Full wwPDB EM Validation Report

Oct 15, 2024 – 03:19 AM EDT

PDB ID	:	8VRW
EMDB ID	:	EMD-43488
Title	:	Cryo-EM structure of human invariant chain in complex with HLA-DR15
Authors	:	Wang, N.; Caveney, N.A.; Jude, K.M.; Garcia, K.C.
Deposited on	:	2024-01-22
Resolution	:	3.03 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

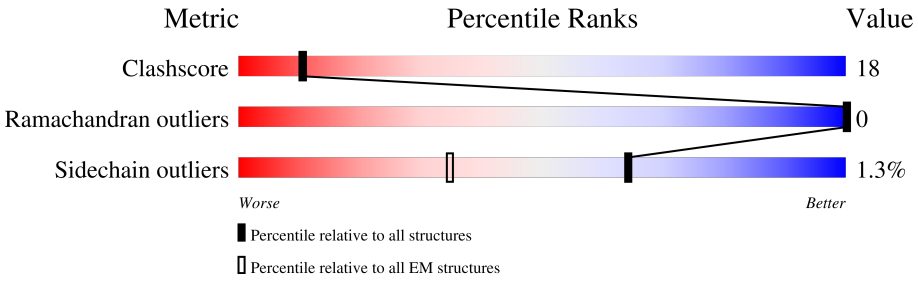
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.03 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 >=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 <=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	288	42% 20% 38%
1	D	288	43% 19% 38%
1	G	288	42% 20% 38%
2	B	300	44% 18% 37%
2	E	300	44% 18% 37%
2	H	300	43% 19% 37%
3	C	308	13% 6% 82%
3	F	308	13% 6% 82%

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Mol	Chain	Length	Quality of chain
3	I	308	13% 6% 82%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 10413 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 HLA class II histocompatibility antigen, DR alpha chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	180	Total	C	N	O	S	0	0
			1478	957	240	276	5		
1	D	180	Total	C	N	O	S	0	0
			1478	957	240	276	5		
1	G	180	Total	C	N	O	S	0	0
			1478	957	240	276	5		

There are 102 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	230	ALA	-	expression tag	UNP P01903
A	231	ALA	-	expression tag	UNP P01903
A	232	ALA	-	expression tag	UNP P01903
A	233	LEU	-	expression tag	UNP P01903
A	234	GLU	-	expression tag	UNP P01903
A	235	VAL	-	expression tag	UNP P01903
A	236	LEU	-	expression tag	UNP P01903
A	237	PHE	-	expression tag	UNP P01903
A	238	GLN	-	expression tag	UNP P01903
A	239	GLY	-	expression tag	UNP P01903
A	240	PRO	-	expression tag	UNP P01903
A	241	GLY	-	expression tag	UNP P01903
A	242	ALA	-	expression tag	UNP P01903
A	243	ALA	-	expression tag	UNP P01903
A	244	GLU	-	expression tag	UNP P01903
A	245	ASP	-	expression tag	UNP P01903
A	246	GLN	-	expression tag	UNP P01903
A	247	VAL	-	expression tag	UNP P01903
A	248	ASP	-	expression tag	UNP P01903
A	249	PRO	-	expression tag	UNP P01903
A	250	ARG	-	expression tag	UNP P01903
A	251	LEU	-	expression tag	UNP P01903
A	252	ILE	-	expression tag	UNP P01903
A	253	ASP	-	expression tag	UNP P01903

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Chain	Residue	Modelled	Actual	Comment	Reference
A	254	GLY	-	expression tag	UNP P01903
A	255	LYS	-	expression tag	UNP P01903
A	256	HIS	-	expression tag	UNP P01903
A	257	HIS	-	expression tag	UNP P01903
A	258	HIS	-	expression tag	UNP P01903
A	259	HIS	-	expression tag	UNP P01903
A	260	HIS	-	expression tag	UNP P01903
A	261	HIS	-	expression tag	UNP P01903
A	262	HIS	-	expression tag	UNP P01903
A	263	HIS	-	expression tag	UNP P01903
D	230	ALA	-	expression tag	UNP P01903
D	231	ALA	-	expression tag	UNP P01903
D	232	ALA	-	expression tag	UNP P01903
D	233	LEU	-	expression tag	UNP P01903
D	234	GLU	-	expression tag	UNP P01903
D	235	VAL	-	expression tag	UNP P01903
D	236	LEU	-	expression tag	UNP P01903
D	237	PHE	-	expression tag	UNP P01903
D	238	GLN	-	expression tag	UNP P01903
D	239	GLY	-	expression tag	UNP P01903
D	240	PRO	-	expression tag	UNP P01903
D	241	GLY	-	expression tag	UNP P01903
D	242	ALA	-	expression tag	UNP P01903
D	243	ALA	-	expression tag	UNP P01903
D	244	GLU	-	expression tag	UNP P01903
D	245	ASP	-	expression tag	UNP P01903
D	246	GLN	-	expression tag	UNP P01903
D	247	VAL	-	expression tag	UNP P01903
D	248	ASP	-	expression tag	UNP P01903
D	249	PRO	-	expression tag	UNP P01903
D	250	ARG	-	expression tag	UNP P01903
D	251	LEU	-	expression tag	UNP P01903
D	252	ILE	-	expression tag	UNP P01903
D	253	ASP	-	expression tag	UNP P01903
D	254	GLY	-	expression tag	UNP P01903
D	255	LYS	-	expression tag	UNP P01903
D	256	HIS	-	expression tag	UNP P01903
D	257	HIS	-	expression tag	UNP P01903
D	258	HIS	-	expression tag	UNP P01903
D	259	HIS	-	expression tag	UNP P01903
D	260	HIS	-	expression tag	UNP P01903
D	261	HIS	-	expression tag	UNP P01903

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Chain	Residue	Modelled	Actual	Comment	Reference
D	262	HIS	-	expression tag	UNP P01903
D	263	HIS	-	expression tag	UNP P01903
G	230	ALA	-	expression tag	UNP P01903
G	231	ALA	-	expression tag	UNP P01903
G	232	ALA	-	expression tag	UNP P01903
G	233	LEU	-	expression tag	UNP P01903
G	234	GLU	-	expression tag	UNP P01903
G	235	VAL	-	expression tag	UNP P01903
G	236	LEU	-	expression tag	UNP P01903
G	237	PHE	-	expression tag	UNP P01903
G	238	GLN	-	expression tag	UNP P01903
G	239	GLY	-	expression tag	UNP P01903
G	240	PRO	-	expression tag	UNP P01903
G	241	GLY	-	expression tag	UNP P01903
G	242	ALA	-	expression tag	UNP P01903
G	243	ALA	-	expression tag	UNP P01903
G	244	GLU	-	expression tag	UNP P01903
G	245	ASP	-	expression tag	UNP P01903
G	246	GLN	-	expression tag	UNP P01903
G	247	VAL	-	expression tag	UNP P01903
G	248	ASP	-	expression tag	UNP P01903
G	249	PRO	-	expression tag	UNP P01903
G	250	ARG	-	expression tag	UNP P01903
G	251	LEU	-	expression tag	UNP P01903
G	252	ILE	-	expression tag	UNP P01903
G	253	ASP	-	expression tag	UNP P01903
G	254	GLY	-	expression tag	UNP P01903
G	255	LYS	-	expression tag	UNP P01903
G	256	HIS	-	expression tag	UNP P01903
G	257	HIS	-	expression tag	UNP P01903
G	258	HIS	-	expression tag	UNP P01903
G	259	HIS	-	expression tag	UNP P01903
G	260	HIS	-	expression tag	UNP P01903
G	261	HIS	-	expression tag	UNP P01903
G	262	HIS	-	expression tag	UNP P01903
G	263	HIS	-	expression tag	UNP P01903

- Molecule 2 is a protein called HLA class II histocompatibility antigen, DRB1 beta chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	188	Total	C	N	O	S	0	0
			1548	980	275	287	6		

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	188	Total	C	N	O	S	0	0
			1548	980	275	287	6		
2	H	188	Total	C	N	O	S	0	0
			1548	980	275	287	6		

There are 102 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	238	ALA	-	expression tag	UNP P01911
B	239	ALA	-	expression tag	UNP P01911
B	240	ALA	-	expression tag	UNP P01911
B	241	LEU	-	expression tag	UNP P01911
B	242	GLU	-	expression tag	UNP P01911
B	243	VAL	-	expression tag	UNP P01911
B	244	LEU	-	expression tag	UNP P01911
B	245	PHE	-	expression tag	UNP P01911
B	246	GLN	-	expression tag	UNP P01911
B	247	GLY	-	expression tag	UNP P01911
B	248	PRO	-	expression tag	UNP P01911
B	249	GLY	-	expression tag	UNP P01911
B	250	ALA	-	expression tag	UNP P01911
B	251	ALA	-	expression tag	UNP P01911
B	252	GLU	-	expression tag	UNP P01911
B	253	ASP	-	expression tag	UNP P01911
B	254	GLN	-	expression tag	UNP P01911
B	255	VAL	-	expression tag	UNP P01911
B	256	ASP	-	expression tag	UNP P01911
B	257	PRO	-	expression tag	UNP P01911
B	258	ARG	-	expression tag	UNP P01911
B	259	LEU	-	expression tag	UNP P01911
B	260	ILE	-	expression tag	UNP P01911
B	261	ASP	-	expression tag	UNP P01911
B	262	GLY	-	expression tag	UNP P01911
B	263	LYS	-	expression tag	UNP P01911
B	264	HIS	-	expression tag	UNP P01911
B	265	HIS	-	expression tag	UNP P01911
B	266	HIS	-	expression tag	UNP P01911
B	267	HIS	-	expression tag	UNP P01911
B	268	HIS	-	expression tag	UNP P01911
B	269	HIS	-	expression tag	UNP P01911
B	270	HIS	-	expression tag	UNP P01911
B	271	HIS	-	expression tag	UNP P01911

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Chain	Residue	Modelled	Actual	Comment	Reference
E	238	ALA	-	expression tag	UNP P01911
E	239	ALA	-	expression tag	UNP P01911
E	240	ALA	-	expression tag	UNP P01911
E	241	LEU	-	expression tag	UNP P01911
E	242	GLU	-	expression tag	UNP P01911
E	243	VAL	-	expression tag	UNP P01911
E	244	LEU	-	expression tag	UNP P01911
E	245	PHE	-	expression tag	UNP P01911
E	246	GLN	-	expression tag	UNP P01911
E	247	GLY	-	expression tag	UNP P01911
E	248	PRO	-	expression tag	UNP P01911
E	249	GLY	-	expression tag	UNP P01911
E	250	ALA	-	expression tag	UNP P01911
E	251	ALA	-	expression tag	UNP P01911
E	252	GLU	-	expression tag	UNP P01911
E	253	ASP	-	expression tag	UNP P01911
E	254	GLN	-	expression tag	UNP P01911
E	255	VAL	-	expression tag	UNP P01911
E	256	ASP	-	expression tag	UNP P01911
E	257	PRO	-	expression tag	UNP P01911
E	258	ARG	-	expression tag	UNP P01911
E	259	LEU	-	expression tag	UNP P01911
E	260	ILE	-	expression tag	UNP P01911
E	261	ASP	-	expression tag	UNP P01911
E	262	GLY	-	expression tag	UNP P01911
E	263	LYS	-	expression tag	UNP P01911
E	264	HIS	-	expression tag	UNP P01911
E	265	HIS	-	expression tag	UNP P01911
E	266	HIS	-	expression tag	UNP P01911
E	267	HIS	-	expression tag	UNP P01911
E	268	HIS	-	expression tag	UNP P01911
E	269	HIS	-	expression tag	UNP P01911
E	270	HIS	-	expression tag	UNP P01911
E	271	HIS	-	expression tag	UNP P01911
H	238	ALA	-	expression tag	UNP P01911
H	239	ALA	-	expression tag	UNP P01911
H	240	ALA	-	expression tag	UNP P01911
H	241	LEU	-	expression tag	UNP P01911
H	242	GLU	-	expression tag	UNP P01911
H	243	VAL	-	expression tag	UNP P01911
H	244	LEU	-	expression tag	UNP P01911
H	245	PHE	-	expression tag	UNP P01911

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Chain	Residue	Modelled	Actual	Comment	Reference
H	246	GLN	-	expression tag	UNP P01911
H	247	GLY	-	expression tag	UNP P01911
H	248	PRO	-	expression tag	UNP P01911
H	249	GLY	-	expression tag	UNP P01911
H	250	ALA	-	expression tag	UNP P01911
H	251	ALA	-	expression tag	UNP P01911
H	252	GLU	-	expression tag	UNP P01911
H	253	ASP	-	expression tag	UNP P01911
H	254	GLN	-	expression tag	UNP P01911
H	255	VAL	-	expression tag	UNP P01911
H	256	ASP	-	expression tag	UNP P01911
H	257	PRO	-	expression tag	UNP P01911
H	258	ARG	-	expression tag	UNP P01911
H	259	LEU	-	expression tag	UNP P01911
H	260	ILE	-	expression tag	UNP P01911
H	261	ASP	-	expression tag	UNP P01911
H	262	GLY	-	expression tag	UNP P01911
H	263	LYS	-	expression tag	UNP P01911
H	264	HIS	-	expression tag	UNP P01911
H	265	HIS	-	expression tag	UNP P01911
H	266	HIS	-	expression tag	UNP P01911
H	267	HIS	-	expression tag	UNP P01911
H	268	HIS	-	expression tag	UNP P01911
H	269	HIS	-	expression tag	UNP P01911
H	270	HIS	-	expression tag	UNP P01911
H	271	HIS	-	expression tag	UNP P01911

- Molecule 3 is a protein called HLA class II histocompatibility antigen gamma chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	56	Total	C	N	O	S	0	0
			445	284	79	78	4		
3	F	56	Total	C	N	O	S	0	0
			445	284	79	78	4		
3	I	56	Total	C	N	O	S	0	0
			445	284	79	78	4		

