-	expression tag	UNP P59768
C	-4	HIS	-	expression tag	UNP P59768
C	-3	HIS	-	expression tag	UNP P59768
C	-2	HIS	-	expression tag	UNP P59768
C	-1	HIS	-	expression tag	UNP P59768
C	0	GLY	-	expression tag	UNP P59768
C	1	GLY	-	expression tag	UNP P59768

- Molecule 4 is a protein called scFv16.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	232	Total	C	N	O	S	0	0
			1784	1133	295	346	10		

- Molecule 5 is a protein called Free fatty acid receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	R	271	Total	C	N	O	S	0	0
			1983	1316	328	330	9		

There are 202 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	-200	MET	-	initiating methionine	UNP O14842
R	-199	GLY	-	expression tag	UNP O14842
R	-198	LYS	-	expression tag	UNP O14842
R	-197	THR	-	expression tag	UNP O14842
R	-196	ILE	-	expression tag	UNP O14842
R	-195	ILE	-	expression tag	UNP O14842
R	-194	ALA	-	expression tag	UNP O14842
R	-193	LEU	-	expression tag	UNP O14842
R	-192	SER	-	expression tag	UNP O14842
R	-191	TYR	-	expression tag	UNP O14842
R	-190	ILE	-	expression tag	UNP O14842
R	-189	PHE	-	expression tag	UNP O14842
R	-188	CYS	-	expression tag	UNP O14842
R	-187	LEU	-	expression tag	UNP O14842
R	-186	VAL	-	expression tag	UNP O14842
R	-185	PHE	-	expression tag	UNP O14842
R	-184	ALA	-	expression tag	UNP O14842
R	-183	ASP	-	expression tag	UNP O14842
R	-182	TYR	-	expression tag	UNP O14842
R	-181	LYS	-	expression tag	UNP O14842
R	-180	ASP	-	expression tag	UNP O14842
R	-179	ASP	-	expression tag	UNP O14842
R	-178	ASP	-	expression tag	UNP O14842
R	-177	ASP	-	expression tag	UNP O14842
R	-176	ALA	-	expression tag	UNP O14842
R	-175	GLU	-	expression tag	UNP O14842
R	-174	ASN	-	expression tag	UNP O14842
R	-173	LEU	-	expression tag	UNP O14842
R	-172	TYR	-	expression tag	UNP O14842

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Chain	Residue	Modelled	Actual	Comment	Reference
R	-171	PHE	-	expression tag	UNP O14842
R	-170	GLN	-	expression tag	UNP O14842
R	-169	GLY	-	expression tag	UNP O14842
R	-168	ASN	-	expression tag	UNP O14842
R	-167	ILE	-	expression tag	UNP O14842
R	-166	PHE	-	expression tag	UNP O14842
R	-165	GLU	-	expression tag	UNP O14842
R	-164	MET	-	expression tag	UNP O14842
R	-163	LEU	-	expression tag	UNP O14842
R	-162	ARG	-	expression tag	UNP O14842
R	-161	ILE	-	expression tag	UNP O14842
R	-160	ASP	-	expression tag	UNP O14842
R	-159	GLU	-	expression tag	UNP O14842
R	-158	GLY	-	expression tag	UNP O14842
R	-157	LEU	-	expression tag	UNP O14842
R	-156	ARG	-	expression tag	UNP O14842
R	-155	LEU	-	expression tag	UNP O14842
R	-154	LYS	-	expression tag	UNP O14842
R	-153	ILE	-	expression tag	UNP O14842
R	-152	TYR	-	expression tag	UNP O14842
R	-151	LYS	-	expression tag	UNP O14842
R	-150	ASP	-	expression tag	UNP O14842
R	-149	THR	-	expression tag	UNP O14842
R	-148	GLU	-	expression tag	UNP O14842
R	-147	GLY	-	expression tag	UNP O14842
R	-146	TYR	-	expression tag	UNP O14842
R	-145	TYR	-	expression tag	UNP O14842
R	-144	THR	-	expression tag	UNP O14842
R	-143	ILE	-	expression tag	UNP O14842
R	-142	GLY	-	expression tag	UNP O14842
R	-141	ILE	-	expression tag	UNP O14842
R	-140	GLY	-	expression tag	UNP O14842
R	-139	HIS	-	expression tag	UNP O14842
R	-138	LEU	-	expression tag	UNP O14842
R	-137	LEU	-	expression tag	UNP O14842
R	-136	THR	-	expression tag	UNP O14842
R	-135	LYS	-	expression tag	UNP O14842
R	-134	SER	-	expression tag	UNP O14842
R	-133	PRO	-	expression tag	UNP O14842
R	-132	SER	-	expression tag	UNP O14842
R	-131	LEU	-	expression tag	UNP O14842
R	-130	ASN	-	expression tag	UNP O14842

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Chain	Residue	Modelled	Actual	Comment	Reference
R	-129	ALA	-	expression tag	UNP O14842
R	-128	ALA	-	expression tag	UNP O14842
R	-127	LYS	-	expression tag	UNP O14842
R	-126	SER	-	expression tag	UNP O14842
R	-125	GLU	-	expression tag	UNP O14842
R	-124	LEU	-	expression tag	UNP O14842
R	-123	ASP	-	expression tag	UNP O14842
R	-122	LYS	-	expression tag	UNP O14842
R	-121	ALA	-	expression tag	UNP O14842
R	-120	ILE	-	expression tag	UNP O14842
R	-119	GLY	-	expression tag	UNP O14842
R	-118	ARG	-	expression tag	UNP O14842
R	-117	ASN	-	expression tag	UNP O14842
R	-116	THR	-	expression tag	UNP O14842
R	-115	ASN	-	expression tag	UNP O14842
R	-114	GLY	-	expression tag	UNP O14842
R	-113	VAL	-	expression tag	UNP O14842
R	-112	ILE	-	expression tag	UNP O14842
R	-111	THR	-	expression tag	UNP O14842
R	-110	LYS	-	expression tag	UNP O14842
R	-109	ASP	-	expression tag	UNP O14842
R	-108	GLU	-	expression tag	UNP O14842
R	-107	ALA	-	expression tag	UNP O14842
R	-106	GLU	-	expression tag	UNP O14842
R	-105	LYS	-	expression tag	UNP O14842
R	-104	LEU	-	expression tag	UNP O14842
R	-103	PHE	-	expression tag	UNP O14842
R	-102	ASN	-	expression tag	UNP O14842
R	-101	GLN	-	expression tag	UNP O14842
R	-100	ASP	-	expression tag	UNP O14842
R	-99	VAL	-	expression tag	UNP O14842
R	-98	ASP	-	expression tag	UNP O14842
R	-97	ALA	-	expression tag	UNP O14842
R	-96	ALA	-	expression tag	UNP O14842
R	-95	VAL	-	expression tag	UNP O14842
R	-94	ARG	-	expression tag	UNP O14842
R	-93	GLY	-	expression tag	UNP O14842
R	-92	ILE	-	expression tag	UNP O14842
R	-91	LEU	-	expression tag	UNP O14842
R	-90	ARG	-	expression tag	UNP O14842
R	-89	ASN	-	expression tag	UNP O14842
R	-88	ALA	-	expression tag	UNP O14842

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Chain	Residue	Modelled	Actual	Comment	Reference
R	-87	LYS	-	expression tag	UNP O14842
R	-86	LEU	-	expression tag	UNP O14842
R	-85	LYS	-	expression tag	UNP O14842
R	-84	PRO	-	expression tag	UNP O14842
R	-83	VAL	-	expression tag	UNP O14842
R	-82	TYR	-	expression tag	UNP O14842
R	-81	ASP	-	expression tag	UNP O14842
R	-80	SER	-	expression tag	UNP O14842
R	-79	LEU	-	expression tag	UNP O14842
R	-78	ASP	-	expression tag	UNP O14842
R	-77	ALA	-	expression tag	UNP O14842
R	-76	VAL	-	expression tag	UNP O14842
R	-75	ARG	-	expression tag	UNP O14842
R	-74	ARG	-	expression tag	UNP O14842
R	-73	ALA	-	expression tag	UNP O14842
R	-72	ALA	-	expression tag	UNP O14842
R	-71	LEU	-	expression tag	UNP O14842
R	-70	ILE	-	expression tag	UNP O14842
R	-69	ASN	-	expression tag	UNP O14842
R	-68	MET	-	expression tag	UNP O14842
R	-67	VAL	-	expression tag	UNP O14842
R	-66	PHE	-	expression tag	UNP O14842
R	-65	GLN	-	expression tag	UNP O14842
R	-64	MET	-	expression tag	UNP O14842
R	-63	GLY	-	expression tag	UNP O14842
R	-62	GLU	-	expression tag	UNP O14842
R	-61	THR	-	expression tag	UNP O14842
R	-60	GLY	-	expression tag	UNP O14842
R	-59	VAL	-	expression tag	UNP O14842
R	-58	ALA	-	expression tag	UNP O14842
R	-57	GLY	-	expression tag	UNP O14842
R	-56	PHE	-	expression tag	UNP O14842
R	-55	THR	-	expression tag	UNP O14842
R	-54	ASN	-	expression tag	UNP O14842
R	-53	SER	-	expression tag	UNP O14842
R	-52	LEU	-	expression tag	UNP O14842
R	-51	ARG	-	expression tag	UNP O14842
R	-50	MET	-	expression tag	UNP O14842
R	-49	LEU	-	expression tag	UNP O14842
R	-48	GLN	-	expression tag	UNP O14842
R	-47	GLN	-	expression tag	UNP O14842
R	-46	LYS	-	expression tag	UNP O14842

