Full wwPDB EM Validation Report

May 10, 2025 – 12:58 PM EDT

PDB ID	:	9NOS / pdb_00009nos
EMDB ID	:	EMD-49612
Title	:	Human sweet taste receptor (TAS1R2 + TAS1R3) from the PEG400 dataset
Authors	:	Juen, Z.; Lu, Z.; Yu, R.; Chang, A.N.; Wang, B.; Fitzpatrick, A.W.P.; Zuker, C.S.
Deposited on	:	2025-03-10
Resolution	:	3.50 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:

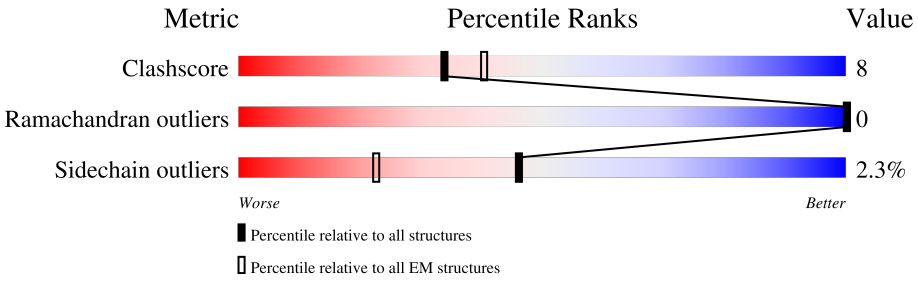
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

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 3.50 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	B	859	15% 72% 18% 9%
2	A	848	18% 73% 19% • 7%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 12555 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 Taste receptor type 1 member 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	780	6059	3900	1050	1060	49	0	0

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-6	MET	-	expression tag	UNP Q7RTX0
B	-5	LYS	-	expression tag	UNP Q7RTX0
B	-4	THR	-	expression tag	UNP Q7RTX0
B	-3	ILE	-	expression tag	UNP Q7RTX0
B	-2	ILE	-	expression tag	UNP Q7RTX0
B	-1	ALA	-	expression tag	UNP Q7RTX0
B	0	LEU	-	expression tag	UNP Q7RTX0
B	1	SER	-	expression tag	UNP Q7RTX0
B	2	TYR	-	expression tag	UNP Q7RTX0
B	3	ILE	-	expression tag	UNP Q7RTX0
B	4	PHE	-	expression tag	UNP Q7RTX0
B	5	CYS	-	expression tag	UNP Q7RTX0
B	6	LEU	-	expression tag	UNP Q7RTX0
B	7	VAL	-	expression tag	UNP Q7RTX0
B	8	PHE	-	expression tag	UNP Q7RTX0
B	9	ALA	-	expression tag	UNP Q7RTX0
B	10	ASP	-	expression tag	UNP Q7RTX0
B	11	TYR	-	expression tag	UNP Q7RTX0
B	12	LYS	-	expression tag	UNP Q7RTX0
B	13	ASP	-	expression tag	UNP Q7RTX0
B	14	ASP	-	expression tag	UNP Q7RTX0
B	15	ASP	-	expression tag	UNP Q7RTX0
B	16	ASP	-	expression tag	UNP Q7RTX0
B	17	LYS	-	expression tag	UNP Q7RTX0
B	18	ALA	-	expression tag	UNP Q7RTX0
B	19	ALA	-	expression tag	UNP Q7RTX0
B	20	ALA	-	expression tag	UNP Q7RTX0
B	757	ARG	CYS	conflict	UNP Q7RTX0

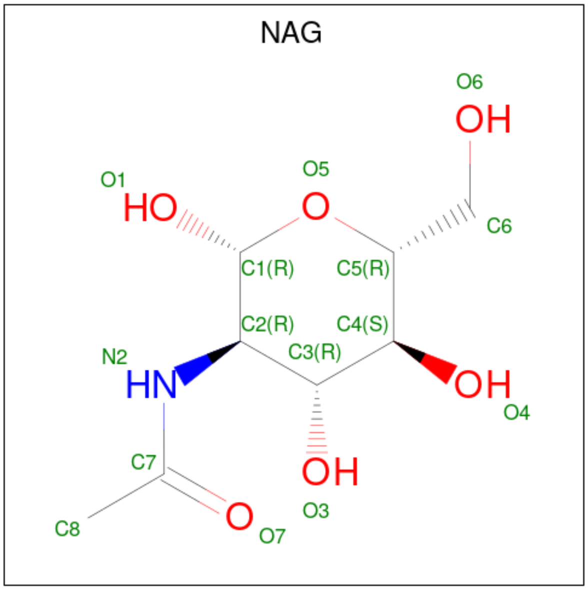
- Molecule 2 is a protein called Taste receptor type 1 member 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	785	Total	C	N	O	S	0	0
			6272	4066	1027	1131	48		