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-11	MET	-	initiating methionine	UNP P04233
C	-10	ASP	-	expression tag	UNP P04233

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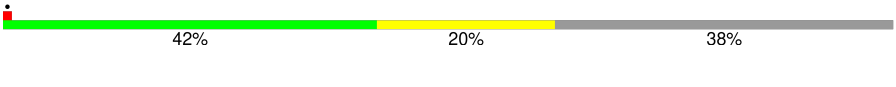
Chain	Residue	Modelled	Actual	Comment	Reference
C	-9	TYR	-	expression tag	UNP P04233
C	-8	LYS	-	expression tag	UNP P04233
C	-7	ASP	-	expression tag	UNP P04233
C	-6	ASP	-	expression tag	UNP P04233
C	-5	ASP	-	expression tag	UNP P04233
C	-4	ASP	-	expression tag	UNP P04233
C	-3	ALA	-	expression tag	UNP P04233
C	-2	GLY	-	expression tag	UNP P04233
C	-1	THR	-	expression tag	UNP P04233
C	0	SER	-	expression tag	UNP P04233
C	1	ARG	-	expression tag	UNP P04233
F	-11	MET	-	initiating methionine	UNP P04233
F	-10	ASP	-	expression tag	UNP P04233
F	-9	TYR	-	expression tag	UNP P04233
F	-8	LYS	-	expression tag	UNP P04233
F	-7	ASP	-	expression tag	UNP P04233
F	-6	ASP	-	expression tag	UNP P04233
F	-5	ASP	-	expression tag	UNP P04233
F	-4	ASP	-	expression tag	UNP P04233
F	-3	ALA	-	expression tag	UNP P04233
F	-2	GLY	-	expression tag	UNP P04233
F	-1	THR	-	expression tag	UNP P04233
F	0	SER	-	expression tag	UNP P04233
F	1	ARG	-	expression tag	UNP P04233
I	-11	MET	-	initiating methionine	UNP P04233
I	-10	ASP	-	expression tag	UNP P04233
I	-9	TYR	-	expression tag	UNP P04233
I	-8	LYS	-	expression tag	UNP P04233
I	-7	ASP	-	expression tag	UNP P04233
I	-6	ASP	-	expression tag	UNP P04233
I	-5	ASP	-	expression tag	UNP P04233
I	-4	ASP	-	expression tag	UNP P04233
I	-3	ALA	-	expression tag	UNP P04233
I	-2	GLY	-	expression tag	UNP P04233
I	-1	THR	-	expression tag	UNP P04233
I	0	SER	-	expression tag	UNP P04233
I	1	ARG	-	expression tag	UNP P04233

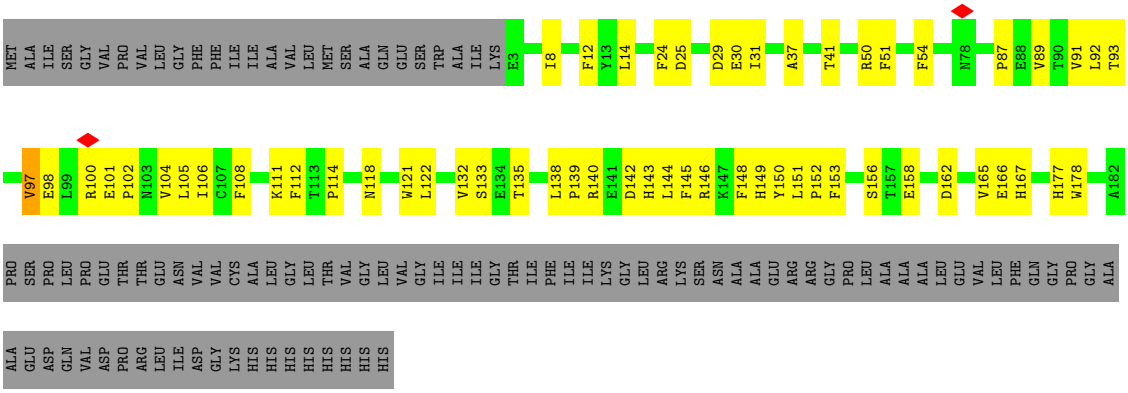
3 Residue-property plots (i)

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: HLA class II histocompatibility antigen, DR alpha chain

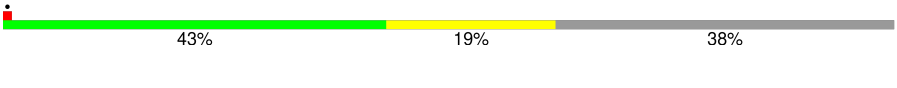
Chain A:

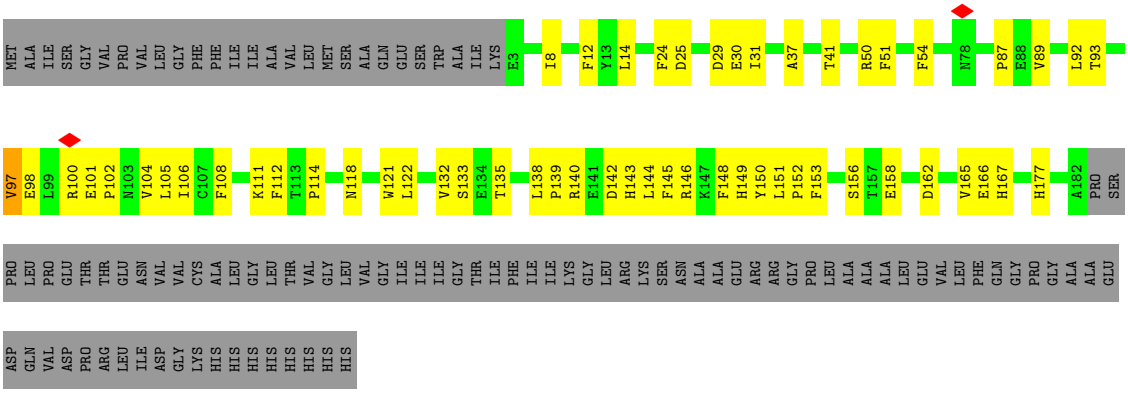




• Molecule 1: HLA class II histocompatibility antigen, DR alpha chain

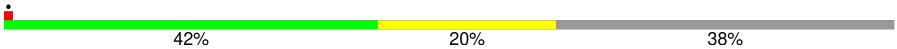
Chain D:

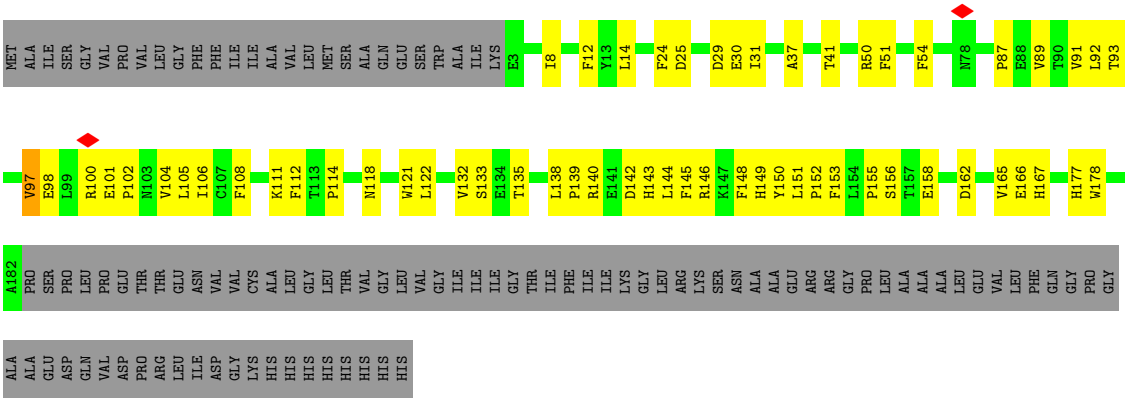




• Molecule 1: HLA class II histocompatibility antigen, DR alpha chain

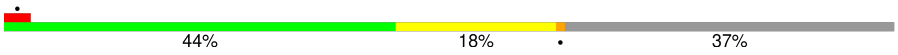
Chain G:

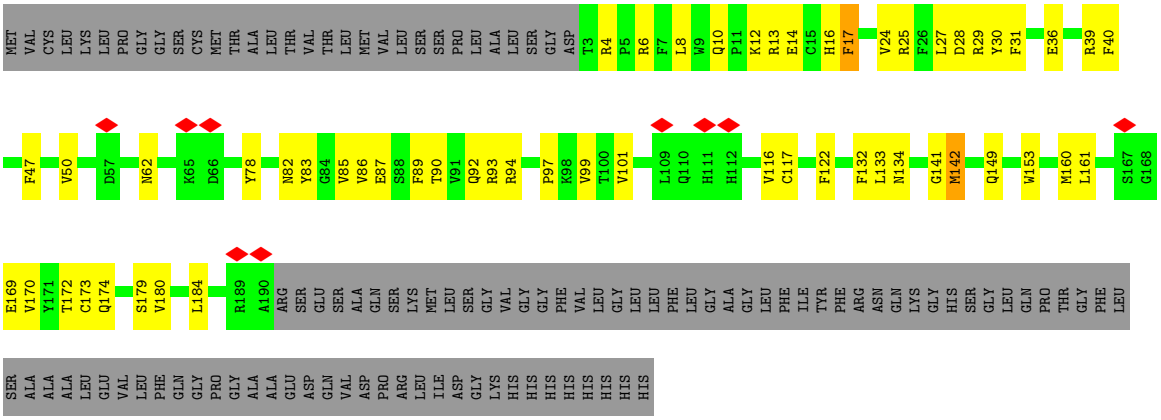




• Molecule 2: HLA class II histocompatibility antigen, DRB1 beta chain

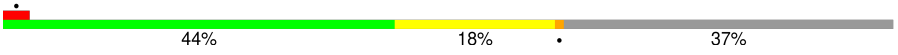
Chain B:

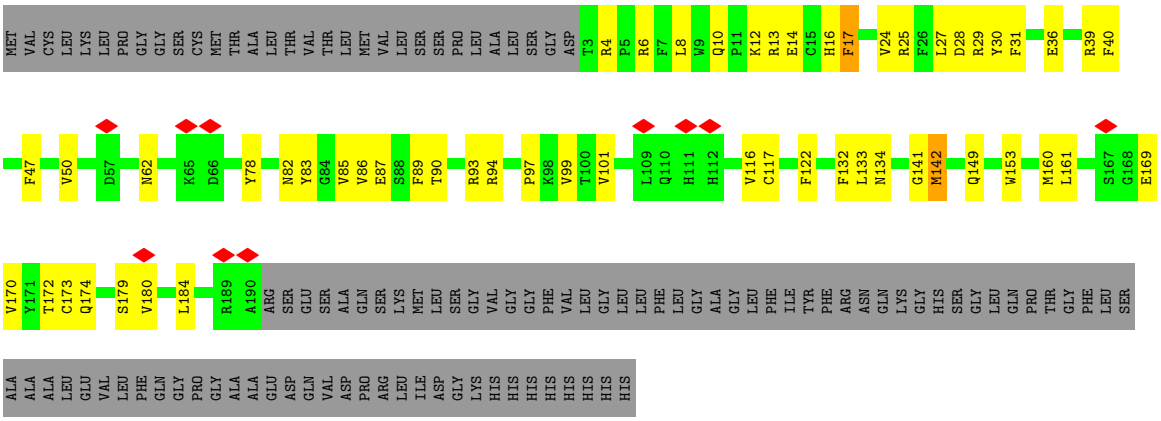




• Molecule 2: HLA class II histocompatibility antigen, DRB1 beta chain

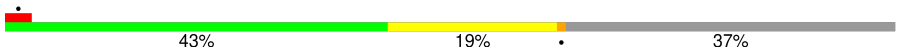
Chain E:

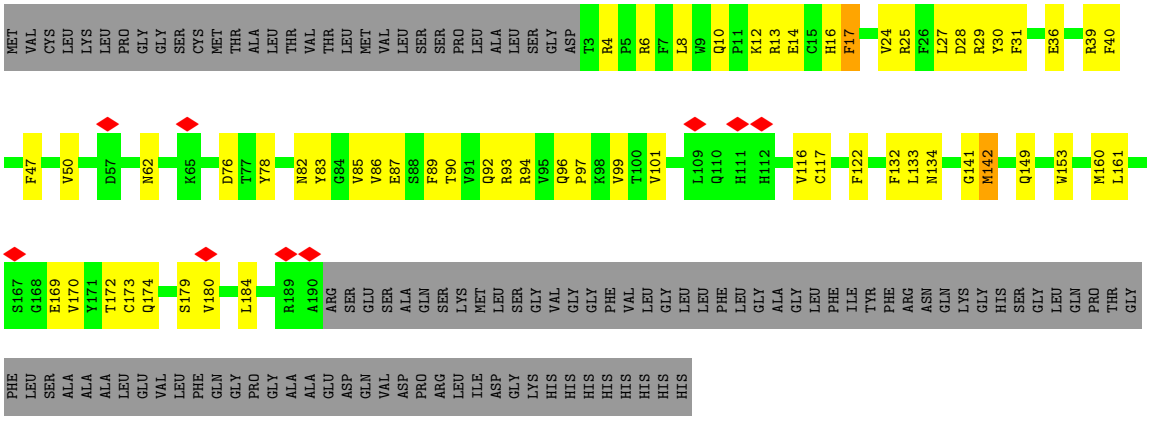




• Molecule 2: HLA class II histocompatibility antigen, DRB1 beta chain

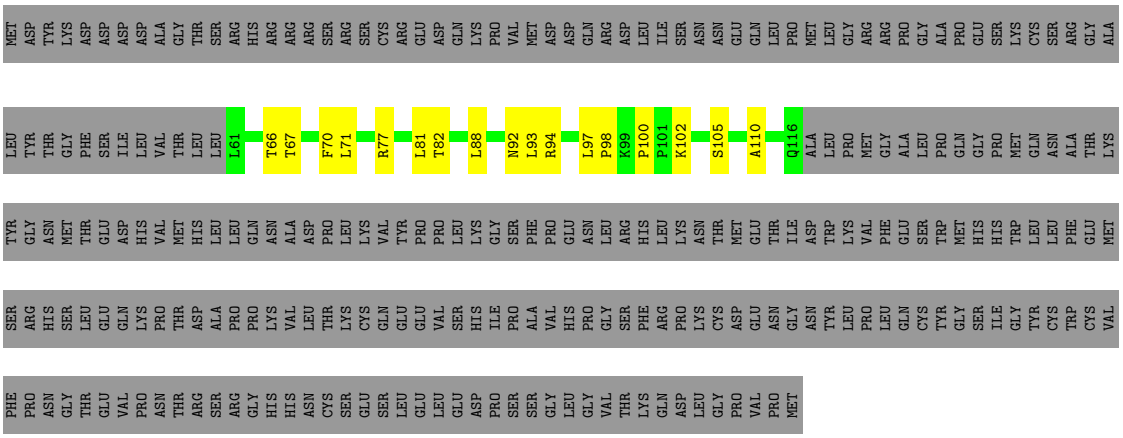
Chain H:





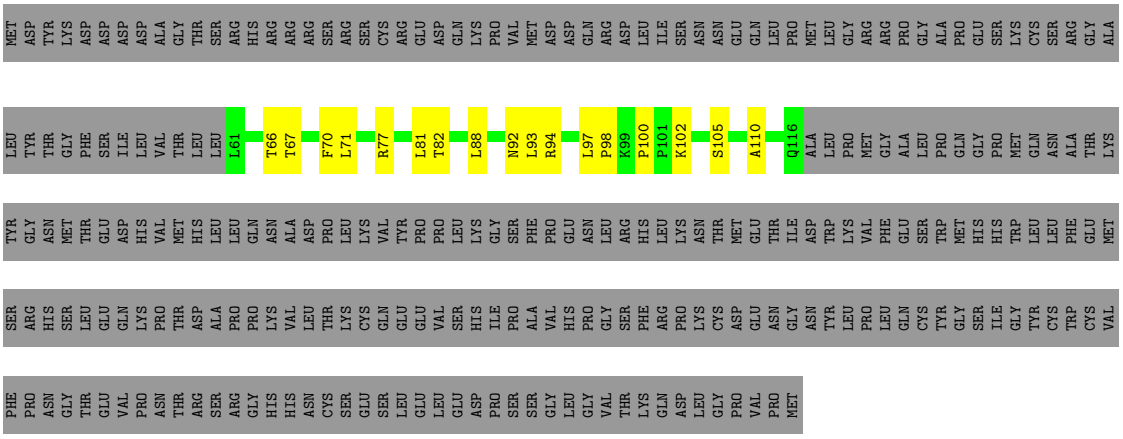
• Molecule 3: HLA class II histocompatibility antigen gamma chain

Chain C:



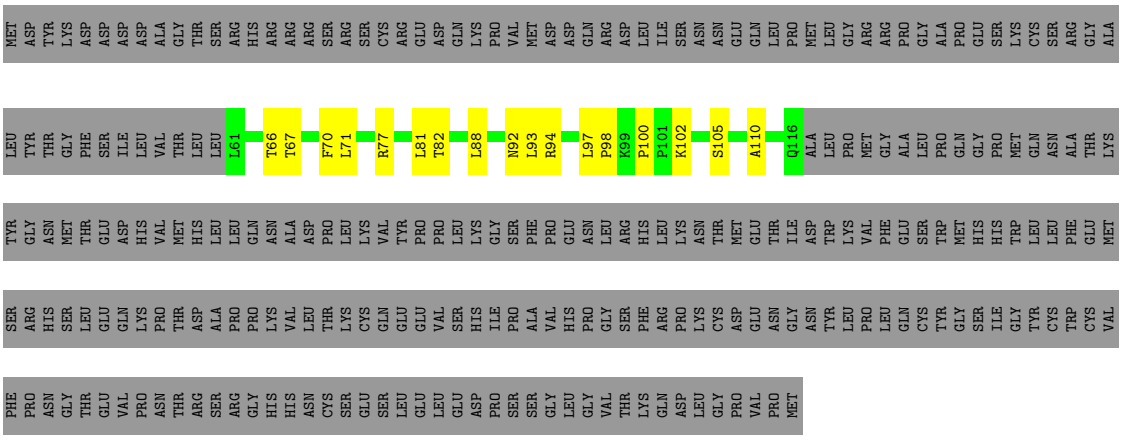
• Molecule 3: HLA class II histocompatibility antigen gamma chain

Chain F:



• Molecule 3: HLA class II histocompatibility antigen gamma chain

Chain I:


MET ASP TYR LYS ASP ASP ASP ASP ALA GLY THR SER ARG HIS ARG ARG ARG SER ARG SER CYS ARG GLU ASP GLN LYS PRO VAL MET ASP ASP GLN ARG ASP LEU ILE SER ASN ASN GLU GLN LEU PRO MET LEU GLY ARG ARG PRO GLY ALA PRO GLU SER LYS CYS SER ARG GLY ALA
LEU TYR THR GLY PHE SER ILE LEU VAL THR LEU LEU L61 T66 T67 F70 L71 R77 L81 T82 L88 N92 L93 R94 L97 P98 K99 P100 P101 K102 S105 A110 Q116 ALA LEU PRO MET GLY ALA LEU PRO GLN GLY PRO MET GLN ASN ALA THR LYS
TYR GLY ASN MET THR GLU ASP HIS VAL MET HIS LEU LEU GLN ASN ALA ASP PRO LEU LYS VAL TYR PRO PRO LEU LYS GLY SER PHE PRO GLU ASN LEU ARG HIS LEU LYS ASN THR MET GLU THR ILE ASP TRP LYS VAL PHE GLU SER TRP MET HIS HIS TRP LEU LEU PHE GLU MET
SER ARG HIS SER LEU GLU GLN LYS PRO THR ASP ALA PRO PRO LYS VAL LEU THR LYS CYS GLN GLU GLU VAL SER HIS ILE PRO ALA VAL HIS PRO GLY SER PHE ARG PRO LYS CYS ASP GLU ASN GLY ASN TYR LEU PRO LEU GLN CYS TYR GLY SER ILE GLY TYR CYS TRP GLY VAL
PHE PRO ASN GLY THR GLU VAL PRO ASN THR ARG SER ARG GLY HIS HIS ASN CYS SER GLU SER LEU GLU GLU LEU GLU ASP PRO SER SER GLY LEU GLY VAL THR LYS GLN ASP LEU GLY PRO VAL PRO MET

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	391922	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 ($e^-/Å^2$)	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.554	Depositor
Minimum map value	-0.024	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.021	Depositor
Recommended contour level	0.00315	Depositor
Map size (Å)	292.544, 292.544, 292.544	wwPDB
Map dimensions	448, 448, 448	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.653, 0.653, 0.653	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).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.32	0/1523	0.49	0/2077
1	D	0.32	0/1523	0.49	0/2077
1	G	0.32	0/1523	0.49	0/2077
2	B	0.26	0/1591	0.50	0/2163
2	E	0.26	0/1591	0.50	0/2163
2	H	0.26	0/1591	0.50	0/2163
3	C	0.30	0/452	0.48	0/609
3	F	0.30	0/452	0.48	0/609
3	I	0.29	0/452	0.48	0/609
All	All	0.29	0/10698	0.49	0/14547

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	D	0	2
1	G	0	2
All	All	0	6

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	100	ARG	Sidechain
1	A	50	ARG	Sidechain
1	D	100	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	D	50	ARG	Sidechain
1	G	100	ARG	Sidechain
1	G	50	ARG	Sidechain

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	1478	0	1412	57	0
1	D	1478	0	1412	57	0
1	G	1478	0	1412	59	0
2	B	1548	0	1474	65	0
2	E	1548	0	1474	63	0
2	H	1548	0	1474	65	0
3	C	445	0	478	46	0
3	F	445	0	478	45	0
3	I	445	0	478	49	0
All	All	10413	0	10092	379	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 18.

All (379) 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)
3:C:88:LEU:CD2	3:F:88:LEU:HD21	1.35	1.55
3:C:88:LEU:HD21	3:I:88:LEU:CD2	1.37	1.52
3:F:88:LEU:CD2	3:I:88:LEU:HD21	1.41	1.47
3:C:88:LEU:CD2	3:F:88:LEU:CD2	2.07	1.32
3:C:88:LEU:CD2	3:I:88:LEU:CD2	2.07	1.30
2:B:29:ARG:HD3	2:B:31:PHE:CZ	1.67	1.29
3:F:88:LEU:CD2	3:I:88:LEU:CD2	2.10	1.29
2:E:29:ARG:HD3	2:E:31:PHE:CZ	1.67	1.28
2:H:29:ARG:HD3	2:H:31:PHE:CZ	1.67	1.26
2:E:36:GLU:OE2	2:E:39:ARG:HB2	1.40	1.22
2:B:36:GLU:OE2	2:B:39:ARG:HB2	1.40	1.21