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Chain	Residue	Modelled	Actual	Comment	Reference
R	-45	ARG	-	expression tag	UNP O14842
R	-44	TRP	-	expression tag	UNP O14842
R	-43	ASP	-	expression tag	UNP O14842
R	-42	GLU	-	expression tag	UNP O14842
R	-41	ALA	-	expression tag	UNP O14842
R	-40	ALA	-	expression tag	UNP O14842
R	-39	VAL	-	expression tag	UNP O14842
R	-38	ASN	-	expression tag	UNP O14842
R	-37	LEU	-	expression tag	UNP O14842
R	-36	ALA	-	expression tag	UNP O14842
R	-35	LYS	-	expression tag	UNP O14842
R	-34	SER	-	expression tag	UNP O14842
R	-33	ARG	-	expression tag	UNP O14842
R	-32	TRP	-	expression tag	UNP O14842
R	-31	TYR	-	expression tag	UNP O14842
R	-30	ASN	-	expression tag	UNP O14842
R	-29	GLN	-	expression tag	UNP O14842
R	-28	THR	-	expression tag	UNP O14842
R	-27	PRO	-	expression tag	UNP O14842
R	-26	ASN	-	expression tag	UNP O14842
R	-25	ARG	-	expression tag	UNP O14842
R	-24	ALA	-	expression tag	UNP O14842
R	-23	LYS	-	expression tag	UNP O14842
R	-22	ARG	-	expression tag	UNP O14842
R	-21	VAL	-	expression tag	UNP O14842
R	-20	ILE	-	expression tag	UNP O14842
R	-19	THR	-	expression tag	UNP O14842
R	-18	THR	-	expression tag	UNP O14842
R	-17	PHE	-	expression tag	UNP O14842
R	-16	ARG	-	expression tag	UNP O14842
R	-15	THR	-	expression tag	UNP O14842
R	-14	GLY	-	expression tag	UNP O14842
R	-13	THR	-	expression tag	UNP O14842
R	-12	TRP	-	expression tag	UNP O14842
R	-11	ASP	-	expression tag	UNP O14842
R	-10	ALA	-	expression tag	UNP O14842
R	-9	TYR	-	expression tag	UNP O14842
R	-8	LEU	-	expression tag	UNP O14842
R	-7	GLU	-	expression tag	UNP O14842
R	-6	VAL	-	expression tag	UNP O14842
R	-5	LEU	-	expression tag	UNP O14842
R	-4	PHE	-	expression tag	UNP O14842

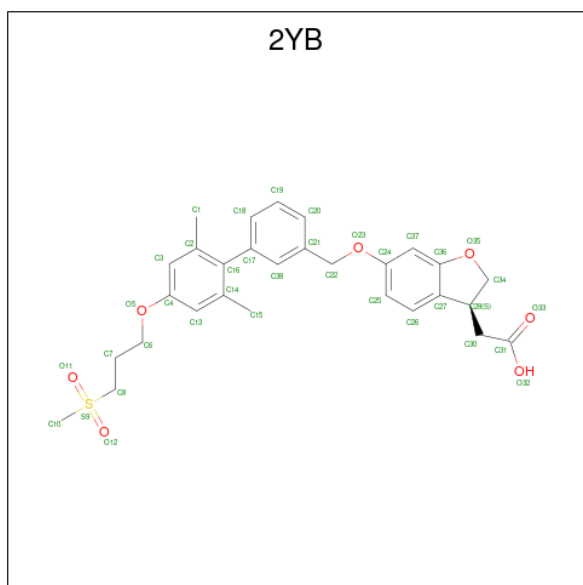
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Chain	Residue	Modelled	Actual	Comment	Reference
R	-3	GLN	-	expression tag	UNP O14842
R	-2	GLY	-	expression tag	UNP O14842
R	-1	PRO	-	expression tag	UNP O14842
R	0	GLU	-	expression tag	UNP O14842
R	1	PHE	-	expression tag	UNP O14842

- Molecule 6 is [(3S)-6-({2',6'-dimethyl-4'-[3-(methylsulfonyl)propoxy]biphenyl-3-yl}methoxy)-2,3-dihydro-1-benzofuran-3-yl]acetic acid (three-letter code: 2YB) (formula: C<sub>29</sub>H<sub>32</sub>O<sub>7</sub>S) (labeled as "Ligand of Interest" by depositor).

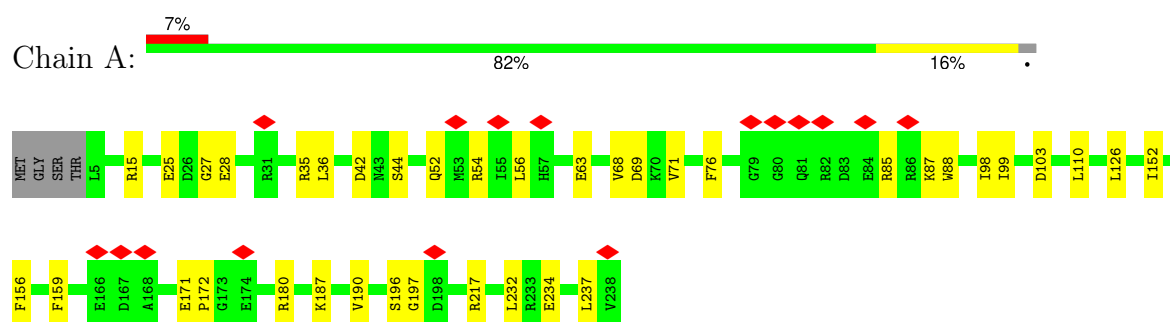


Mol	Chain	Residues	Atoms				AltConf
6	R	1	Total	C	O	S	0
			37	29	7	1	

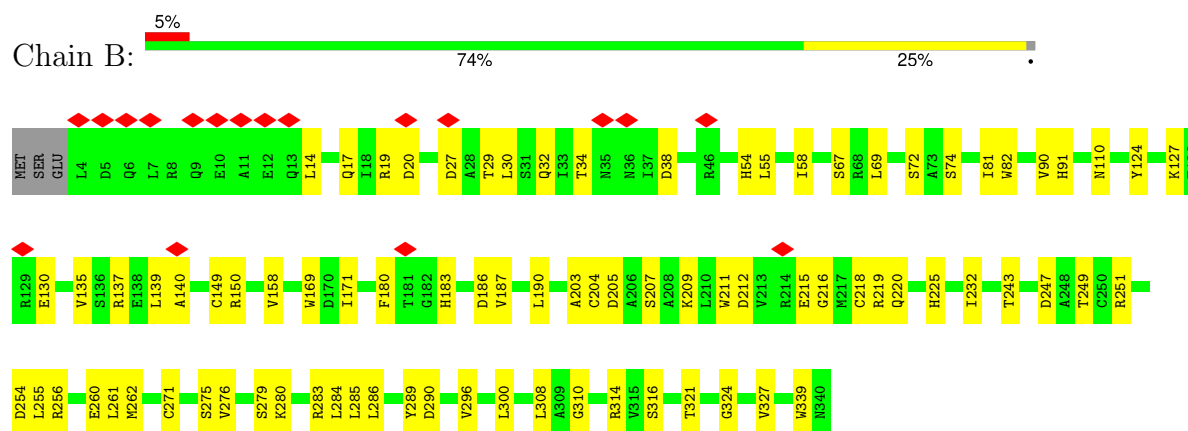
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

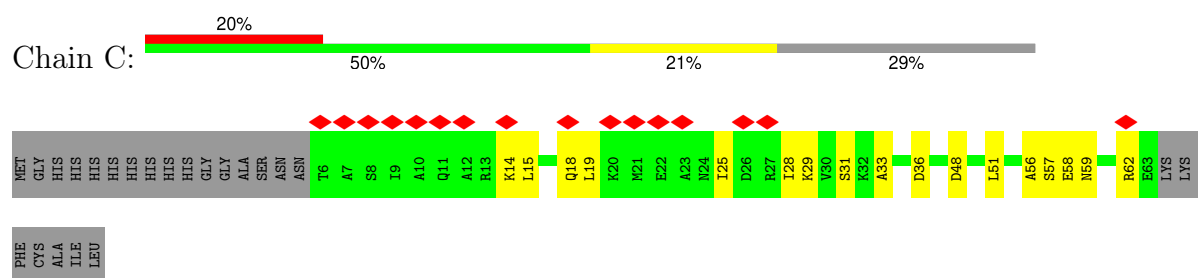
- Molecule 1: A modified Guanine nucleotide-binding protein G(q) subunit alpha



- Molecule 2: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1



- Molecule 3: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2



- Molecule 4: scFv16



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	223309	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 ( $e^-/\text{\AA}^2$ )	1.2	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.115	Depositor
Minimum map value	-0.056	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.023	Depositor
Map size ( $\text{\AA}$ )	214.00002, 214.00002, 214.00002	wwPDB
Map dimensions	200, 200, 200	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.07, 1.07, 1.07	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 2YB

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	0.30	0/1912	0.49	0/2583
2	B	0.32	0/2619	0.56	0/3552
3	C	0.27	0/412	0.41	0/562
4	E	0.33	0/1828	0.52	0/2478
5	R	0.30	0/2044	0.51	0/2806
All	All	0.31	0/8815	0.52	0/11981

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 [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	1877	0	1825	27	0
2	B	2572	0	2469	59	0
3	C	406	0	386	16	0
4	E	1784	0	1723	32	0
5	R	1983	0	2004	39	0
6	R	37	0	31	2	0
All	All	8659	0	8438	160	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 9.