There are 27 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-8	MET	-	expression tag	UNP Q8TE23
A	-7	LYS	-	expression tag	UNP Q8TE23
A	-6	THR	-	expression tag	UNP Q8TE23
A	-5	ILE	-	expression tag	UNP Q8TE23
A	-4	ILE	-	expression tag	UNP Q8TE23
A	-3	ALA	-	expression tag	UNP Q8TE23
A	-2	LEU	-	expression tag	UNP Q8TE23
A	-1	SER	-	expression tag	UNP Q8TE23
A	0	TYR	-	expression tag	UNP Q8TE23
A	1	ILE	-	expression tag	UNP Q8TE23
A	2	PHE	-	expression tag	UNP Q8TE23
A	3	CYS	-	expression tag	UNP Q8TE23
A	4	LEU	-	expression tag	UNP Q8TE23
A	5	VAL	-	expression tag	UNP Q8TE23
A	6	PHE	-	expression tag	UNP Q8TE23
A	7	ALA	-	expression tag	UNP Q8TE23
A	8	TYR	-	expression tag	UNP Q8TE23
A	9	PRO	-	expression tag	UNP Q8TE23
A	10	TYR	-	expression tag	UNP Q8TE23
A	11	ASP	-	expression tag	UNP Q8TE23
A	12	VAL	-	expression tag	UNP Q8TE23
A	13	PRO	-	expression tag	UNP Q8TE23
A	14	ASP	-	expression tag	UNP Q8TE23
A	15	TYR	-	expression tag	UNP Q8TE23
A	16	ALA	-	expression tag	UNP Q8TE23
A	17	ALA	-	expression tag	UNP Q8TE23
A	18	ALA	-	expression tag	UNP Q8TE23

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	AltConf
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	B	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0

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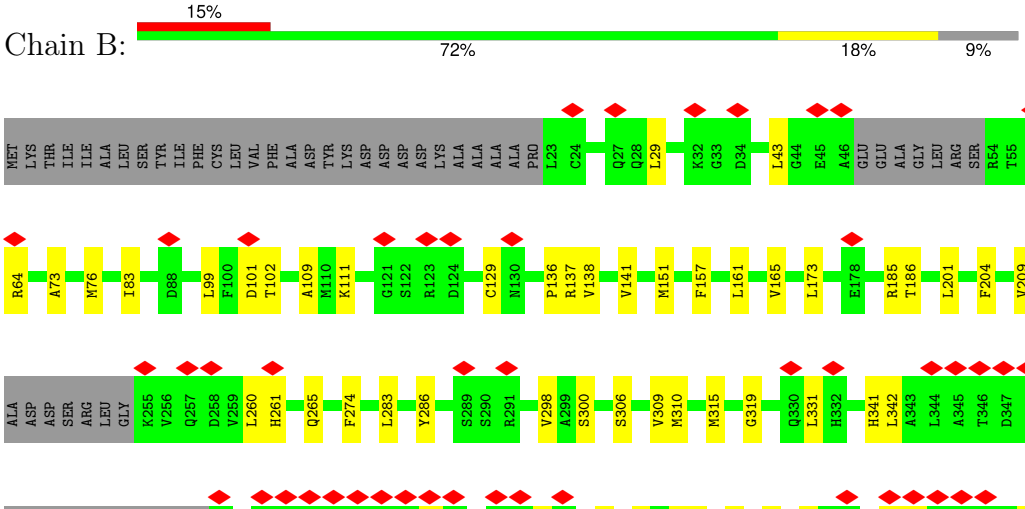
Mol	Chain	Residues	Atoms				AltConf
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	A	1	Total	C	N	O	0
			14	8	1	5	