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:88:LEU:HD23	3:F:88:LEU:CD2	1.71	1.18
3:C:88:LEU:CD2	3:I:88:LEU:HD21	1.72	1.16
2:H:36:GLU:OE2	2:H:39:ARG:HB2	1.40	1.16
3:C:88:LEU:CD2	3:I:88:LEU:HD23	1.73	1.13
2:H:29:ARG:HD3	2:H:31:PHE:HZ	0.99	1.12
2:B:29:ARG:HB3	2:B:31:PHE:CE2	1.86	1.10
3:F:88:LEU:HD21	3:I:88:LEU:CD2	1.74	1.10
3:F:88:LEU:HD23	3:I:88:LEU:CD2	1.78	1.10
2:H:29:ARG:HB3	2:H:31:PHE:CE2	1.86	1.10
2:E:29:ARG:HB3	2:E:31:PHE:CE2	1.86	1.09
3:C:88:LEU:HD21	3:F:88:LEU:CD2	1.75	1.06
2:B:29:ARG:HD3	2:B:31:PHE:HZ	0.99	1.02
2:B:36:GLU:OE2	2:B:39:ARG:CB	2.11	0.99
2:E:82:ASN:O	2:E:86:VAL:HG22	1.63	0.99
2:H:82:ASN:O	2:H:86:VAL:HG22	1.63	0.98
2:E:36:GLU:OE2	2:E:39:ARG:CB	2.11	0.98
2:B:82:ASN:O	2:B:86:VAL:HG22	1.63	0.97
2:H:36:GLU:OE2	2:H:39:ARG:CB	2.11	0.97
2:E:29:ARG:HD3	2:E:31:PHE:HZ	0.99	0.95
2:B:36:GLU:OE1	2:B:50:VAL:HG21	1.72	0.90
2:E:36:GLU:OE1	2:E:50:VAL:HG21	1.72	0.90
2:H:36:GLU:OE1	2:H:50:VAL:HG21	1.72	0.89
1:D:143:HIS:ND1	2:E:12:LYS:HE3	1.88	0.88
1:A:143:HIS:ND1	2:B:12:LYS:HE3	1.88	0.88
3:F:88:LEU:HD21	3:I:88:LEU:HD21	0.88	0.88
1:G:143:HIS:ND1	2:H:12:LYS:HE3	1.88	0.88
3:C:88:LEU:HD21	3:F:88:LEU:HD21	0.86	0.86
3:C:88:LEU:HD23	3:F:88:LEU:HD22	1.60	0.83
2:B:29:ARG:CB	2:B:31:PHE:CE2	2.62	0.83
3:C:88:LEU:HD22	3:I:88:LEU:HD23	1.59	0.83
3:C:88:LEU:HD21	3:I:88:LEU:HD21	0.84	0.82
3:F:97:LEU:HD21	1:G:152:PRO:CG	2.09	0.82
2:H:29:ARG:CB	2:H:31:PHE:CE2	2.62	0.82
2:E:29:ARG:CB	2:E:31:PHE:CE2	2.62	0.81
2:H:29:ARG:CD	2:H:31:PHE:CZ	2.60	0.81
2:E:29:ARG:CD	2:E:31:PHE:CZ	2.60	0.81
1:A:143:HIS:CE1	2:B:31:PHE:CE2	2.69	0.80
2:E:29:ARG:HD3	2:E:31:PHE:CE2	2.17	0.80
1:D:143:HIS:CE1	2:E:31:PHE:CE2	2.69	0.80
1:G:143:HIS:CE1	2:H:31:PHE:CE2	2.69	0.79
2:B:29:ARG:HD3	2:B:31:PHE:CE2	2.17	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:29:ARG:HD3	2:H:31:PHE:CE2	2.17	0.79
3:F:88:LEU:HD23	3:I:88:LEU:HD22	1.64	0.78
2:B:29:ARG:CD	2:B:31:PHE:CZ	2.60	0.77
1:A:152:PRO:CG	3:I:97:LEU:HD21	2.14	0.77
3:F:67:THR:O	3:F:71:LEU:HG	1.85	0.76
3:C:67:THR:O	3:C:71:LEU:HG	1.85	0.76
3:I:67:THR:O	3:I:71:LEU:HG	1.85	0.76
3:C:97:LEU:HD21	1:D:152:PRO:CG	2.17	0.73
1:G:143:HIS:CE1	2:H:31:PHE:CD2	2.77	0.73
1:D:143:HIS:CE1	2:E:31:PHE:CD2	2.77	0.72
1:A:143:HIS:CE1	2:B:31:PHE:CD2	2.77	0.72
1:A:140:ARG:O	2:B:12:LYS:NZ	2.23	0.71
1:D:140:ARG:O	2:E:12:LYS:NZ	2.23	0.71
1:G:140:ARG:O	2:H:12:LYS:NZ	2.23	0.70
3:C:88:LEU:HD21	3:I:88:LEU:CG	2.23	0.68
3:C:88:LEU:CG	3:F:88:LEU:HD21	2.22	0.68
3:F:97:LEU:HD21	1:G:152:PRO:HG3	1.75	0.67
1:G:132:VAL:HG22	1:G:151:LEU:HD13	1.77	0.67
1:D:132:VAL:HG22	1:D:151:LEU:HD13	1.77	0.66
1:G:118:ASN:HB2	1:G:166:GLU:HB2	1.77	0.65
3:F:82:THR:HG21	3:I:77:ARG:HH11	1.61	0.65
2:E:134:ASN:H	2:E:170:VAL:HG12	1.61	0.65
1:D:118:ASN:HB2	1:D:166:GLU:HB2	1.77	0.65
2:H:134:ASN:H	2:H:170:VAL:HG12	1.61	0.65
1:A:118:ASN:HB2	1:A:166:GLU:HB2	1.77	0.65
2:B:134:ASN:H	2:B:170:VAL:HG12	1.61	0.65
3:F:88:LEU:CG	3:I:88:LEU:HD21	2.24	0.65
3:C:70:PHE:CB	3:I:71:LEU:HD22	2.27	0.65
1:D:92:LEU:CD1	1:D:106:ILE:HB	2.28	0.64
1:A:132:VAL:HG22	1:A:151:LEU:HD13	1.77	0.64
2:H:29:ARG:CD	2:H:31:PHE:CE2	2.79	0.64
3:F:98:PRO:HD2	1:G:133:SER:CB	2.28	0.64
2:B:36:GLU:CD	2:B:50:VAL:HG21	2.18	0.64
1:G:92:LEU:CD1	1:G:106:ILE:HB	2.27	0.64
1:A:152:PRO:HG3	3:I:97:LEU:HD21	1.79	0.64
1:G:12:PHE:HB3	2:H:10:GLN:HB3	1.79	0.64
1:D:12:PHE:HB3	2:E:10:GLN:HB3	1.79	0.64
2:E:116:VAL:HG22	2:E:160:MET:HG2	1.80	0.64
1:A:92:LEU:CD1	1:A:106:ILE:HB	2.28	0.64
2:B:29:ARG:CD	2:B:31:PHE:CE2	2.79	0.64
2:B:116:VAL:HG22	2:B:160:MET:HG2	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:36:GLU:CD	2:E:50:VAL:HG21	2.18	0.63
2:E:132:PHE:HB2	2:E:172:THR:HB	1.80	0.63
1:A:12:PHE:HB3	2:B:10:GLN:HB3	1.79	0.63
2:H:28:ASP:HB3	2:H:40:PHE:HB2	1.81	0.63
1:A:30:GLU:O	2:B:153:TRP:NE1	2.30	0.63
2:H:36:GLU:CD	2:H:50:VAL:HG21	2.18	0.63
1:G:92:LEU:HD11	1:G:106:ILE:HD12	1.81	0.63
3:C:77:ARG:HH11	3:I:82:THR:HG21	1.63	0.63
2:H:116:VAL:HG22	2:H:160:MET:HG2	1.80	0.63
1:A:92:LEU:HD11	1:A:106:ILE:HD12	1.81	0.63
2:B:28:ASP:HB3	2:B:40:PHE:HB2	1.81	0.63
1:G:30:GLU:O	2:H:153:TRP:NE1	2.30	0.63
1:A:143:HIS:CE1	2:B:12:LYS:HE3	2.35	0.62
1:G:143:HIS:NE2	2:H:31:PHE:CZ	2.67	0.62
1:A:143:HIS:NE2	2:B:31:PHE:CZ	2.67	0.62
2:B:132:PHE:HB2	2:B:172:THR:HB	1.80	0.62
1:D:143:HIS:NE2	2:E:31:PHE:CZ	2.67	0.62
2:E:28:ASP:HB3	2:E:40:PHE:HB2	1.81	0.62
3:C:97:LEU:HD21	1:D:152:PRO:HG3	1.82	0.62
2:E:29:ARG:CD	2:E:31:PHE:CE2	2.79	0.62
1:D:92:LEU:HD11	1:D:106:ILE:HD12	1.81	0.62
1:G:143:HIS:CE1	2:H:12:LYS:HE3	2.35	0.61
1:D:143:HIS:CE1	2:E:12:LYS:HE3	2.35	0.61
1:G:135:THR:HG22	1:G:148:PHE:H	1.65	0.61
1:A:135:THR:HG22	1:A:148:PHE:H	1.66	0.61
2:H:132:PHE:HB2	2:H:172:THR:HB	1.80	0.61
1:A:133:SER:CB	3:I:98:PRO:HD2	2.30	0.61
1:D:135:THR:HG22	1:D:148:PHE:H	1.66	0.60
1:D:30:GLU:O	2:E:153:TRP:NE1	2.30	0.60
1:A:133:SER:HB3	3:I:98:PRO:HD2	1.84	0.60
1:D:89:VAL:HG21	1:D:165:VAL:HG21	1.83	0.60
1:D:162:ASP:OD1	1:D:177:HIS:ND1	2.34	0.60
1:G:162:ASP:OD1	1:G:177:HIS:ND1	2.34	0.60
3:F:71:LEU:HD22	3:I:70:PHE:CB	2.32	0.60
1:G:143:HIS:NE2	2:H:31:PHE:CE2	2.70	0.60
1:D:140:ARG:NH1	1:D:142:ASP:OD1	2.35	0.59
1:D:143:HIS:NE2	2:E:31:PHE:CE2	2.70	0.59
1:G:140:ARG:NH1	1:G:142:ASP:OD1	2.35	0.59
1:A:140:ARG:NH1	1:A:142:ASP:OD1	2.35	0.59
3:C:70:PHE:HB3	3:I:71:LEU:HD22	1.85	0.59
3:F:98:PRO:HD2	1:G:133:SER:HB3	1.83	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:162:ASP:OD1	1:A:177:HIS:ND1	2.34	0.59
1:A:143:HIS:NE2	2:B:31:PHE:CE2	2.70	0.59
1:G:111:LYS:HA	1:G:144:LEU:HB3	1.85	0.59
1:D:111:LYS:HA	1:D:144:LEU:HB3	1.84	0.59
2:E:36:GLU:OE2	2:E:39:ARG:CG	2.51	0.59
2:H:36:GLU:OE2	2:H:39:ARG:CG	2.51	0.59
3:C:98:PRO:HD2	1:D:133:SER:CB	2.32	0.59
1:G:89:VAL:HG21	1:G:165:VAL:HG21	1.83	0.59
2:H:13:ARG:NH2	2:H:30:TYR:OH	2.36	0.59
3:F:93:LEU:HD12	1:G:102:PRO:HB3	1.85	0.58
1:A:89:VAL:HG21	1:A:165:VAL:HG21	1.83	0.58
3:F:97:LEU:HD21	1:G:152:PRO:HG2	1.85	0.58
2:B:13:ARG:NH2	2:B:30:TYR:OH	2.36	0.58
2:B:36:GLU:OE2	2:B:39:ARG:CG	2.51	0.58
2:E:86:VAL:O	2:E:90:THR:OG1	2.18	0.58
3:C:66:THR:O	3:C:70:PHE:HD2	1.86	0.58
3:I:66:THR:O	3:I:70:PHE:HD2	1.86	0.58
3:C:82:THR:HG21	3:F:77:ARG:HH11	1.68	0.58
1:A:122:LEU:HB2	1:A:162:ASP:HB2	1.86	0.58
2:E:13:ARG:NH2	2:E:30:TYR:OH	2.36	0.58
1:A:111:LYS:HA	1:A:144:LEU:HB3	1.84	0.57
1:A:92:LEU:CD1	1:A:106:ILE:HD12	2.35	0.57
3:F:66:THR:O	3:F:70:PHE:HD2	1.87	0.57
3:C:98:PRO:HD2	1:D:133:SER:HB3	1.85	0.57
3:C:71:LEU:HD22	3:F:70:PHE:CB	2.34	0.57
2:E:16:HIS:HB2	2:E:25:ARG:HB3	1.86	0.57
3:F:100:PRO:HG3	1:G:133:SER:HA	1.86	0.57
2:B:16:HIS:HB2	2:B:25:ARG:HB3	1.86	0.57
3:C:81:LEU:HD21	3:I:81:LEU:HG	1.85	0.57
1:D:92:LEU:CD1	1:D:106:ILE:HD12	2.34	0.57
1:D:122:LEU:HB2	1:D:162:ASP:HB2	1.86	0.57
1:D:139:PRO:HB2	2:E:12:LYS:HZ3	1.67	0.57
1:G:92:LEU:CD1	1:G:106:ILE:HD12	2.35	0.57
1:G:104:VAL:HG11	1:G:150:TYR:HD2	1.70	0.57
1:D:104:VAL:HG11	1:D:150:TYR:HD2	1.70	0.57
3:F:97:LEU:HD11	1:G:152:PRO:HG2	1.87	0.56
2:H:16:HIS:HB2	2:H:25:ARG:HB3	1.86	0.56
1:D:98:GLU:HB2	1:D:101:GLU:HB3	1.87	0.56
1:G:98:GLU:HB2	1:G:101:GLU:HB3	1.87	0.56
1:A:133:SER:HA	3:I:100:PRO:HG3	1.86	0.56
1:G:122:LEU:HB2	1:G:162:ASP:HB2	1.86	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:104:VAL:HG11	1:A:150:TYR:HD2	1.70	0.56
1:A:152:PRO:HG2	3:I:97:LEU:HD11	1.88	0.56
1:A:93:THR:HG21	1:A:97:VAL:HG13	1.89	0.55
1:A:98:GLU:HB2	1:A:101:GLU:HB3	1.87	0.55
3:F:92:ASN:HD21	3:I:88:LEU:HD12	1.71	0.55
3:F:81:LEU:HG	3:I:81:LEU:HD21	1.89	0.55
1:A:29:ASP:OD1	2:B:149:GLN:NE2	2.40	0.55
1:G:29:ASP:OD1	2:H:149:GLN:NE2	2.40	0.55
3:C:66:THR:O	3:C:70:PHE:CD2	2.60	0.54
3:F:66:THR:O	3:F:70:PHE:CD2	2.60	0.54
1:D:93:THR:HG21	1:D:97:VAL:HG13	1.89	0.54
3:C:102:LYS:HD3	1:D:37:ALA:HB1	1.88	0.54
1:G:93:THR:HG21	1:G:97:VAL:HG13	1.89	0.54
3:I:66:THR:O	3:I:70:PHE:CD2	2.60	0.54
3:C:100:PRO:HG3	1:D:133:SER:HA	1.88	0.54
2:E:132:PHE:HE2	2:E:174:GLN:HB2	1.73	0.54
3:C:71:LEU:HD22	3:F:70:PHE:HB3	1.89	0.54
1:D:29:ASP:OD1	2:E:149:GLN:NE2	2.40	0.54
3:F:71:LEU:HD22	3:I:70:PHE:HB3	1.90	0.54
2:E:141:GLY:HA3	2:E:161:LEU:HD12	1.91	0.53
2:H:29:ARG:CB	2:H:31:PHE:HE2	2.20	0.53
2:H:132:PHE:HE2	2:H:174:GLN:HB2	1.73	0.53
3:C:97:LEU:HD11	1:D:152:PRO:HG2	1.90	0.53
2:H:141:GLY:HA3	2:H:161:LEU:HD12	1.91	0.53
2:B:29:ARG:HB3	2:B:31:PHE:CZ	2.42	0.53
2:H:86:VAL:O	2:H:90:THR:OG1	2.18	0.53
3:C:81:LEU:HG	3:F:81:LEU:HD21	1.90	0.52
1:A:121:TRP:HE1	1:A:149:HIS:HB3	1.74	0.52
2:B:29:ARG:CB	2:B:31:PHE:HE2	2.20	0.52
2:E:29:ARG:CB	2:E:31:PHE:HE2	2.20	0.52
2:B:86:VAL:O	2:B:90:THR:OG1	2.18	0.52
2:B:132:PHE:HE2	2:B:174:GLN:HB2	1.73	0.52
1:G:41:THR:HG21	1:G:54:PHE:HB3	1.92	0.52
1:A:139:PRO:HB2	2:B:12:LYS:HZ3	1.75	0.52
3:C:97:LEU:HD21	1:D:152:PRO:HG2	1.92	0.52
1:D:121:TRP:HE1	1:D:149:HIS:HB3	1.74	0.52
1:A:24:PHE:HB3	1:A:31:ILE:HD12	1.91	0.52
2:B:141:GLY:HA3	2:B:161:LEU:HD12	1.91	0.52
2:E:133:LEU:HD22	2:E:169:GLU:HB3	1.92	0.52
1:G:24:PHE:HB3	1:G:31:ILE:HD12	1.91	0.52
1:A:102:PRO:HB3	3:I:93:LEU:HD12	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:139:PRO:HB2	2:H:12:LYS:HZ3	1.76	0.51
2:B:133:LEU:HD22	2:B:169:GLU:HB3	1.92	0.51
2:H:29:ARG:HB3	2:H:31:PHE:CZ	2.43	0.51
1:A:41:THR:HG21	1:A:54:PHE:HB3	1.91	0.51
1:D:145:PHE:HE1	2:E:8:LEU:HD21	1.75	0.51
3:F:102:LYS:HD3	1:G:37:ALA:HB1	1.93	0.51
2:H:4:ARG:HB2	2:H:6:ARG:HH12	1.76	0.51
1:A:37:ALA:HB1	3:I:102:LYS:HD3	1.91	0.51
1:D:24:PHE:HB3	1:D:31:ILE:HD12	1.91	0.51
1:D:41:THR:HG21	1:D:54:PHE:HB3	1.91	0.51
1:G:145:PHE:HE1	2:H:8:LEU:HD21	1.75	0.51
2:H:133:LEU:HD22	2:H:169:GLU:HB3	1.92	0.51
3:C:88:LEU:HD12	3:I:92:ASN:HD21	1.76	0.51
1:G:121:TRP:HE1	1:G:149:HIS:HB3	1.74	0.51
2:E:142:MET:SD	2:E:142:MET:N	2.84	0.51
2:H:142:MET:SD	2:H:142:MET:N	2.84	0.51
2:B:31:PHE:CE1	2:B:36:GLU:HB2	2.46	0.50
2:B:142:MET:SD	2:B:142:MET:N	2.84	0.50
2:H:31:PHE:CE1	2:H:36:GLU:HB2	2.46	0.50
1:A:87:PRO:O	1:A:89:VAL:HG23	2.11	0.50
2:B:4:ARG:HB2	2:B:6:ARG:HH12	1.76	0.50
1:A:152:PRO:HG2	3:I:97:LEU:HD21	1.90	0.50
1:G:87:PRO:O	1:G:89:VAL:HG23	2.11	0.50
1:A:145:PHE:HE1	2:B:8:LEU:HD21	1.75	0.50
2:E:31:PHE:CE1	2:E:36:GLU:HB2	2.47	0.50
1:A:92:LEU:HD11	1:A:106:ILE:HB	1.94	0.50
2:B:180:VAL:HG21	2:B:184:LEU:HD11	1.94	0.50
1:A:156:SER:OG	1:A:158:GLU:OE1	2.30	0.50
1:D:87:PRO:O	1:D:89:VAL:HG23	2.11	0.50
1:D:156:SER:OG	1:D:158:GLU:OE1	2.30	0.50
1:G:92:LEU:HD11	1:G:106:ILE:HB	1.93	0.50
1:G:156:SER:OG	1:G:158:GLU:OE1	2.30	0.50
1:D:104:VAL:CG1	1:D:150:TYR:HB3	2.42	0.49
3:C:92:ASN:HD21	3:F:88:LEU:HD12	1.77	0.49
1:A:114:PRO:HG2	2:B:6:ARG:HG3	1.95	0.49
1:A:133:SER:OG	3:I:97:LEU:HB3	2.12	0.49
2:E:4:ARG:HB2	2:E:6:ARG:HH12	1.76	0.49
1:G:87:PRO:HB3	1:G:112:PHE:HB3	1.94	0.49
1:G:104:VAL:CG1	1:G:150:TYR:HB3	2.42	0.49
2:H:47:PHE:HB2	2:H:62:ASN:HB3	1.95	0.49
1:D:92:LEU:HD11	1:D:106:ILE:HB	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:104:VAL:CG1	1:A:150:TYR:HB3	2.42	0.49
2:E:180:VAL:HG21	2:E:184:LEU:HD11	1.94	0.49
3:C:97:LEU:HB3	1:D:133:SER:OG	2.12	0.48
3:C:93:LEU:HD12	1:D:102:PRO:HB3	1.94	0.48
2:E:47:PHE:HB2	2:E:62:ASN:HB3	1.95	0.48
2:B:47:PHE:HB2	2:B:62:ASN:HB3	1.95	0.48
2:B:132:PHE:N	2:B:172:THR:O	2.47	0.48
2:H:180:VAL:HG21	2:H:184:LEU:HD11	1.94	0.48
1:A:87:PRO:HB3	1:A:112:PHE:HB3	1.94	0.48
2:H:132:PHE:N	2:H:172:THR:O	2.47	0.48
1:D:114:PRO:HG2	2:E:6:ARG:HG3	1.95	0.48
1:D:87:PRO:HB3	1:D:112:PHE:HB3	1.94	0.48
2:E:14:GLU:OE1	2:E:27:LEU:HD23	2.14	0.48
2:H:36:GLU:CD	2:H:50:VAL:CG2	2.82	0.47
2:E:29:ARG:HB3	2:E:31:PHE:CZ	2.43	0.47
2:B:14:GLU:OE1	2:B:27:LEU:HD23	2.14	0.47
1:G:114:PRO:HG2	2:H:6:ARG:HG3	1.95	0.47
2:H:14:GLU:OE1	2:H:27:LEU:HD23	2.14	0.47
3:F:97:LEU:HB3	1:G:133:SER:OG	2.15	0.47
2:E:132:PHE:N	2:E:172:THR:O	2.47	0.47
1:A:138:LEU:HD12	1:A:148:PHE:HE2	1.80	0.47
1:D:138:LEU:HD12	1:D:148:PHE:HE2	1.80	0.47
2:E:36:GLU:CD	2:E:50:VAL:CG2	2.82	0.47
2:B:36:GLU:CD	2:B:50:VAL:CG2	2.82	0.47
3:C:77:ARG:NH1	3:I:82:THR:HG21	2.30	0.47
3:I:94:ARG:HA	3:I:97:LEU:HG	1.97	0.46
1:D:105:LEU:HG	1:D:153:PHE:CE1	2.51	0.46
3:F:82:THR:HG21	3:I:77:ARG:NH1	2.28	0.46
1:G:138:LEU:HD12	1:G:148:PHE:HE2	1.80	0.46
3:C:94:ARG:HA	3:C:97:LEU:HG	1.97	0.46
3:F:94:ARG:HA	3:F:97:LEU:HG	1.97	0.46
1:D:8:ILE:HB	1:D:25:ASP:HB3	1.98	0.46
2:B:27:LEU:HD21	2:B:29:ARG:HE	1.82	0.45
1:G:105:LEU:HG	1:G:153:PHE:CE1	2.51	0.45
1:A:105:LEU:HG	1:A:153:PHE:CE1	2.51	0.45
1:G:146:ARG:NH1	2:H:149:GLN:OE1	2.49	0.45
1:A:8:ILE:HB	1:A:25:ASP:HB3	1.98	0.45
1:D:146:ARG:NH1	2:E:149:GLN:OE1	2.49	0.45
2:E:27:LEU:HD21	2:E:29:ARG:HE	1.82	0.45
2:E:85:VAL:HG13	3:F:105:SER:HB3	1.99	0.45
1:A:146:ARG:NH1	2:B:149:GLN:OE1	2.49	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:97:PRO:O	2:E:99:VAL:HG23	2.17	0.44
1:D:14:LEU:HD11	2:E:6:ARG:HB3	2.00	0.44
2:E:94:ARG:HB3	2:E:179:SER:HA	2.00	0.44
2:B:97:PRO:O	2:B:99:VAL:HG23	2.17	0.44
3:F:93:LEU:O	3:F:97:LEU:HG	2.17	0.44
1:G:8:ILE:HB	1:G:25:ASP:HB3	1.98	0.44
2:H:27:LEU:HD21	2:H:29:ARG:HE	1.82	0.44
1:G:14:LEU:HD11	2:H:6:ARG:HB3	2.00	0.44
1:G:104:VAL:HG11	1:G:150:TYR:CD2	2.51	0.44
3:C:93:LEU:O	3:C:97:LEU:HG	2.17	0.44
3:I:93:LEU:O	3:I:97:LEU:HG	2.17	0.44
1:A:104:VAL:HG11	1:A:150:TYR:CD2	2.51	0.44
2:B:16:HIS:O	2:B:25:ARG:N	2.32	0.44
2:B:94:ARG:HB3	2:B:179:SER:HA	2.00	0.44
2:H:89:PHE:O	2:H:93:ARG:HB2	2.18	0.44
2:B:89:PHE:O	2:B:93:ARG:HB2	2.18	0.43
2:H:97:PRO:O	2:H:99:VAL:HG23	2.17	0.43
1:A:104:VAL:HG13	1:A:150:TYR:HB3	2.01	0.43
3:C:70:PHE:HB2	3:I:71:LEU:HD22	2.00	0.43
1:D:104:VAL:HG11	1:D:150:TYR:CD2	2.51	0.43
2:H:85:VAL:HG13	3:I:105:SER:HB3	1.99	0.43
1:D:135:THR:HG21	1:D:148:PHE:HD2	1.83	0.43
2:E:89:PHE:O	2:E:93:ARG:HB2	2.18	0.43
2:B:85:VAL:HG13	3:C:105:SER:HB3	1.99	0.43
1:D:92:LEU:C	1:D:92:LEU:HD12	2.39	0.43
2:H:16:HIS:O	2:H:25:ARG:N	2.32	0.43
2:E:17:PHE:HB3	2:E:24:VAL:HG22	2.01	0.43
1:G:92:LEU:C	1:G:92:LEU:HD12	2.39	0.43
1:D:104:VAL:HG13	1:D:150:TYR:HB3	2.01	0.43
1:A:14:LEU:HD11	2:B:6:ARG:HB3	2.00	0.43
1:A:135:THR:HG21	1:A:148:PHE:HD2	1.84	0.43
1:A:92:LEU:HD12	1:A:92:LEU:C	2.39	0.43
2:H:96:GLN:HA	2:H:97:PRO:HD3	1.92	0.43
2:H:94:ARG:HB3	2:H:179:SER:HA	1.99	0.43
1:G:139:PRO:HB2	2:H:12:LYS:NZ	2.34	0.42
2:B:17:PHE:HB3	2:B:24:VAL:HG22	2.01	0.42
2:E:78:TYR:HE2	3:F:110:ALA:H	1.68	0.42
1:G:135:THR:HG21	1:G:148:PHE:HD2	1.83	0.42
3:C:77:ARG:HD3	3:I:82:THR:OG1	2.20	0.42
3:F:92:ASN:HD21	3:I:88:LEU:CD1	2.31	0.42
2:B:78:TYR:HE2	3:C:110:ALA:H	1.67	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:101:VAL:HG22	2:B:117:CYS:HA	2.01	0.42
1:G:104:VAL:HG13	1:G:150:TYR:HB3	2.01	0.42
2:H:17:PHE:HB3	2:H:24:VAL:HG22	2.01	0.42
3:C:94:ARG:HA	3:C:97:LEU:CD1	2.50	0.42
2:B:27:LEU:HD11	2:B:39:ARG:HG2	2.02	0.42
2:E:16:HIS:O	2:E:25:ARG:N	2.32	0.42
2:H:78:TYR:HE2	3:I:110:ALA:H	1.68	0.42
3:I:94:ARG:HA	3:I:97:LEU:CD1	2.50	0.42
1:A:112:PHE:HB2	1:A:167:HIS:CE1	2.55	0.42
3:F:94:ARG:HA	3:F:97:LEU:CD1	2.50	0.42
2:H:101:VAL:HG22	2:H:117:CYS:HA	2.01	0.42
2:E:89:PHE:CD1	2:E:90:THR:HG23	2.55	0.41
1:A:139:PRO:HB2	2:B:12:LYS:NZ	2.34	0.41
1:D:112:PHE:HB2	1:D:167:HIS:CE1	2.55	0.41
2:H:97:PRO:HA	2:H:122:PHE:HB3	2.02	0.41
1:D:104:VAL:CG1	1:D:150:TYR:HD2	2.33	0.41
1:G:112:PHE:HB2	1:G:167:HIS:CE1	2.55	0.41
2:B:36:GLU:OE2	2:B:39:ARG:HG3	2.21	0.41
2:B:173:CYS:SG	2:B:174:GLN:N	2.94	0.41
2:E:101:VAL:HG22	2:E:117:CYS:HA	2.01	0.41
1:D:139:PRO:HB2	2:E:12:LYS:NZ	2.34	0.41
2:E:173:CYS:SG	2:E:174:GLN:N	2.94	0.41
1:G:91:VAL:HG11	1:G:178:TRP:HB2	2.02	0.41
2:E:83:TYR:O	2:E:87:GLU:HB2	2.20	0.41
2:H:76:ASP:OD1	2:H:76:ASP:N	2.54	0.41
2:H:83:TYR:O	2:H:87:GLU:HB2	2.20	0.41
2:B:83:TYR:O	2:B:87:GLU:HB2	2.20	0.41
2:B:89:PHE:CD1	2:B:90:THR:HG23	2.55	0.41
2:B:97:PRO:HA	2:B:122:PHE:HB3	2.02	0.41
1:G:104:VAL:CG1	1:G:150:TYR:HD2	2.33	0.41
2:H:92:GLN:O	2:H:94:ARG:HG2	2.21	0.41
2:H:173:CYS:SG	2:H:174:GLN:N	2.94	0.41
1:A:91:VAL:HG11	1:A:178:TRP:HB2	2.02	0.41
2:E:97:PRO:HA	2:E:122:PHE:HB3	2.02	0.41
1:G:98:GLU:O	1:G:155:PRO:HG2	2.21	0.40
2:B:92:GLN:O	2:B:94:ARG:HG2	2.21	0.40
2:H:27:LEU:HD11	2:H:39:ARG:HG2	2.02	0.40
2:E:27:LEU:HD11	2:E:39:ARG:HG2	2.02	0.40
3:C:70:PHE:CD2	3:I:71:LEU:HD13	2.56	0.40
3:F:82:THR:OG1	3:I:77:ARG:HD3	2.21	0.40