All (160) 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)
4:E:187:LEU:HD21	4:E:190:TYR:HB3	1.60	0.82
2:B:58:ILE:HG12	2:B:74:SER:OG	1.84	0.74
1:A:234:GLU:OE2	5:R:118:ARG:NH1	2.21	0.74
2:B:58:ILE:CG1	2:B:74:SER:OG	2.37	0.72
1:A:15:ARG:NH1	2:B:90:VAL:O	2.20	0.72
5:R:80:PRO:HB2	6:R:401:2YB:H20	1.73	0.70
2:B:69:LEU:HA	2:B:82:TRP:O	1.92	0.68
5:R:55:LEU:HD12	5:R:89:PRO:HB2	1.76	0.66
4:E:178:LEU:HB3	4:E:188:LEU:HD11	1.79	0.64
5:R:128:ALA:HA	5:R:131:TRP:HD1	1.60	0.64
1:A:27:GLY:HA3	2:B:55:LEU:HD13	1.81	0.62
2:B:256:ARG:NH2	3:C:36:ASP:OD2	2.34	0.61
2:B:321:THR:HG23	2:B:324:GLY:H	1.66	0.60
2:B:218:CYS:HB3	3:C:14:LYS:HE2	1.84	0.60
1:A:159:PHE:O	1:A:180:ARG:NH2	2.35	0.59
4:E:14:PRO:HD3	4:E:120:SER:HB2	1.86	0.58
4:E:40:ALA:HB3	4:E:43:LYS:HB2	1.84	0.58
4:E:139:VAL:HG12	4:E:162:SER:HB3	1.85	0.58
5:R:59:LEU:HD11	5:R:269:VAL:HG11	1.86	0.57
2:B:140:ALA:HB3	2:B:169:TRP:HZ3	1.70	0.57
4:E:51:ILE:HG21	4:E:79:LEU:HD11	1.85	0.57
3:C:56:ALA:HB1	3:C:62:ARG:HD2	1.85	0.57
2:B:219:ARG:HG2	2:B:220:GLN:HG3	1.85	0.56
2:B:183:HIS:ND1	2:B:203:ALA:HB2	2.20	0.56
2:B:29:THR:HG23	2:B:32:GLN:H	1.69	0.56
5:R:266:ALA:O	5:R:269:VAL:HG12	2.05	0.56
2:B:19:ARG:NH2	2:B:20:ASP:OD1	2.39	0.56
2:B:308:LEU:HD12	2:B:339:TRP:CD2	2.40	0.56
2:B:137:ARG:NE	2:B:171:ILE:O	2.39	0.55
4:E:6:GLU:OE2	4:E:114:GLY:N	2.33	0.55
5:R:23:ASN:ND2	5:R:52:ASP:OD2	2.40	0.55
5:R:258:ARG:HH21	5:R:262:LEU:HD21	1.72	0.55
5:R:24:VAL:HG12	5:R:53:LEU:HD11	1.90	0.54
5:R:88:PHE:HZ	5:R:131:TRP:CZ3	2.25	0.54
5:R:72:TRP:HZ3	5:R:79:CYS:HA	1.72	0.54
4:E:7:SER:HA	4:E:115:THR:HG21	1.88	0.54
4:E:63:THR:O	4:E:67:ARG:NH2	2.40	0.54
5:R:138:LEU:HD23	5:R:186:LEU:HD11	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:36:LEU:HD13	1:A:99:ILE:HD11	1.90	0.53
2:B:58:ILE:HG12	2:B:74:SER:HG	1.70	0.53
4:E:51:ILE:HD12	4:E:58:ILE:HG12	1.91	0.53
5:R:209:LEU:O	5:R:219:LYS:NZ	2.42	0.52
1:A:187:LYS:HA	1:A:190:VAL:HG22	1.91	0.52
5:R:62:LYS:HB2	5:R:82:PHE:HZ	1.75	0.52
2:B:280:LYS:HB3	3:C:48:ASP:HB3	1.91	0.52
5:R:259:LYS:O	5:R:263:ILE:HG12	2.09	0.51
2:B:310:GLY:HA3	2:B:339:TRP:HH2	1.75	0.51
4:E:200:PRO:HG2	4:E:203:PHE:HE1	1.75	0.51
4:E:12:VAL:O	4:E:120:SER:N	2.42	0.51
2:B:251:ARG:HD2	2:B:260:GLU:OE2	2.10	0.51
5:R:128:ALA:HA	5:R:131:TRP:CD1	2.44	0.51
2:B:271:CYS:HB2	2:B:290:ASP:HB2	1.92	0.50
1:A:68:VAL:O	1:A:71:VAL:HG12	2.11	0.50
4:E:4:LEU:HD12	4:E:110:PHE:HD2	1.76	0.50
1:A:35:ARG:HB3	1:A:76:PHE:HE2	1.77	0.50
3:C:29:LYS:HZ3	3:C:31:SER:H	1.60	0.50
4:E:157:ILE:HD11	4:E:245:LEU:HD11	1.93	0.49
3:C:57:SER:OG	3:C:58:GLU:OE1	2.25	0.49
5:R:236:CYS:HB3	5:R:268:SER:HB2	1.95	0.49
2:B:124:TYR:CE2	2:B:135:VAL:HG22	2.47	0.49
2:B:283:ARG:HD3	3:C:51:LEU:HD21	1.94	0.49
1:A:232:LEU:HD21	5:R:108:ALA:HB2	1.93	0.49
4:E:38:ARG:O	4:E:46:GLU:N	2.44	0.49
1:A:232:LEU:HD22	1:A:237:LEU:HD22	1.95	0.49
2:B:30:LEU:HD23	2:B:262:MET:HB2	1.96	0.48
5:R:55:LEU:HD22	5:R:269:VAL:HB	1.95	0.48
2:B:158:VAL:HG12	2:B:190:LEU:HD11	1.96	0.48
2:B:290:ASP:OD1	2:B:314:ARG:NE	2.44	0.48
1:A:56:LEU:O	1:A:63:GLU:HB2	2.13	0.48
4:E:12:VAL:HG21	4:E:86:LEU:HD13	1.95	0.48
3:C:25:ILE:HA	3:C:28:ILE:HG22	1.96	0.48
5:R:193:LEU:HB3	5:R:194:PRO:HD3	1.96	0.48
2:B:205:ASP:OD1	2:B:207:SER:OG	2.23	0.47
2:B:149:CYS:O	2:B:150:ARG:NH1	2.48	0.47
5:R:62:LYS:HB2	5:R:82:PHE:CZ	2.49	0.47
2:B:58:ILE:HA	2:B:74:SER:OG	2.15	0.47
1:A:44:SER:HA	1:A:103:ASP:HB2	1.97	0.46
2:B:279:SER:HB3	2:B:284:LEU:HB2	1.97	0.46
2:B:254:ASP:OD1	3:C:33:ALA:HB1	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:109:ASP:OD2	4:E:110:PHE:N	2.49	0.46
4:E:204:SER:O	4:E:214:LEU:HD12	2.15	0.46
2:B:232:ILE:HG13	2:B:243:THR:HG22	1.97	0.46
1:A:237:LEU:HD11	5:R:104:ARG:HG2	1.97	0.46
2:B:38:ASP:OD1	2:B:38:ASP:N	2.44	0.46
1:A:25:GLU:O	1:A:28:GLU:HG3	2.15	0.46
2:B:130:GLU:N	2:B:130:GLU:OE2	2.49	0.46
1:A:35:ARG:HB3	1:A:76:PHE:CE2	2.49	0.46
2:B:276:VAL:HG13	2:B:285:LEU:HD11	1.97	0.46
2:B:209:LYS:HD3	2:B:218:CYS:SG	2.56	0.45
2:B:27:ASP:HB2	3:C:29:LYS:HZ1	1.81	0.45
4:E:98:ARG:HH21	4:E:109:ASP:CG	2.19	0.45
4:E:172:THR:HG23	4:E:192:MET:HB2	1.98	0.45
5:R:23:ASN:HD21	5:R:52:ASP:HB3	1.81	0.45
4:E:150:THR:O	4:E:153:GLU:HG2	2.17	0.45
5:R:161:ASN:OD1	5:R:162:THR:N	2.50	0.45
2:B:286:LEU:HG	2:B:296:VAL:HG22	1.99	0.45
4:E:38:ARG:N	4:E:46:GLU:O	2.43	0.45
5:R:131:TRP:O	5:R:135:LEU:HD23	2.17	0.45
2:B:81:ILE:HB	2:B:91:HIS:HB2	1.98	0.45
1:A:98:ILE:HD11	1:A:126:LEU:HD22	1.99	0.44
3:C:59:ASN:O	3:C:62:ARG:HG2	2.17	0.44
1:A:152:ILE:HG22	1:A:156:PHE:HB2	2.00	0.44
2:B:225:HIS:CE1	2:B:251:ARG:HG2	2.52	0.44
1:A:42:ASP:N	1:A:42:ASP:OD1	2.50	0.44
1:A:85:ARG:HB2	1:A:88:TRP:CZ2	2.52	0.44
1:A:87:LYS:HA	1:A:87:LYS:HD2	1.66	0.44
2:B:261:LEU:HD12	2:B:261:LEU:HA	1.87	0.44
2:B:212:ASP:HB3	2:B:215:GLU:HG2	2.00	0.44
5:R:34:ALA:HA	5:R:42:LEU:HD13	2.00	0.44
2:B:139:LEU:HD23	2:B:139:LEU:HA	1.85	0.44
3:C:51:LEU:HD12	3:C:51:LEU:HA	1.87	0.43
5:R:53:LEU:HA	5:R:56:THR:HG22	2.00	0.43
5:R:54:LEU:HD22	5:R:89:PRO:HG3	2.00	0.43
4:E:52:SER:O	4:E:72:ARG:NH2	2.41	0.43
4:E:146:SER:OG	4:E:246:GLU:OE2	2.35	0.43
5:R:84:VAL:O	5:R:88:PHE:HB3	2.18	0.43
2:B:286:LEU:HD22	2:B:327:VAL:HG21	1.99	0.43
2:B:58:ILE:HG13	2:B:74:SER:OG	2.16	0.43
5:R:114:TYR:O	5:R:118:ARG:HB2	2.19	0.43
1:A:52:GLN:HE21	1:A:54:ARG:HE	1.65	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:155:VAL:HG12	4:E:216:ILE:HB	1.99	0.43
1:A:110:LEU:HD23	1:A:156:PHE:CE2	2.54	0.43
4:E:72:ARG:HD3	4:E:74:ASP:OD1	2.19	0.43
1:A:196:SER:OG	1:A:197:GLY:N	2.52	0.42
4:E:91:THR:HG22	4:E:119:VAL:HG13	2.01	0.42
5:R:12:TYR:CZ	5:R:62:LYS:HE3	2.55	0.42
1:A:52:GLN:HE21	1:A:54:ARG:NE	2.18	0.42
2:B:180:PHE:CE2	2:B:216:GLY:HA2	2.54	0.42
2:B:67:SER:O	2:B:67:SER:OG	2.36	0.42
5:R:12:TYR:CE1	5:R:62:LYS:HE3	2.54	0.42
5:R:72:TRP:CZ3	5:R:79:CYS:HA	2.55	0.42
1:A:171:GLU:HG3	1:A:172:PRO:HD3	2.01	0.42
2:B:271:CYS:SG	2:B:289:TYR:HB3	2.60	0.42
5:R:228:GLY:HA2	5:R:231:LEU:HG	2.02	0.42
2:B:275:SER:OG	2:B:316:SER:O	2.37	0.41
1:A:52:GLN:NE2	1:A:54:ARG:HB2	2.35	0.41
4:E:71:SER:OG	4:E:80:PHE:HB2	2.20	0.41
2:B:54:HIS:NE2	2:B:72:SER:OG	2.42	0.41
4:E:174:LEU:HD13	4:E:212:PHE:CG	2.55	0.41
4:E:190:TYR:CZ	4:E:194:ASN:HB3	2.54	0.41
5:R:142:PHE:HD2	6:R:401:2YB:H13	1.86	0.41
2:B:34:THR:HG21	2:B:300:LEU:O	2.21	0.41
5:R:96:PHE:CD1	5:R:130:ILE:HD11	2.55	0.41
1:A:69:ASP:OD1	1:A:217:ARG:NH2	2.54	0.41
2:B:17:GLN:OE1	3:C:19:LEU:HD12	2.20	0.41
4:E:38:ARG:HG3	4:E:92:ALA:CB	2.51	0.41
2:B:180:PHE:HB3	2:B:211:TRP:CZ3	2.55	0.41
4:E:200:PRO:HG2	4:E:203:PHE:CE1	2.55	0.41
2:B:247:ASP:OD1	2:B:249:THR:HG22	2.20	0.41
2:B:249:THR:CG2	2:B:251:ARG:HE	2.33	0.41
2:B:254:ASP:OD2	2:B:255:LEU:N	2.53	0.41
5:R:88:PHE:HZ	5:R:131:TRP:HZ3	1.67	0.41
5:R:106:LEU:HD23	5:R:106:LEU:HA	1.88	0.41
5:R:274:LEU:HD23	5:R:274:LEU:HA	1.90	0.41
3:C:14:LYS:NZ	3:C:18:GLN:OE1	2.54	0.40
3:C:48:ASP:OD1	3:C:48:ASP:N	2.43	0.40
2:B:186:ASP:HB2	2:B:204:CYS:SG	2.61	0.40
2:B:14:LEU:HD13	3:C:15:LEU:HB2	2.03	0.40
2:B:110:ASN:HD22	2:B:127:LYS:HD2	1.87	0.40
2:B:183:HIS:HD1	2:B:187:VAL:HG22	1.85	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	232/238 (98%)	226 (97%)	6 (3%)	0	100	100
2	B	335/340 (98%)	320 (96%)	15 (4%)	0	100	100
3	C	56/82 (68%)	55 (98%)	1 (2%)	0	100	100
4	E	228/318 (72%)	221 (97%)	7 (3%)	0	100	100
5	R	267/501 (53%)	256 (96%)	11 (4%)	0	100	100
All	All	1118/1479 (76%)	1078 (96%)	40 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 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	200/212 (94%)	200 (100%)	0	100	100
2	B	275/283 (97%)	275 (100%)	0	100	100
3	C	37/66 (56%)	37 (100%)	0	100	100
4	E	196/262 (75%)	196 (100%)	0	100	100
5	R	195/391 (50%)	195 (100%)	0	100	100
All	All	903/1214 (74%)	903 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	52	GLN
5	R	23	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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is 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	$\# Z  > 2$
6	2YB	R	401	-	40,40,40	2.65	11 (27%)	53,57,57	1.60	8 (15%)