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: Taste receptor type 1 member 3

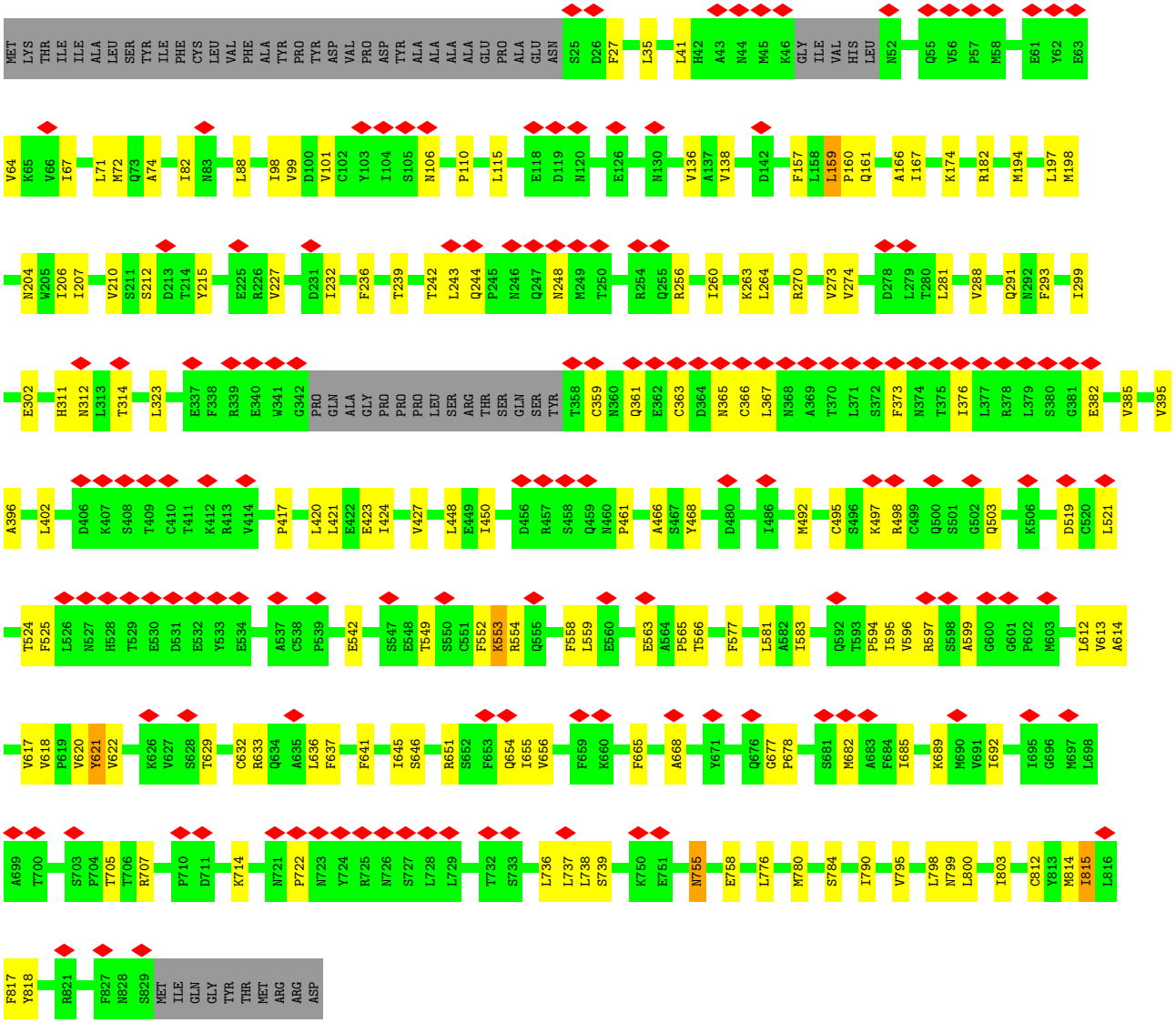
Chain B:



• Molecule 2: Taste receptor type 1 member 2

Chain A:


18%
73%
19%
7%


MET LYS THR ILE ILE ALA LEU SER TYR ILE PHE CYS LEU VAL PHE ALA TYR PRO TYR ASP VAL PRO ASP TYR ALA ALA ALA GLU PRO ALA GLU ASN S25 D26 F27 L35 L41 H42 A43 N44 M45 K46 GLY ILE VAL HIS LEU N52 Q55 V56 P57 M58 E61 Y62 E63
V64 K65 V66 I67 L71 M72 Q73 A74 I82 N83 L88 I98 V99 D100 V101 C102 Y103 I104 S105 N106 P110 L115 E118 D119 N120 E126 N130 V136 A137 V138 D142 F157 L158 L159 P160 Q161 A166 I167 K174 R182 M194 L197 M198
N204 W205 I206 I207 V210 S211 S212 D213 T214 Y215 E225 R226 V227 D231 I232 F236 T239 T242 L243 Q244 P245 N246 Q247 N248 M249 T250 R254 Q255 R256 I260 K263 L264 R270 V273 V274 D278 L279 T280 L281 V288 Q291 N292 F293 I299
E302 H311 N312 L313 T314 L323 E337 F338 R339 E340 W341 G342 PRO GLN ALA GLY PRO PRO PRO LEU SER ARG THR SER GLN SER TYR T358 C359 N360 Q361 E362 C363 D364 N365 C366 L367 N368 A369 T370 L371 S372 F373 N374 T375 I376 L377 R378 L379 S380 G381 E382 V385 V395
A396 L402 D406 K407 S408 T409 C410 T411 K412 R413 V414 P417 L420 L421 E422 E423 I424 V427 L448 E449 I450 D456 R457 S458 Q459 N460 P461 A466 S467 Y468 D480 I486 M492 C495 S496 K497 R498 C499 Q500 S501 G502 Q503 K506 D519 C520 L521
T524 F525 L526 N527 H528 T529 E530 D531 E532 Y533 E534 A537 C538 P539 E542 S547 E548 T549 S550 C551 F552 K553 R554 Q555 F558 L559 E560 E563 A564 P565 T566 F577 L581 A582 I583 Q592 T593 P594 I595 V596 R597 S598 A599 G600 G601 P602 M603 L612 V613 A614
V617 V618 P619 V620 Y621 V622 K626 V627 S628 T629 C632 R633 Q634 A635 L636 F637 F641 I645 S646 R651 S652 F653 Q654 I655 V656 F659 K660 F665 A668 Y671 Q676 G677 P678 S681 M682 A683 F684 I685 K689 M690 V691 I692 I695 G696 M697 L698
A699 T700 S703 P704 T705 T706 R707 P710 D711 K714 N721 P722 N723 Y724 R725 N726 S727 L728 L729 T732 S733 L736 L737 L738 S739 K750 E751 N755 E758 L776 M780 S784 I790 V795 L798 N799 L800 I803 C812 Y813 M814 I815 L816
F817 Y818 R821 F827 N828 S829 MET ILE GLN GLY TYR THR MET ARG ARG ASP

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	151281	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	59	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.239	Depositor
Minimum map value	-0.216	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.018	Depositor
Recommended contour level	0.22	Depositor
Map size (Å)	374.465, 372.819, 375.288	wwPDB
Map dimensions	455, 453, 456	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.823, 0.823, 0.823	Depositor

5 Model quality

5.1 Standard geometry

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

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	B	0.13	0/6218	0.31	0/8468
2	A	0.12	0/6435	0.30	0/8774
All	All	0.13	0/12653	0.30	0/17242

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	6059	0	6021	104	0
2	A	6272	0	6206	100	0
3	A	112	0	104	1	0
3	B	112	0	104	0	0
All	All	12555	0	12435	201	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 8.