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	178/288 (62%)	170 (96%)	8 (4%)	0	100	100
1	D	178/288 (62%)	170 (96%)	8 (4%)	0	100	100
1	G	178/288 (62%)	170 (96%)	8 (4%)	0	100	100
2	B	186/300 (62%)	178 (96%)	8 (4%)	0	100	100
2	E	186/300 (62%)	178 (96%)	8 (4%)	0	100	100
2	H	186/300 (62%)	178 (96%)	8 (4%)	0	100	100
3	C	54/308 (18%)	52 (96%)	2 (4%)	0	100	100
3	F	54/308 (18%)	52 (96%)	2 (4%)	0	100	100
3	I	54/308 (18%)	52 (96%)	2 (4%)	0	100	100
All	All	1254/2688 (47%)	1200 (96%)	54 (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	164/249 (66%)	161 (98%)	3 (2%)	54	77
1	D	164/249 (66%)	161 (98%)	3 (2%)	54	77
1	G	164/249 (66%)	161 (98%)	3 (2%)	54	77
2	B	170/258 (66%)	168 (99%)	2 (1%)	67	84
2	E	170/258 (66%)	168 (99%)	2 (1%)	67	84

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	H	170/258 (66%)	168 (99%)	2 (1%)	67 84
3	C	50/275 (18%)	50 (100%)	0	100 100
3	F	50/275 (18%)	50 (100%)	0	100 100
3	I	50/275 (18%)	50 (100%)	0	100 100
All	All	1152/2346 (49%)	1137 (99%)	15 (1%)	64 83

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	51	PHE
1	A	97	VAL
1	A	108	PHE
2	B	17	PHE
2	B	142	MET
1	D	51	PHE
1	D	97	VAL
1	D	108	PHE
2	E	17	PHE
2	E	142	MET
1	G	51	PHE
1	G	97	VAL
1	G	108	PHE
2	H	17	PHE
2	H	142	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	89	GLN
3	C	92	ASN
3	F	89	GLN
3	F	92	ASN
3	I	89	GLN
3	I	92	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)

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

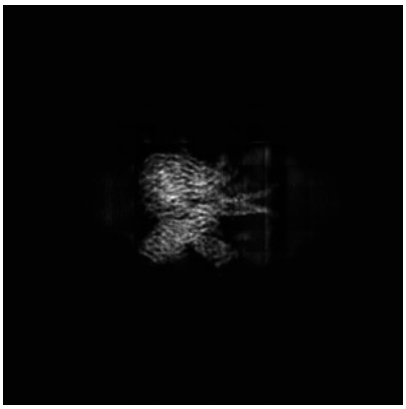
This section contains visualisations of the EMDB entry EMD-43488. These allow visual inspection of the internal detail of the map and identification of artifacts.