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
6	2YB	R	401	-	-	4/21/30/30	0/4/4/4

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	R	401	2YB	C15-C14	-6.17	1.39	1.51
6	R	401	2YB	C1-C2	-6.12	1.39	1.51
6	R	401	2YB	C16-C17	-5.66	1.39	1.50
6	R	401	2YB	C26-C27	-5.30	1.33	1.39
6	R	401	2YB	C22-C21	-4.72	1.39	1.50
6	R	401	2YB	O11-S9	4.67	1.53	1.44
6	R	401	2YB	C27-C28	-4.65	1.38	1.51
6	R	401	2YB	O12-S9	4.59	1.53	1.44
6	R	401	2YB	C36-C27	-4.38	1.34	1.38
6	R	401	2YB	C8-S9	3.80	1.83	1.78
6	R	401	2YB	C37-C36	-3.15	1.33	1.38

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	R	401	2YB	C34-O35-C36	-5.30	101.53	106.83
6	R	401	2YB	C37-C36-C27	-4.64	119.46	123.75
6	R	401	2YB	O12-S9-O11	-4.07	109.58	117.22
6	R	401	2YB	C26-C27-C36	3.77	122.13	119.45
6	R	401	2YB	C22-O23-C24	-2.72	111.15	117.62
6	R	401	2YB	C6-O5-C4	-2.30	111.94	117.93
6	R	401	2YB	C28-C30-C31	-2.28	109.36	113.59
6	R	401	2YB	C36-C27-C28	-2.01	106.83	108.76

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	R	401	2YB	C6-C7-C8-S9
6	R	401	2YB	C7-C8-S9-C10
6	R	401	2YB	C28-C30-C31-O32
6	R	401	2YB	C28-C30-C31-O33

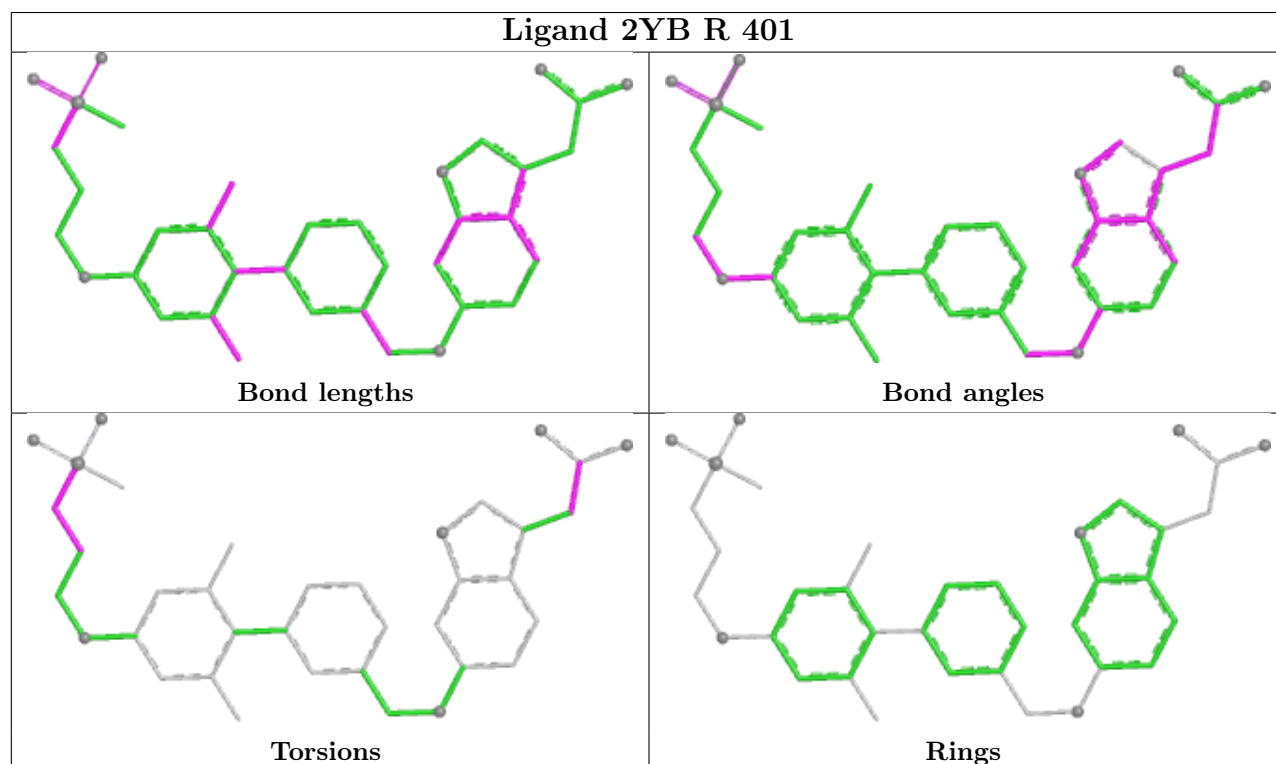
There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	R	401	2YB	2	0

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.

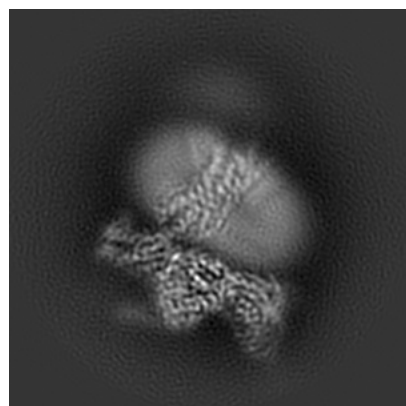
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-28177. These allow visual inspection of the internal detail of the map and identification of artifacts.