All (201) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:260:LEU:HD12	1:B:286:TYR:CE2	1.80	1.16
1:B:260:LEU:HD21	1:B:283:LEU:HD11	1.33	1.02
1:B:260:LEU:HD12	1:B:286:TYR:CD2	2.00	0.96
2:A:74:ALA:HB2	2:A:385:VAL:HG13	1.50	0.93
1:B:260:LEU:HD12	1:B:286:TYR:HE2	1.31	0.93
1:B:260:LEU:CD1	1:B:286:TYR:CD2	2.59	0.84
2:A:74:ALA:CB	2:A:385:VAL:HG13	2.10	0.80
2:A:210:VAL:CG2	2:A:239:THR:HG22	2.11	0.80
1:B:29:LEU:HD22	1:B:99:LEU:HD12	1.64	0.80
1:B:260:LEU:CD1	1:B:286:TYR:CE2	2.65	0.77
1:B:186:THR:HG22	1:B:186:THR:O	1.88	0.74
2:A:99:VAL:HG11	2:A:110:PRO:HB3	1.71	0.73
1:B:410:CYS:HB3	1:B:416:PRO:HD2	1.70	0.73
1:B:260:LEU:CD1	1:B:286:TYR:HD2	2.01	0.72
1:B:59:SER:HB3	1:B:111:LYS:HE3	1.72	0.72
1:B:623:LEU:HD11	1:B:636:GLN:HA	1.71	0.72
2:A:72:MET:HG3	2:A:98:ILE:HD13	1.71	0.71
1:B:617:VAL:HG23	1:B:643:PRO:HB2	1.72	0.69
2:A:210:VAL:HG23	2:A:239:THR:HG22	1.73	0.69
2:A:159:LEU:HD23	2:A:417:PRO:HB3	1.75	0.69
1:B:750:LEU:HD12	1:B:750:LEU:O	1.94	0.68
2:A:115:LEU:HD13	2:A:157:PHE:HE2	1.59	0.68
1:B:716:THR:HG23	1:B:717:GLU:HG3	1.76	0.67
2:A:138:VAL:HG13	2:A:161:GLN:HG3	1.77	0.66
2:A:82:ILE:HD12	2:A:88:LEU:HD22	1.78	0.66
1:B:560:ARG:HH21	1:B:788:VAL:HG11	1.61	0.65
1:B:201:LEU:HD13	1:B:209:VAL:HG11	1.77	0.65
1:B:791:PRO:O	1:B:795:MET:HG3	1.97	0.64
1:B:545:GLU:HB2	1:B:556:ARG:HA	1.79	0.64
2:A:27:PHE:HD2	2:A:361:GLN:HG2	1.63	0.64
2:A:776:LEU:HD22	2:A:795:VAL:HG11	1.81	0.63
1:B:572:LEU:HD13	1:B:795:MET:HB2	1.80	0.63
2:A:755:ASN:HB2	2:A:758:GLU:HG3	1.80	0.62
2:A:689:LYS:HA	2:A:692:ILE:HG22	1.81	0.62
2:A:274:VAL:HG11	2:A:281:LEU:HD21	1.82	0.62
1:B:201:LEU:HD21	1:B:298:VAL:HG21	1.81	0.60
2:A:542:GLU:HA	2:A:554:ARG:HG3	1.84	0.60
2:A:41:LEU:HD11	2:A:72:MET:HE1	1.83	0.59
2:A:559:LEU:HB3	2:A:622:VAL:HG23	1.84	0.59
1:B:260:LEU:HD21	1:B:283:LEU:CD1	2.23	0.59
2:A:450:ILE:HB	2:A:466:ALA:HB3	1.85	0.59
2:A:64:VAL:HG21	2:A:365:ASN:HB2	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:735:ALA:O	1:B:739:THR:HG23	2.04	0.58
2:A:420:LEU:O	2:A:424:ILE:HG22	2.03	0.58
2:A:101:VAL:HG23	2:A:106:ASN:O	2.03	0.57
2:A:563:GLU:HB2	2:A:566:THR:HB	1.87	0.57
1:B:458:LEU:HD13	1:B:485:ILE:HG23	1.86	0.56
2:A:204:ASN:HA	2:A:232:ILE:HG23	1.86	0.56
1:B:76:MET:HG3	1:B:397:VAL:HG21	1.86	0.56
1:B:653:LEU:HD21	1:B:684:VAL:HG11	1.88	0.56