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.

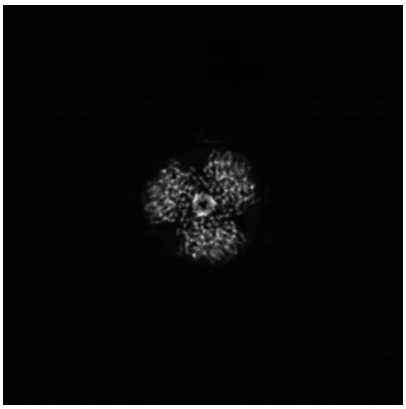
6.1 Orthogonal projections

6.1.1 Primary map

X

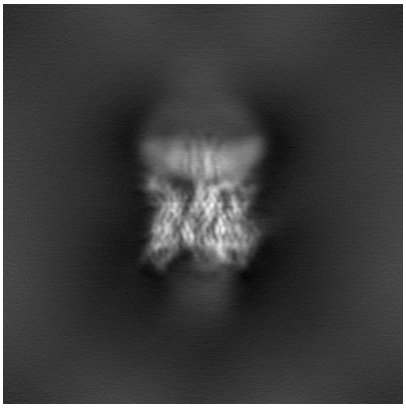


Y

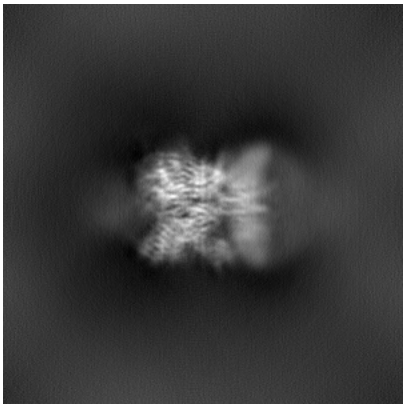


Z

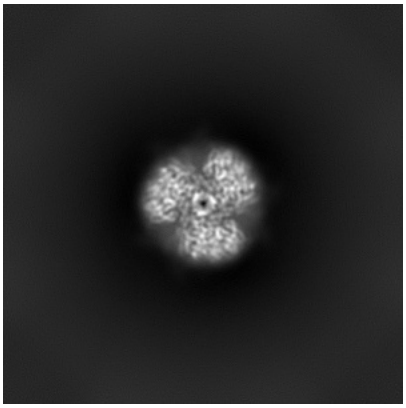
6.1.2 Raw map



X



Y

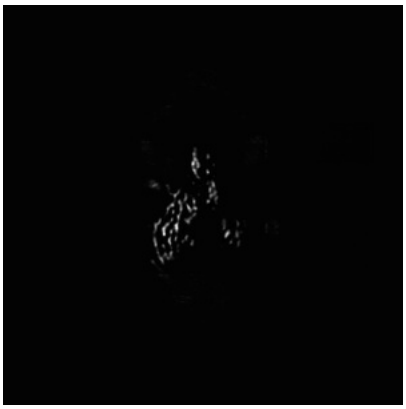


Z

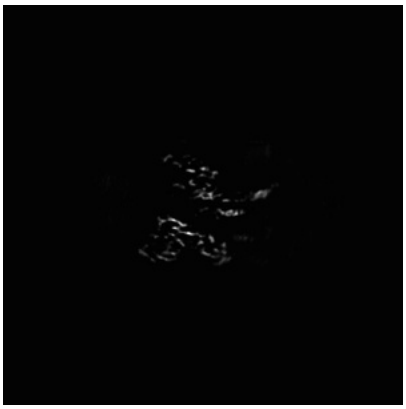
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

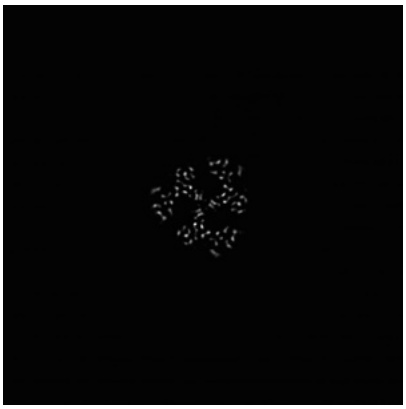
6.2.1 Primary map



X Index: 224

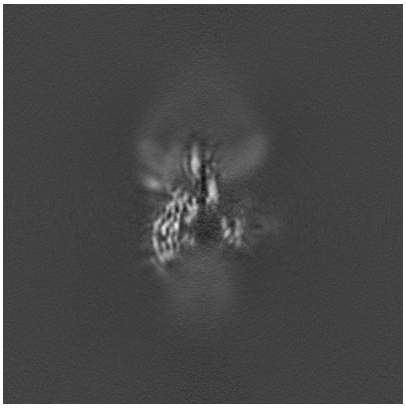


Y Index: 224

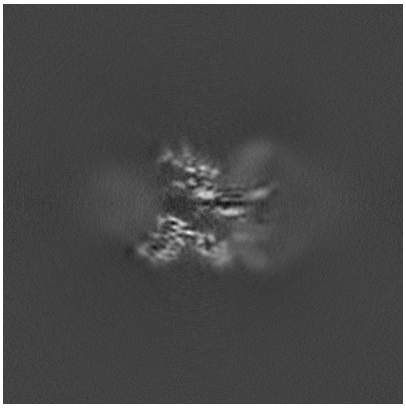


Z Index: 224

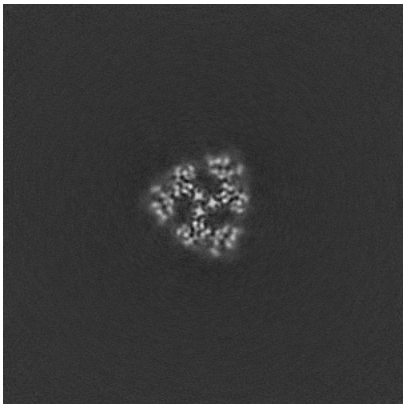
6.2.2 Raw map



X Index: 224



Y Index: 224



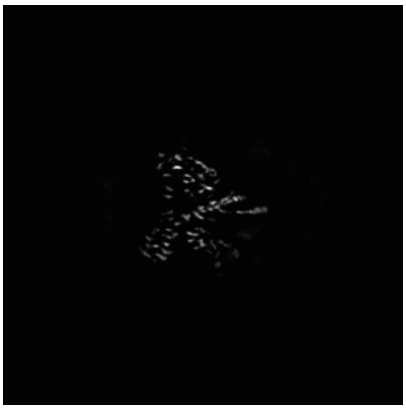
Z Index: 224

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

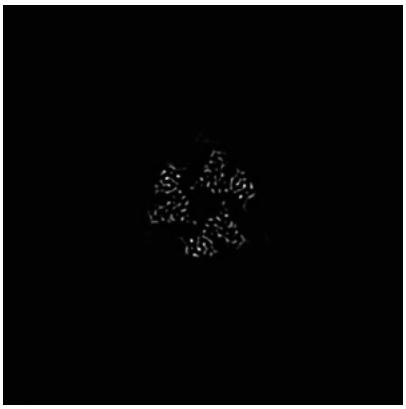
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 233

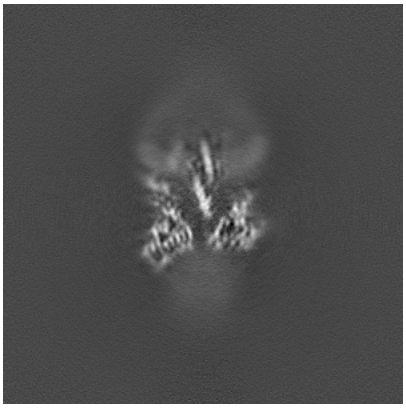


Y Index: 233

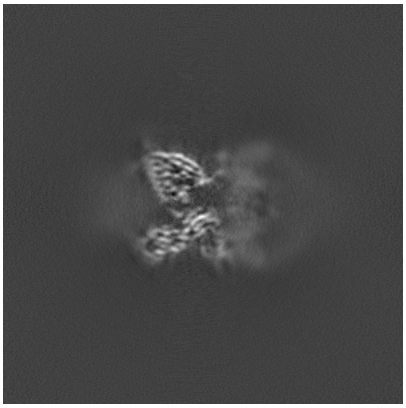


Z Index: 195

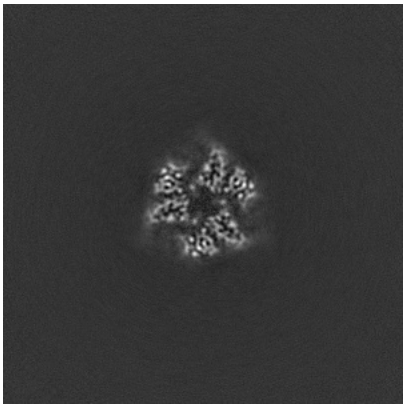
6.3.2 Raw map



X Index: 233



Y Index: 243

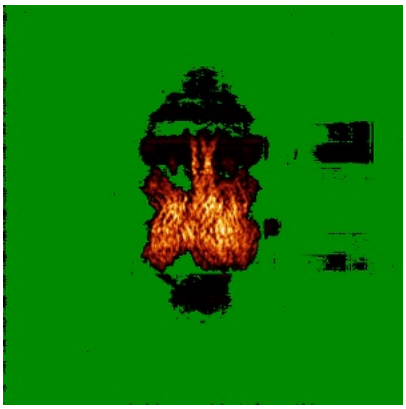


Z Index: 196

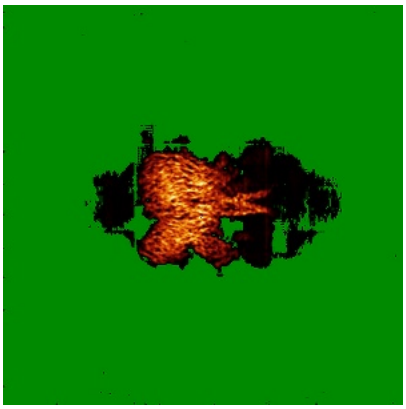
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

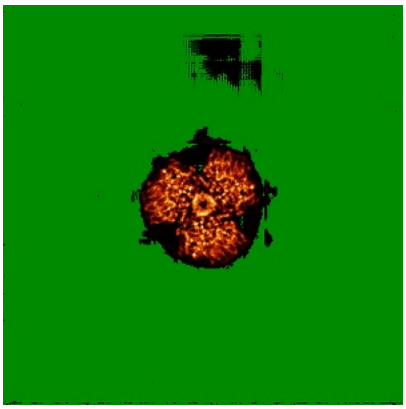
6.4.1 Primary map



X

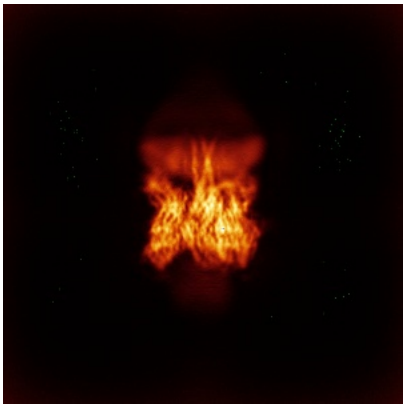


Y

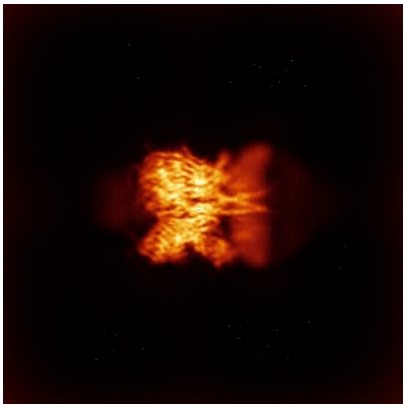


Z

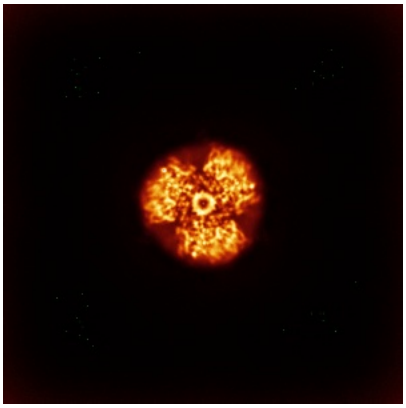
6.4.2 Raw map



X



Y

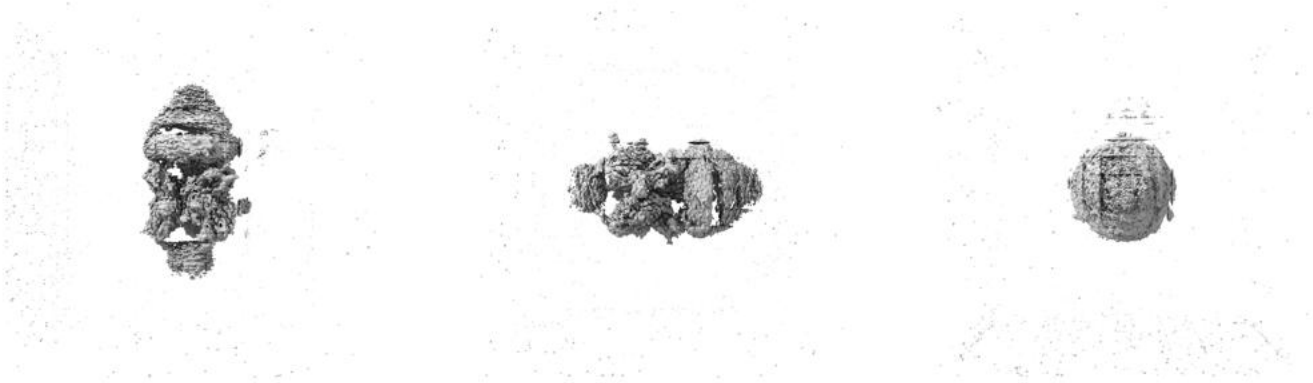


Z

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



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.00315. 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

X Y Z

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.