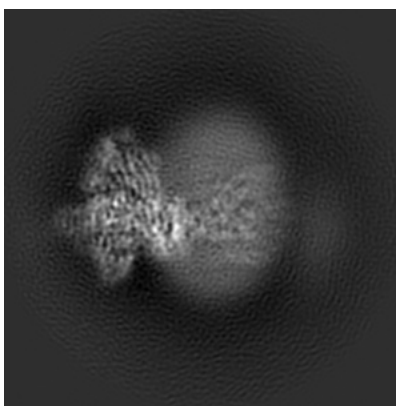
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

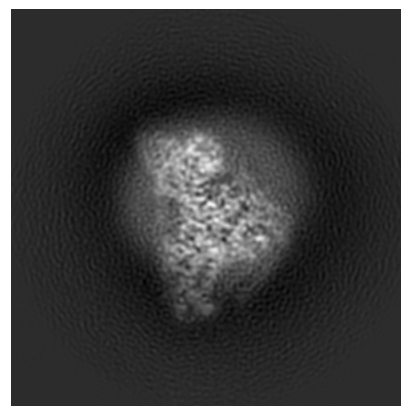
#### 6.1.1 Primary map



X

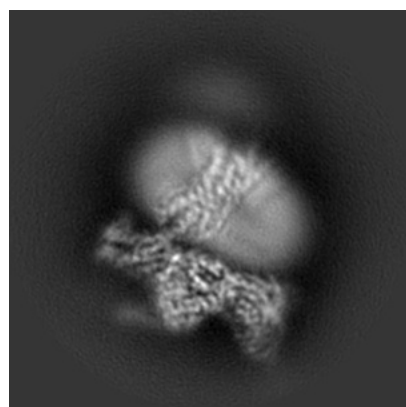


Y

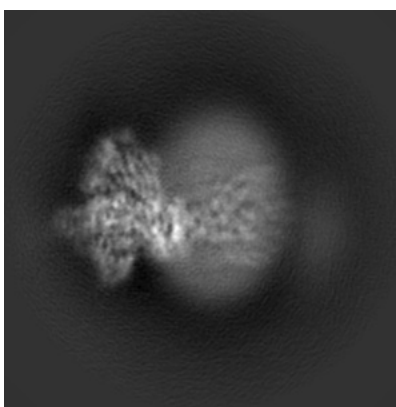


Z

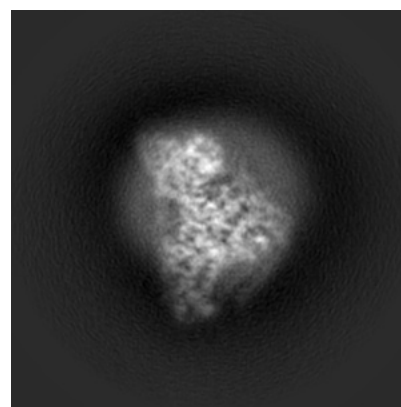
#### 6.1.2 Raw map



X



Y



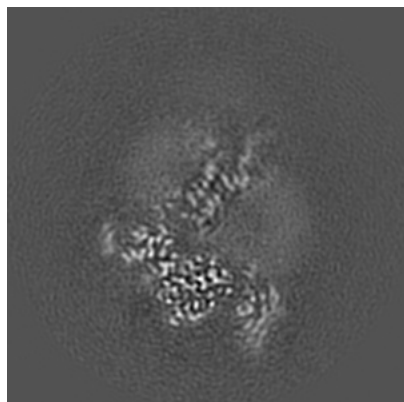
Z

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

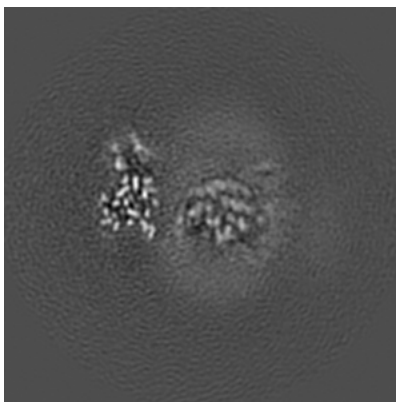


## 6.2 Central slices [i](#)

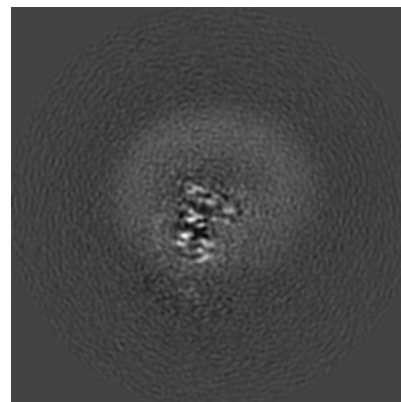
### 6.2.1 Primary map



X Index: 100

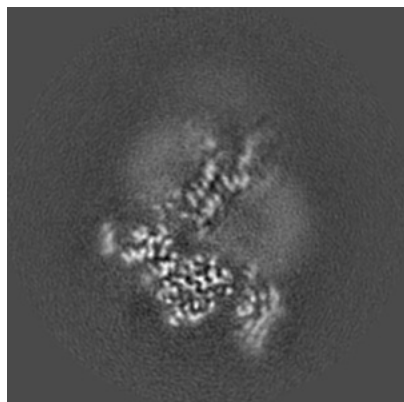


Y Index: 100

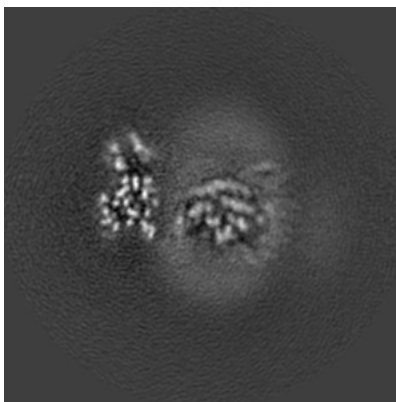


Z Index: 100

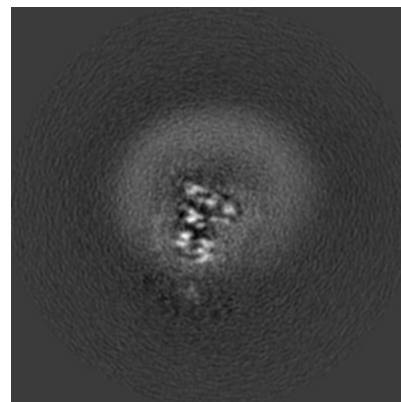
### 6.2.2 Raw map



X Index: 100



Y Index: 100

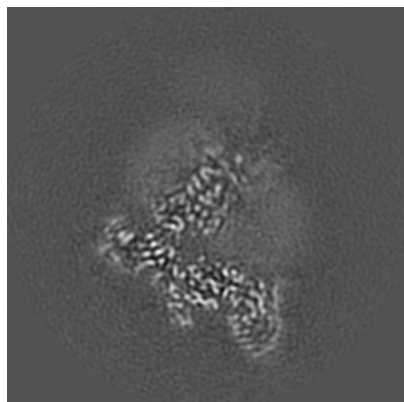


Z Index: 100

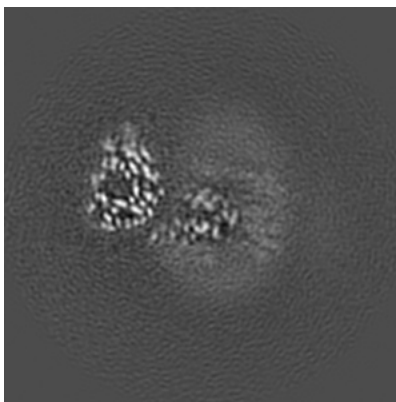
The images above show central slices of the map in three orthogonal directions.

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

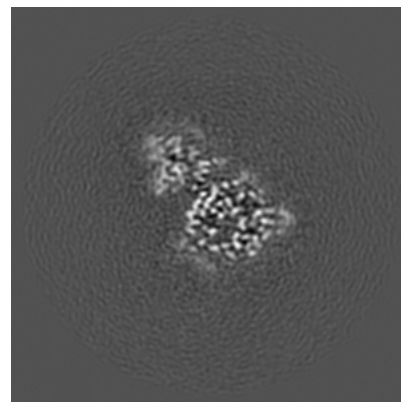
### 6.3.1 Primary map



X Index: 93

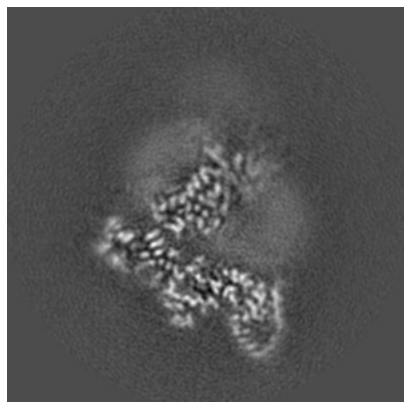


Y Index: 93

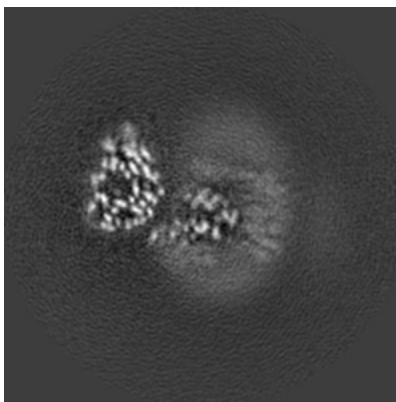


Z Index: 62

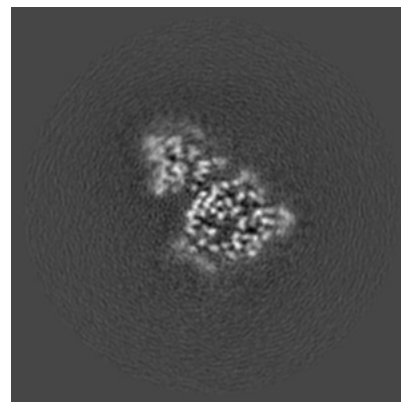
### 6.3.2 Raw map



X Index: 94



Y Index: 93

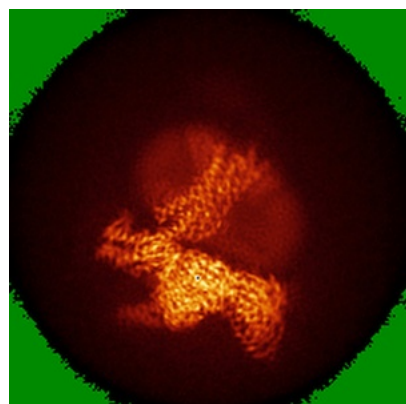


Z Index: 62

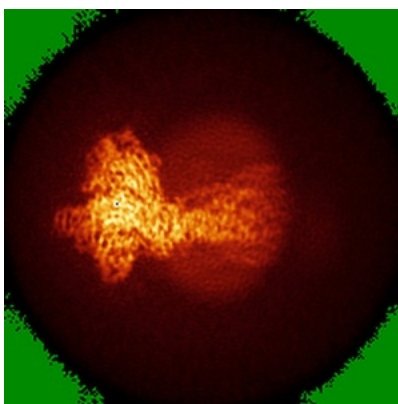
The images above show the largest variance slices of the map in three orthogonal directions.