1:B:775:TRP:HA	1:B:778:PHE:HB3	1.88	0.56
1:B:342:LEU:HD12	1:B:378:LEU:HG	1.86	0.56
1:B:774:THR:HG23	1:B:775:TRP:CD1	2.41	0.55
2:A:646:SER:HA	2:A:738:LEU:HD21	1.88	0.55
1:B:598:LEU:HD23	1:B:817:LEU:HD22	1.88	0.55
2:A:167:ILE:HD11	2:A:215:TYR:HE1	1.72	0.55
1:B:562:LEU:HD21	1:B:792:ALA:HB2	1.88	0.54
2:A:136:VAL:HG12	2:A:420:LEU:HD22	1.89	0.54
1:B:442:LEU:HD23	1:B:450:VAL:HG21	1.90	0.53
1:B:260:LEU:HD11	1:B:286:TYR:HD2	1.71	0.53
2:A:273:VAL:HG12	2:A:299:ILE:HB	1.88	0.53
2:A:248:ASN:HB3	3:A:906:NAG:H2	1.90	0.53
1:B:456:LEU:HD23	1:B:471:VAL:HG23	1.91	0.53
1:B:614:LEU:HD22	1:B:802:VAL:HG22	1.91	0.53
2:A:35:LEU:HD13	2:A:395:VAL:HG11	1.91	0.53
2:A:780:MET:HE2	2:A:780:MET:HA	1.90	0.52
2:A:227:VAL:HG22	2:A:232:ILE:HB	1.91	0.52
1:B:73:ALA:HB1	1:B:99:LEU:HD13	1.92	0.52
1:B:597:PRO:HD2	1:B:824:ASN:HB2	1.91	0.52
1:B:713:MET:HA	1:B:713:MET:HE2	1.92	0.51
1:B:775:TRP:O	1:B:779:VAL:HG23	2.11	0.51
2:A:595:ILE:HG23	2:A:596:VAL:HG13	1.92	0.51
1:B:410:CYS:CB	1:B:415:CYS:HA	2.41	0.50
2:A:665:PHE:HB3	2:A:668:ALA:HB3	1.93	0.50
1:B:43:LEU:HD12	1:B:101:ASP:HB2	1.94	0.50
1:B:186:THR:O	1:B:186:THR:CG2	2.58	0.50
1:B:331:LEU:HD13	1:B:390:THR:HG22	1.94	0.49
1:B:506:GLY:H	1:B:530:ARG:HH22	1.60	0.49
2:A:376:ILE:HG13	2:A:461:PRO:HG2	1.92	0.49
1:B:243:VAL:HG11	1:B:283:LEU:HD22	1.94	0.49
1:B:407:THR:HG21	1:B:421:VAL:HG21	1.94	0.49
2:A:498:ARG:HH11	2:A:498:ARG:HG2	1.78	0.49
2:A:617:VAL:HB	2:A:637:PHE:HE1	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:594:ARG:HA	1:B:599:VAL:HG21	1.96	0.48
1:B:319:GLY:HA2	1:B:488:HIS:CG	2.48	0.48
1:B:186:THR:HG21	1:B:395:ALA:HB3	1.95	0.48
2:A:115:LEU:HD22	2:A:157:PHE:CD2	2.48	0.48
2:A:382:GLU:HB3	2:A:385:VAL:HB	1.95	0.48
2:A:525:PHE:HB2	2:A:549:THR:HA	1.96	0.48
2:A:503:GLN:HG2	2:A:519:ASP:HA	1.95	0.47
1:B:660:VAL:HA	1:B:664:LEU:HD13	1.97	0.47
2:A:160:PRO:HG3	2:A:421:LEU:HB2	1.97	0.47
1:B:642:LEU:HB3	1:B:643:PRO:HD3	1.97	0.47
1:B:657:GLU:HB2	1:B:676:LEU:HD22	1.96	0.47
2:A:115:LEU:HD13	2:A:157:PHE:CE2	2.45	0.47
2:A:497:LYS:HE2	2:A:497:LYS:HB2	1.80	0.47
1:B:309:VAL:HG13	1:B:315:MET:HE3	1.98	0.46
1:B:598:LEU:HA	1:B:829:PHE:HE2	1.80	0.46
1:B:151:MET:HE2	1:B:173:LEU:HD11	1.98	0.46
2:A:655:ILE:HG13	2:A:656:VAL:HG23	1.97	0.46
2:A:88:LEU:HD21	2:A:396:ALA:HB1	1.98	0.46