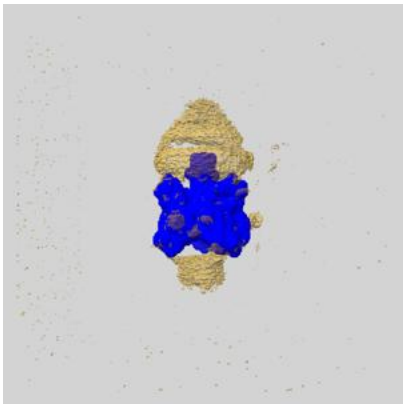
6.6 Mask visualisation (i)

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

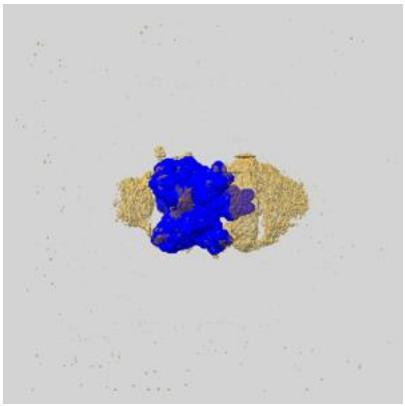
A mask typically either:

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

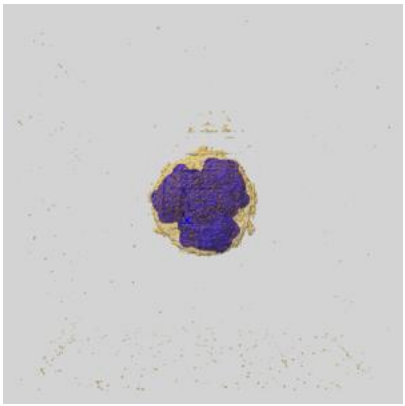
6.6.1 emd_43488_msk_1.map (i)



X



Y

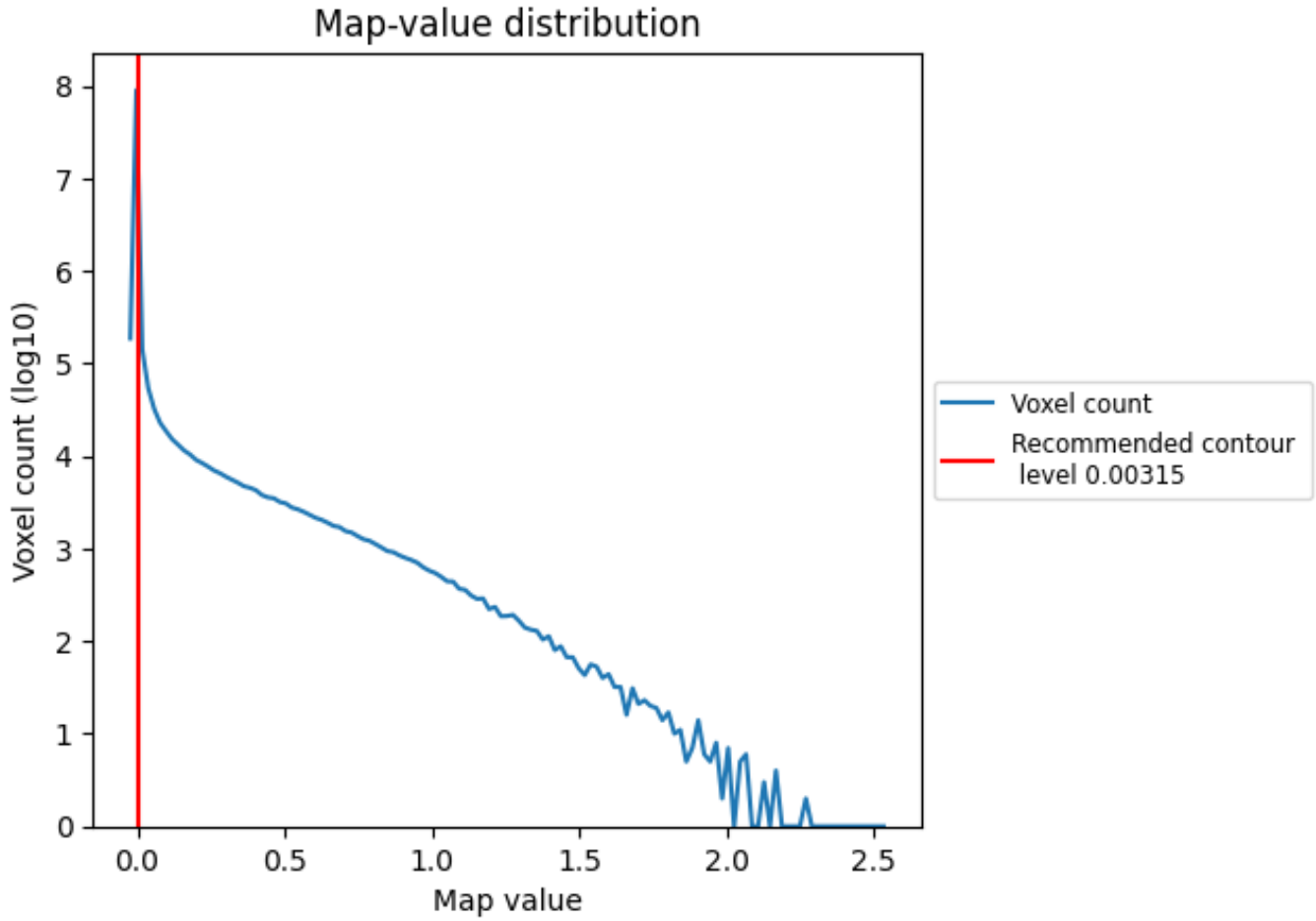


Z

7 Map analysis

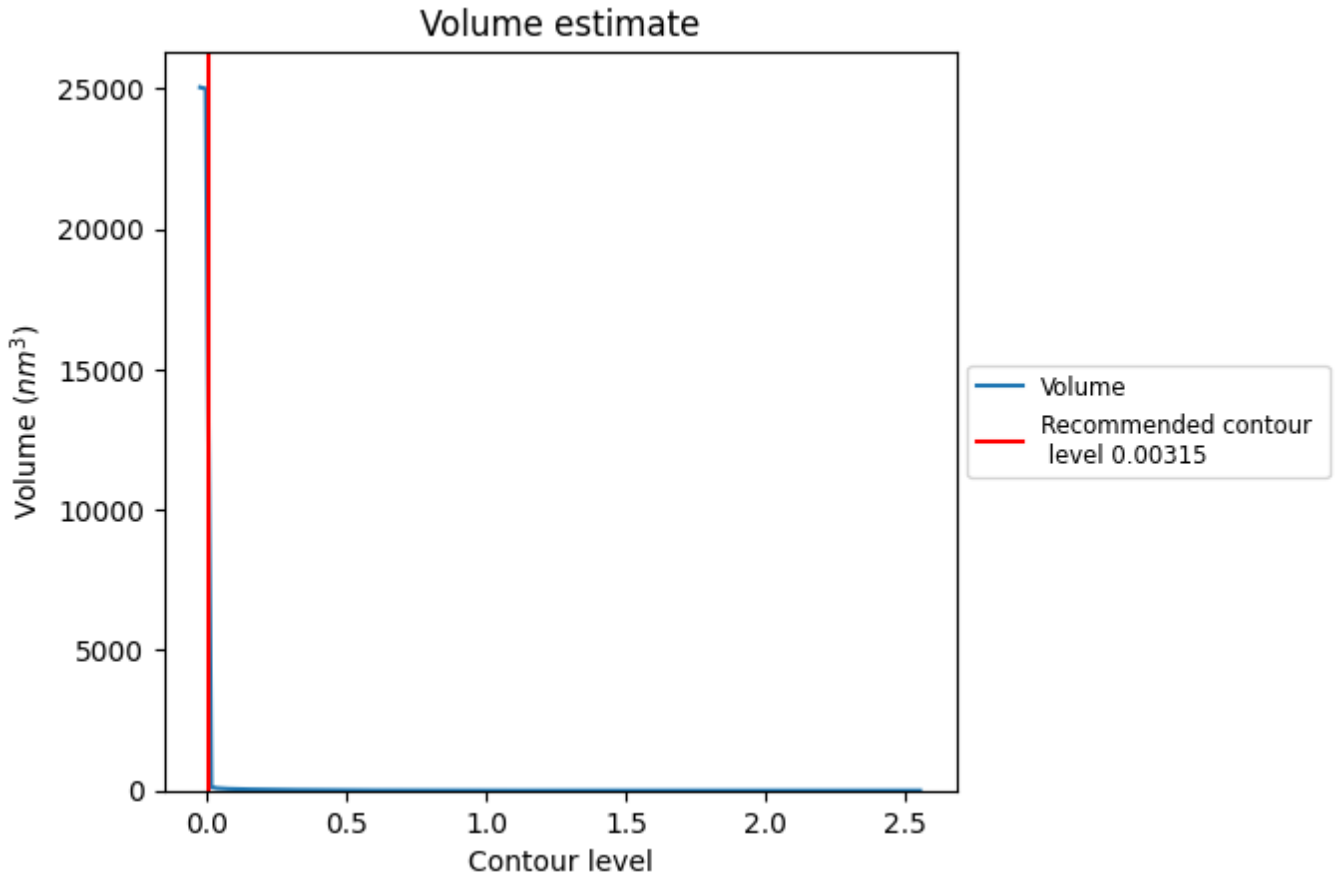
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

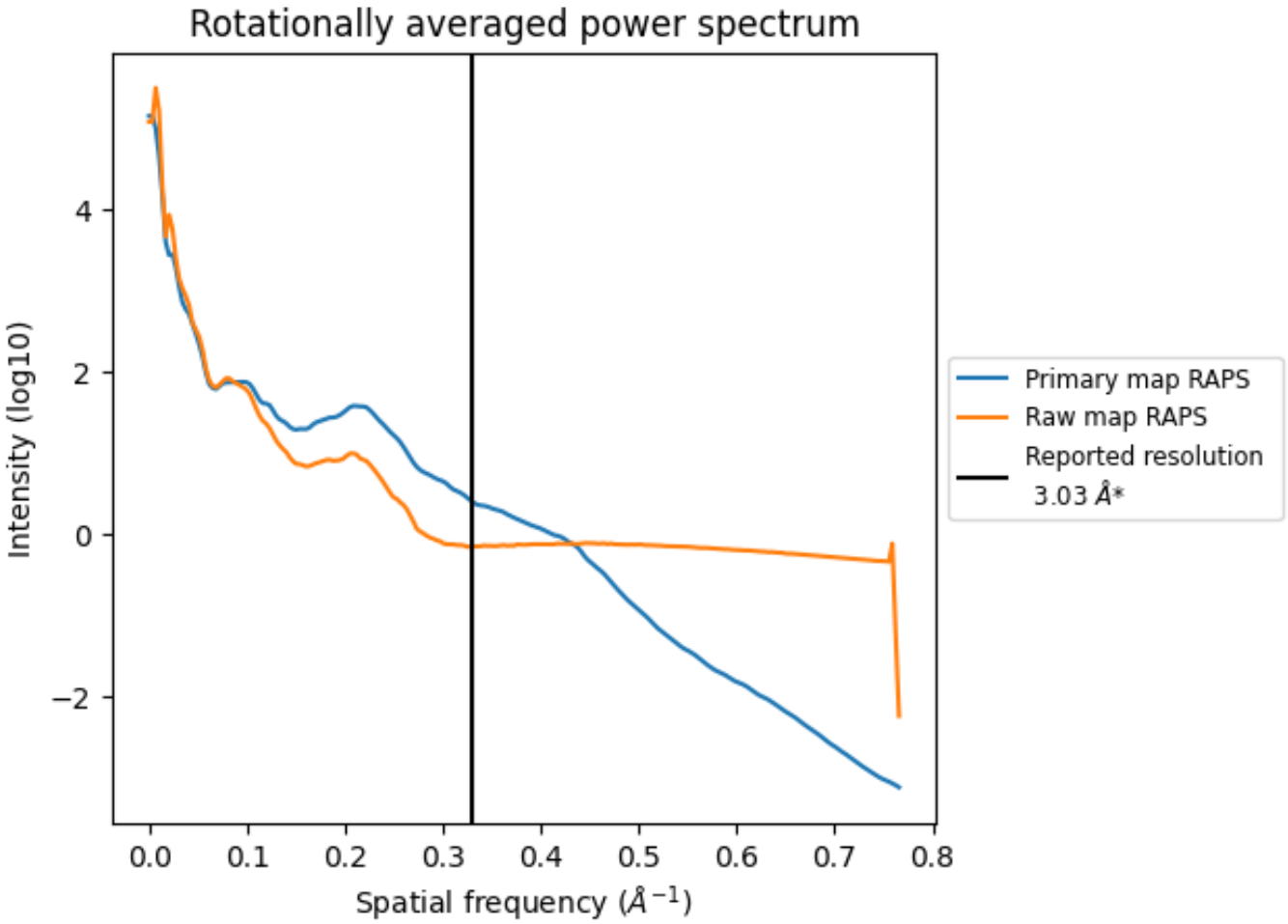
7.2 Volume estimate



The volume at the recommended contour level is 16615 nm^3; this corresponds to an approximate mass of 15009 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)