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

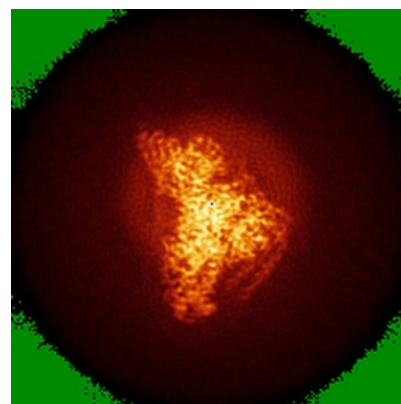
### 6.4.1 Primary map



X

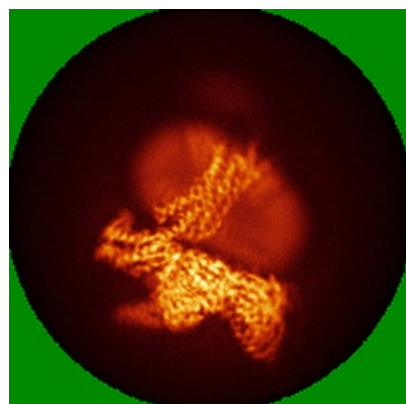


Y

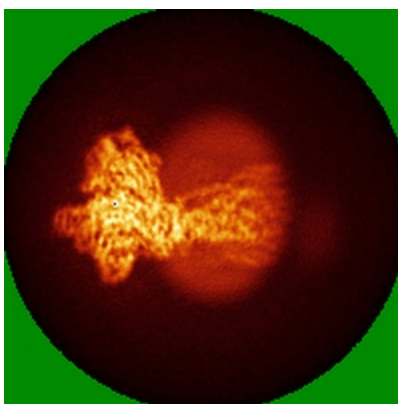


Z

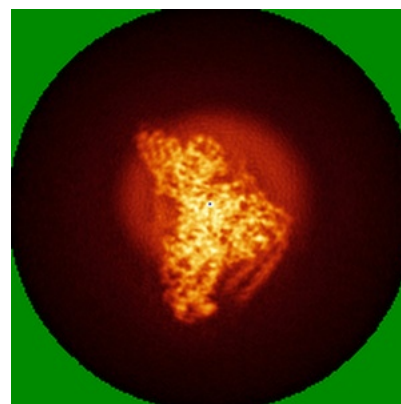
### 6.4.2 Raw map



X



Y

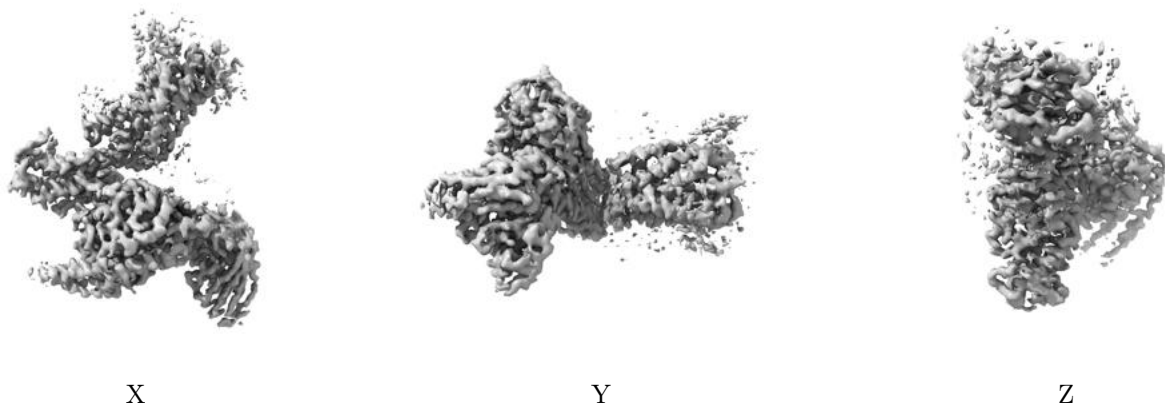


Z

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.

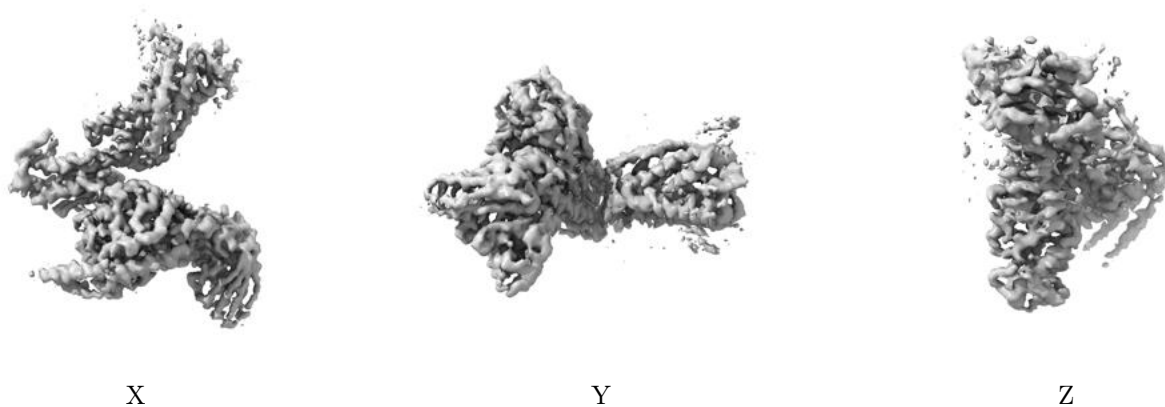
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.023. 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.

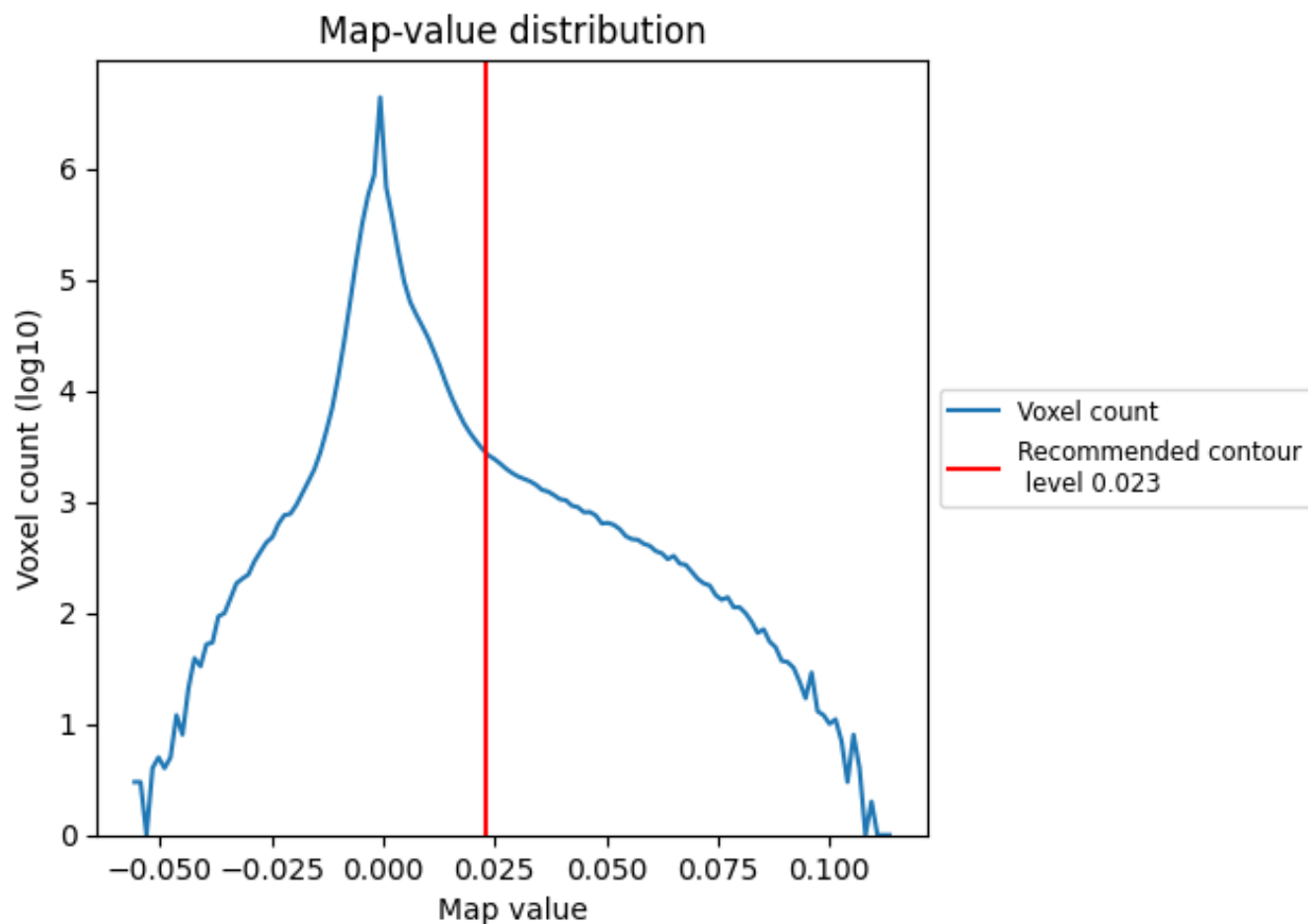
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

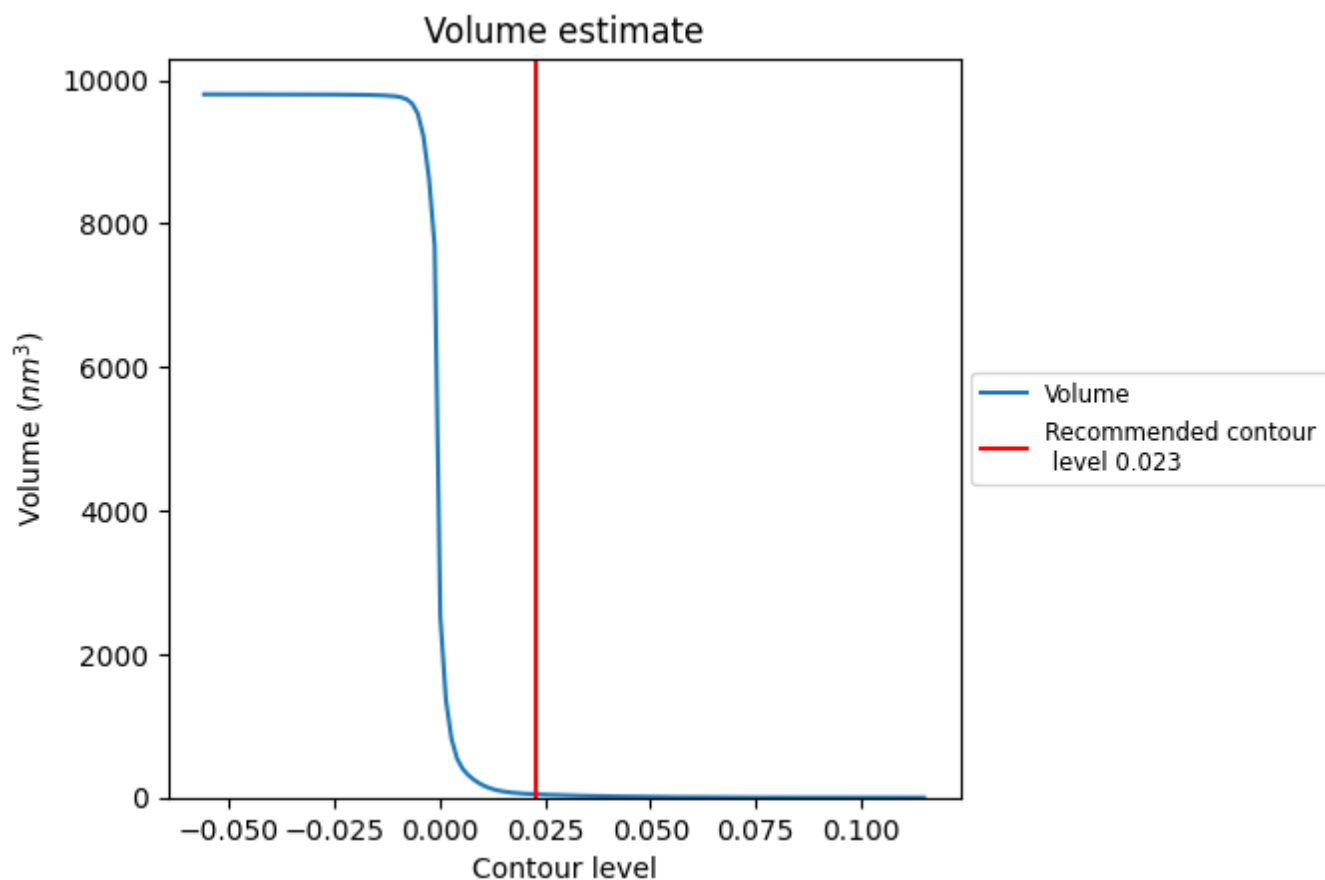
This section contains the results of statistical analysis of the map.

### 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.

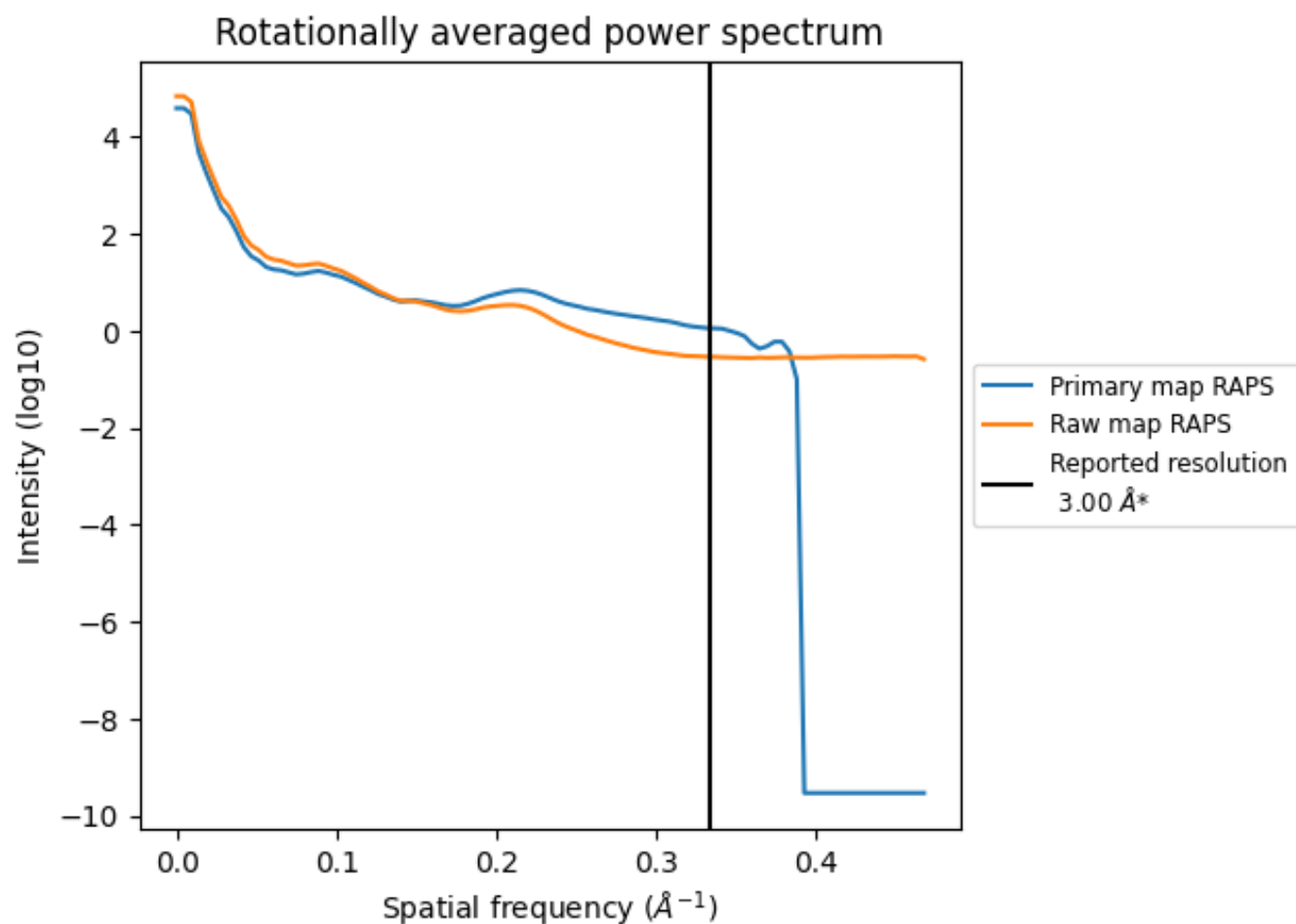
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 45 nm<sup>3</sup>; this corresponds to an approximate mass of 41 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 ⓘ



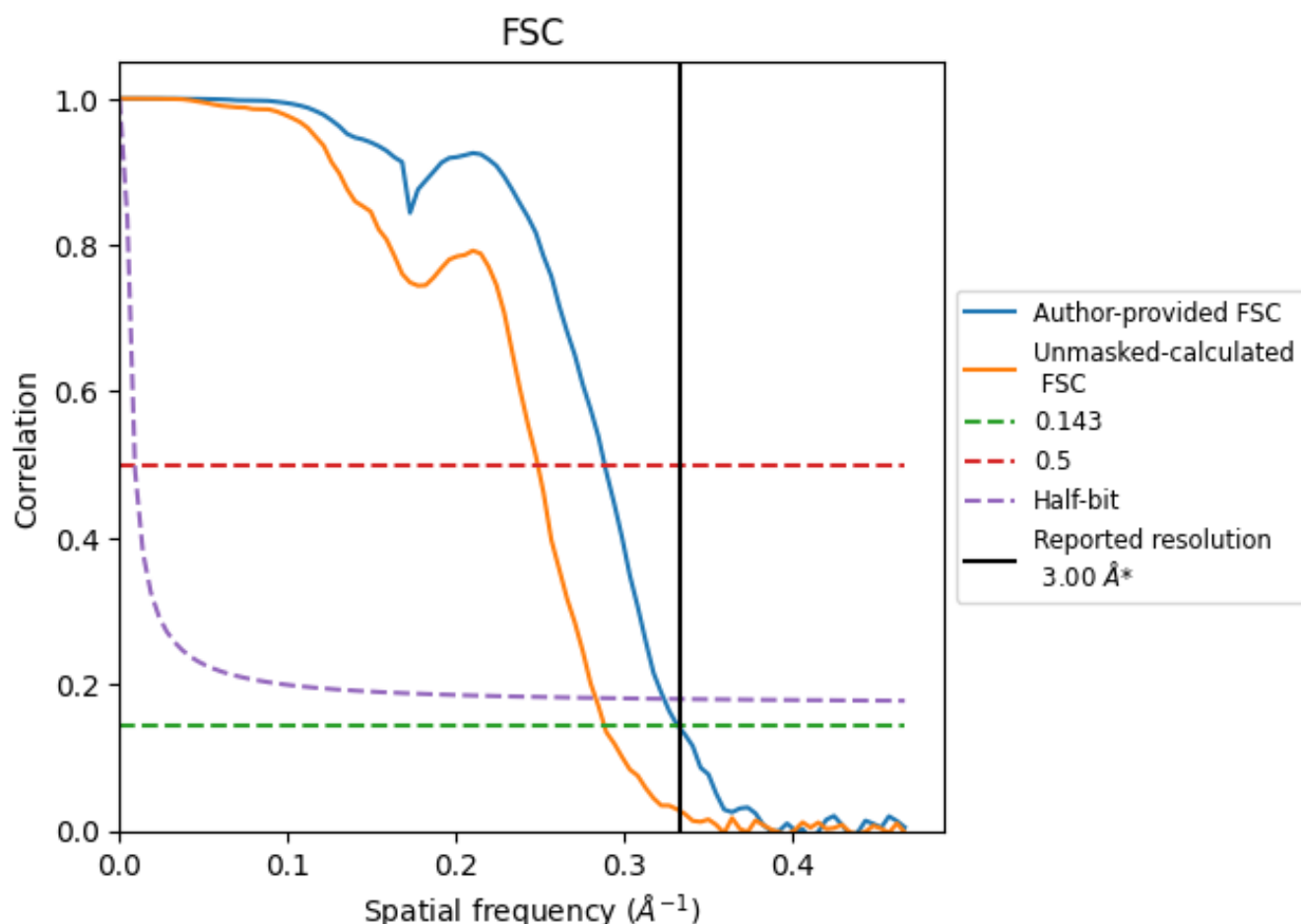
\*Reported resolution corresponds to spatial frequency of 0.333 Å<sup>-1</sup>