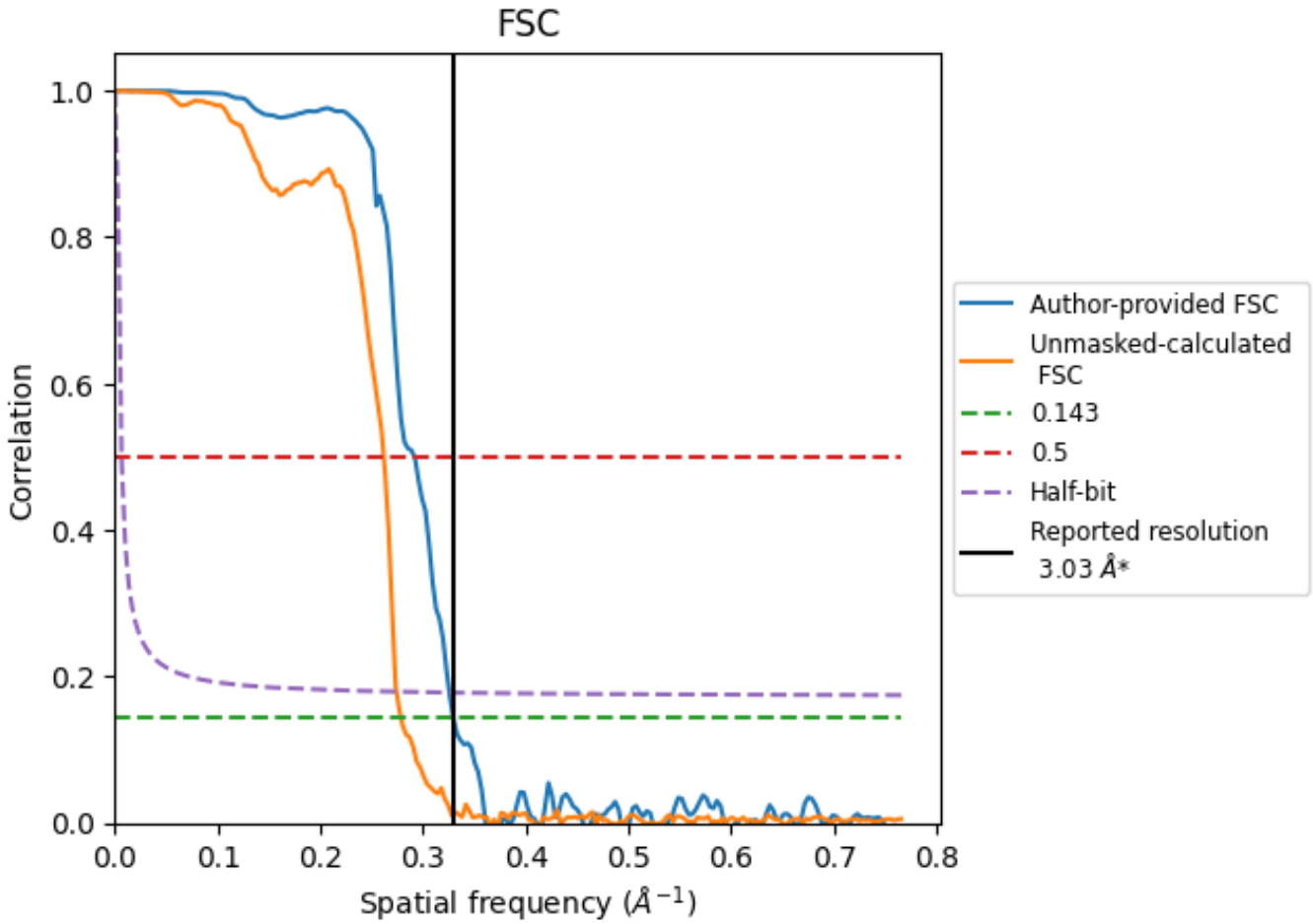


*Reported resolution corresponds to spatial frequency of 0.330 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.330 Å^{-1}

8.2 Resolution estimates (i)

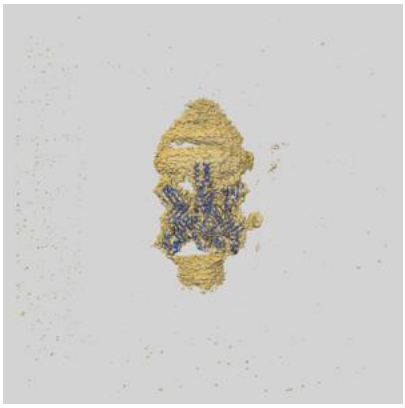
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.03	-	-
Author-provided FSC curve	3.03	3.43	3.07
Unmasked-calculated*	3.59	3.82	3.65

*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 3.59 differs from the reported value 3.03 by more than 10 %

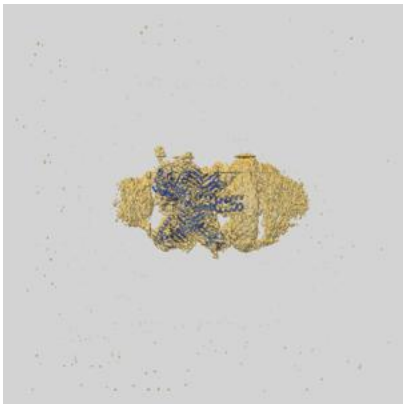
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-43488 and PDB model 8VRW. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay



X

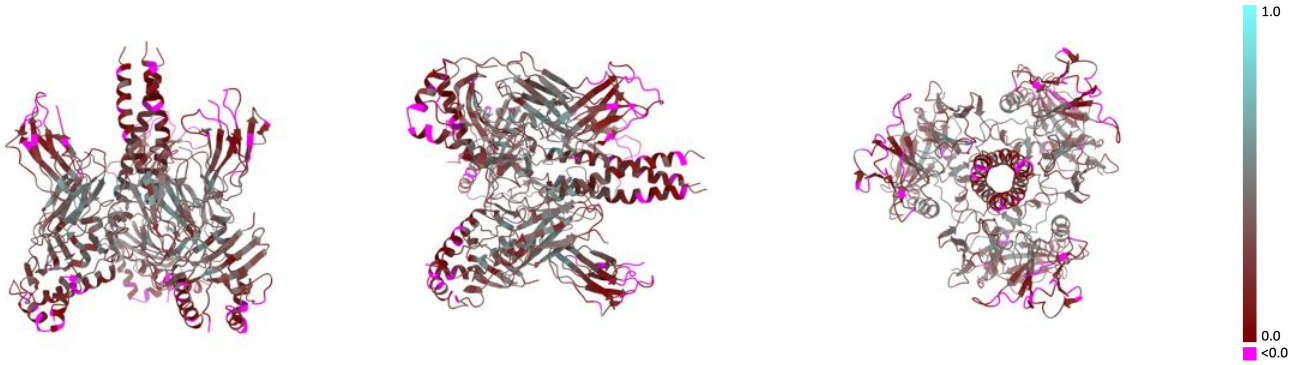


Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.00315 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.

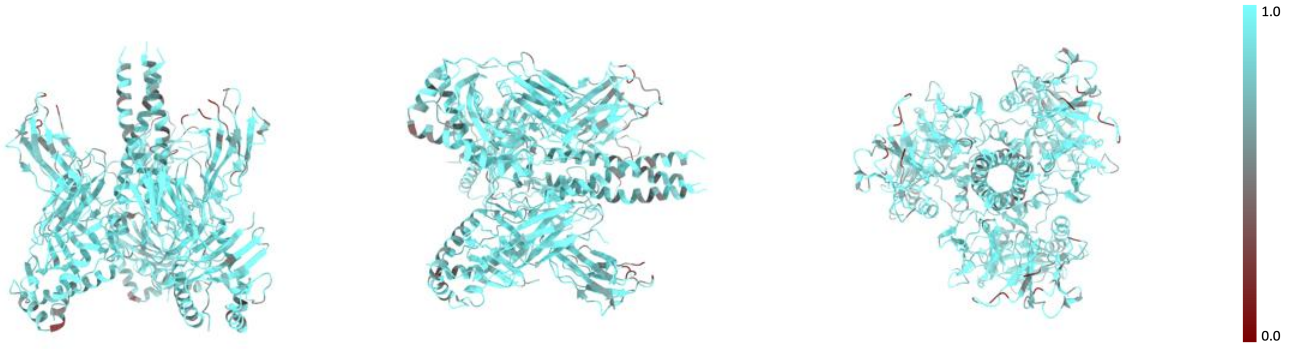
9.2 Q-score mapped to coordinate model (i)



X Y Z

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.

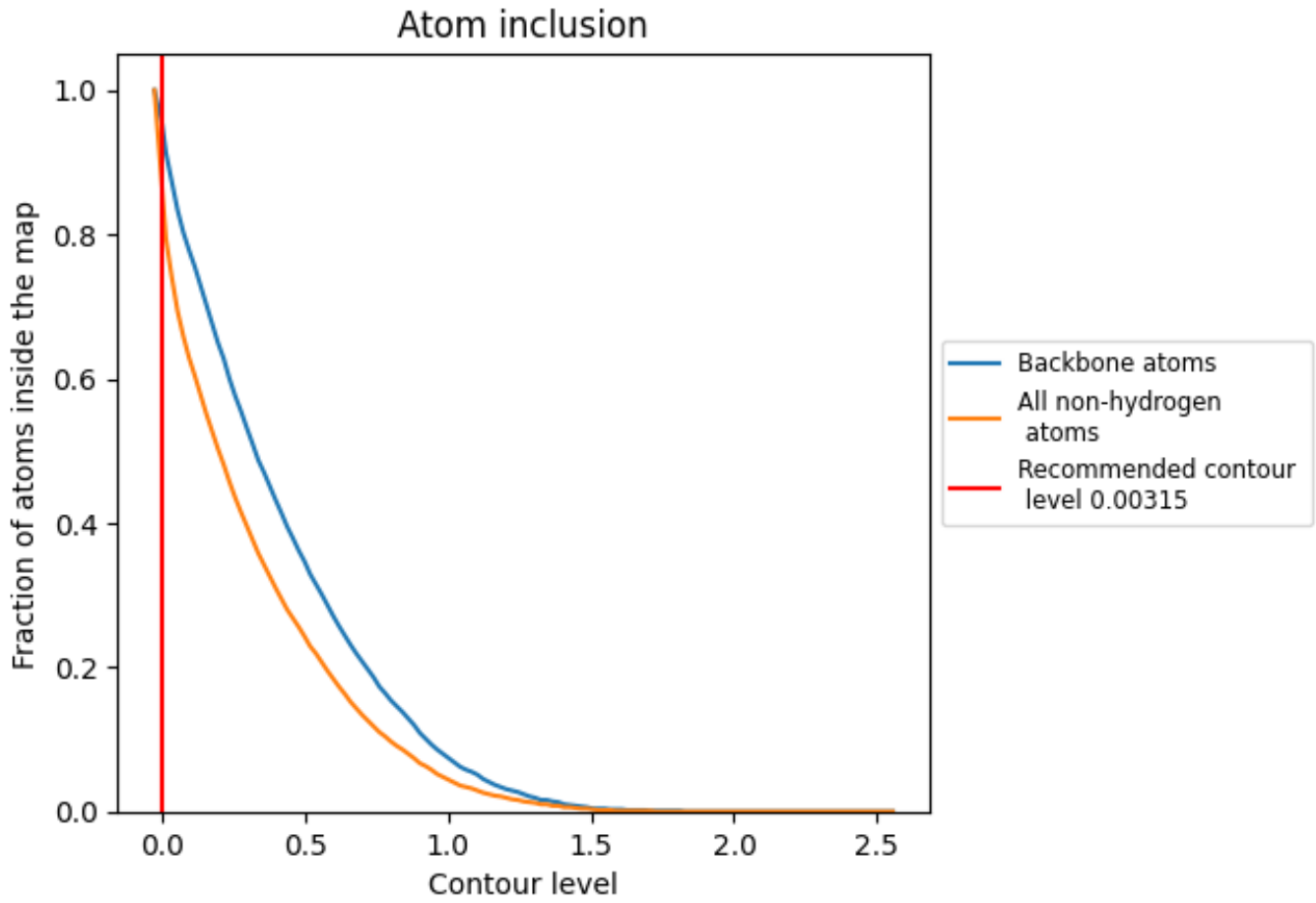
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.00315).

9.4 Atom inclusion (i)



At the recommended contour level, 95% of all backbone atoms, 86% 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 (0.00315) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8640	0.2720
A	0.8940	0.3290
B	0.8390	0.2270
C	0.8260	0.2330
D	0.9040	0.3360
E	0.8340	0.2230
F	0.8310	0.2340
G	0.9050	0.3360
H	0.8400	0.2210
I	0.8310	0.2380