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

## 8.2 Resolution estimates [i](#)

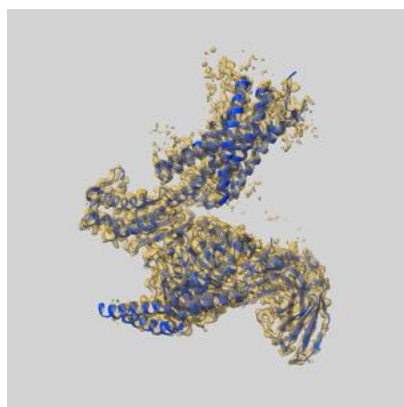
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	3.01	3.46	3.09
Unmasked-calculated*	3.47	4.02	3.53

\*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 3.47 differs from the reported value 3.0 by more than 10 %

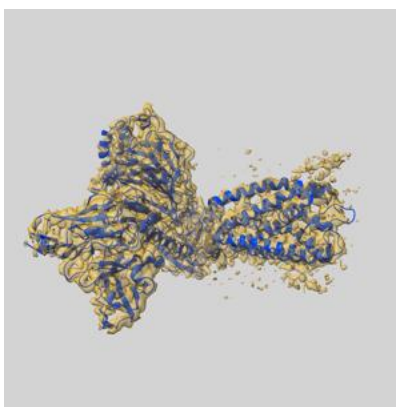
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-28177 and PDB model 8EJC. Per-residue inclusion information can be found in section 3 on page 10.

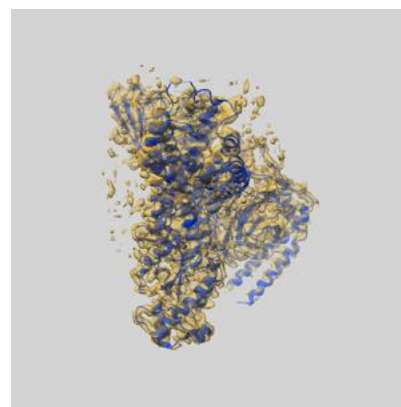
### 9.1 Map-model overlay [i](#)



X



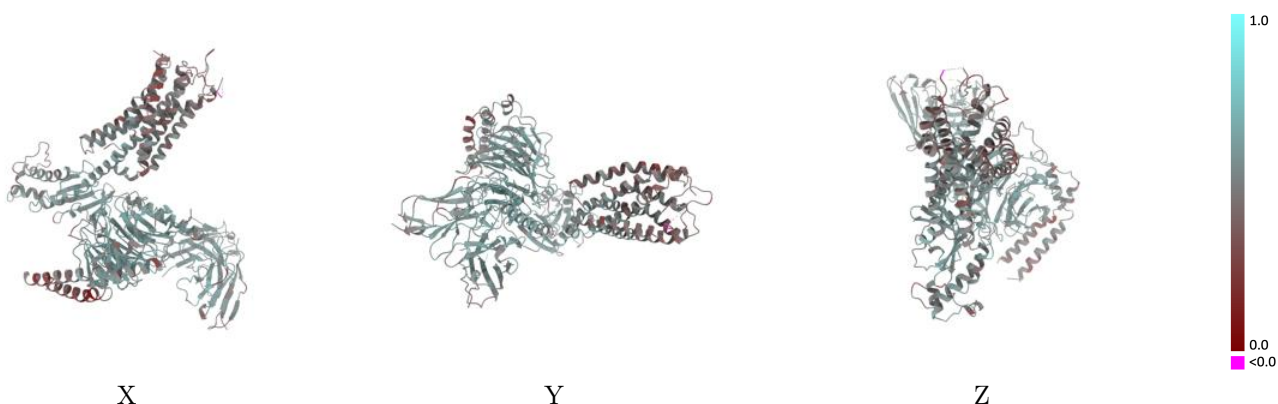
Y



Z

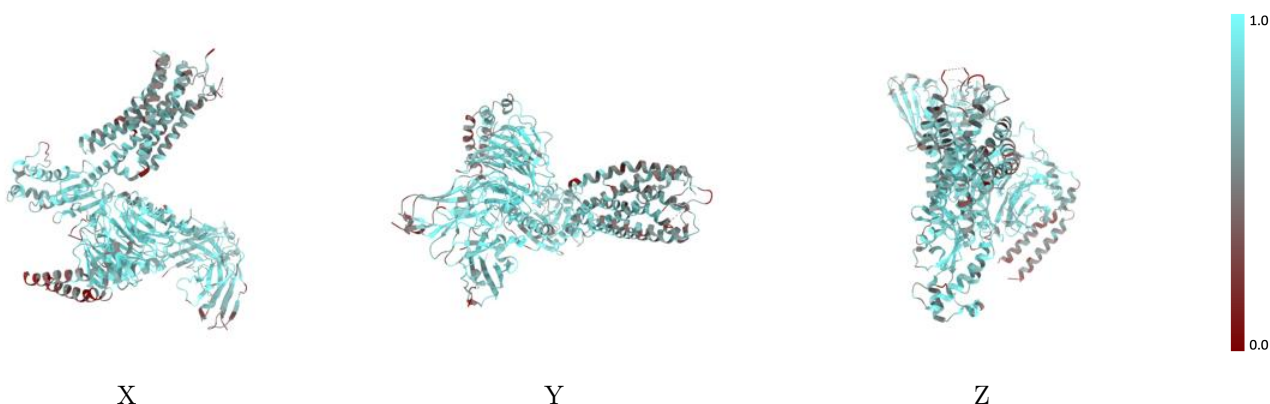
The images above show the 3D surface view of the map at the recommended contour level 0.023 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



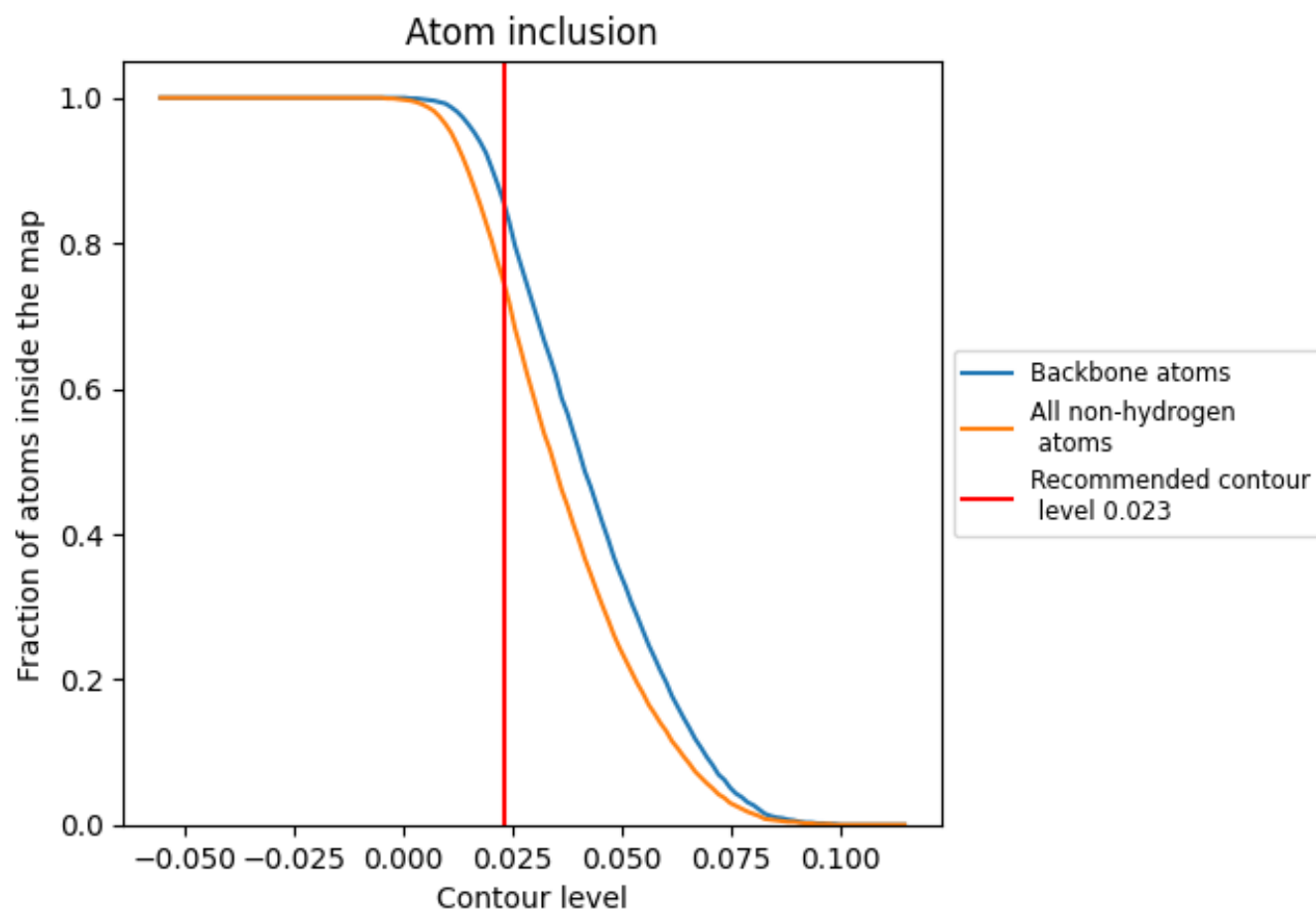
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.023).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 74% 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 (0.023) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.7450	<div></div> 0.5220
A	<div></div> 0.7580	<div></div> 0.5290
B	<div></div> 0.8370	<div></div> 0.5690
C	<div></div> 0.5860	<div></div> 0.4250
E	<div></div> 0.7710	<div></div> 0.5450
R	<div></div> 0.6270	<div></div> 0.4530