2:A:613:VAL:O	2:A:617:VAL:HG23	2.15	0.46
2:A:565:PRO:HB2	2:A:790:ILE:HG12	1.97	0.46
2:A:705:THR:HG21	2:A:722:PRO:HA	1.98	0.46
2:A:736:LEU:HA	2:A:739:SER:HB3	1.97	0.46
2:A:814:MET:HA	2:A:818:TYR:HB2	1.97	0.46
1:B:260:LEU:CD1	1:B:286:TYR:HE2	2.14	0.46
2:A:424:ILE:HA	2:A:427:VAL:HG13	1.97	0.45
2:A:599:ALA:HA	2:A:651:ARG:HH12	1.82	0.45
1:B:83:ILE:HD11	1:B:398:TYR:HA	1.97	0.45
1:B:682:TRP:O	1:B:686:LEU:HG	2.16	0.45
1:B:714:LEU:HD13	1:B:715:PRO:HD2	1.98	0.45
1:B:774:THR:HG23	1:B:775:TRP:HD1	1.78	0.45
1:B:165:VAL:HG13	1:B:165:VAL:O	2.17	0.45
1:B:641:HIS:CE1	1:B:734:HIS:HE2	2.34	0.45
2:A:581:LEU:HD13	2:A:612:LEU:HD21	1.98	0.45
2:A:243:LEU:HD23	2:A:243:LEU:HA	1.81	0.45
2:A:645:ILE:HG22	2:A:738:LEU:HD22	1.99	0.45
2:A:256:ARG:O	2:A:260:ILE:HG12	2.17	0.45
1:B:633:CYS:HA	1:B:636:GLN:HG3	1.98	0.44
2:A:594:PRO:HA	2:A:597:ARG:HG2	1.99	0.44
2:A:707:ARG:HH22	2:A:784:SER:HB3	1.81	0.44
1:B:727:TRP:HA	1:B:730:PHE:CE2	2.52	0.44
2:A:542:GLU:HB3	2:A:553:LYS:HA	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:642:LEU:HD11	1:B:689:MET:HG3	2.00	0.44
1:B:754:GLN:HG2	1:B:757:ARG:HB2	1.98	0.44
1:B:410:CYS:HB3	1:B:415:CYS:HA	1.99	0.44
2:A:174:LYS:HA	2:A:174:LYS:HD3	1.75	0.44
2:A:270:ARG:HD3	2:A:270:ARG:HA	1.76	0.44
1:B:136:PRO:HG2	1:B:423:PRO:HG2	1.98	0.44
1:B:803:LEU:HD23	1:B:803:LEU:HA	1.80	0.44
2:A:67:ILE:O	2:A:71:LEU:HG	2.17	0.44
1:B:682:TRP:HA	1:B:685:VAL:HG12	1.99	0.44
2:A:621:TYR:CZ	2:A:633:ARG:HD3	2.53	0.43
2:A:707:ARG:NH2	2:A:784:SER:HB3	2.33	0.43
1:B:627:GLN:HA	1:B:628:PRO:HD3	1.88	0.43
2:A:651:ARG:HD2	2:A:654:GLN:HE21	1.83	0.43
2:A:803:ILE:HD13	2:A:803:ILE:HA	1.82	0.43
2:A:64:VAL:HG11	2:A:366:CYS:HA	2.00	0.43
2:A:166:ALA:O	2:A:182:ARG:HD2	2.18	0.43
2:A:212:SER:HB2	2:A:242:THR:HG23	1.99	0.43
2:A:367:LEU:HD12	2:A:367:LEU:HA	1.85	0.43
2:A:402:LEU:HD13	2:A:423:GLU:HB2	2.00	0.43
2:A:492:MET:HE2	2:A:492:MET:HB3	1.95	0.43
1:B:704:PRO:HD3	1:B:725:ARG:HH21	1.83	0.43
2:A:552:PHE:CE1	2:A:714:LYS:HG3	2.54	0.43
1:B:460:VAL:HG21	1:B:469:HIS:CE1	2.54	0.43
2:A:618:VAL:HA	2:A:637:PHE:HZ	1.83	0.43
2:A:197:LEU:HD21	2:A:323:LEU:HD13	2.01	0.43
2:A:646:SER:HB3	2:A:685:ILE:HG21	2.00	0.43
1:B:625:PRO:HD3	1:B:795:MET:SD	2.59	0.43
1:B:462:GLN:O	1:B:462:GLN:HG2	2.19	0.42
1:B:587:LEU:HA	1:B:611:LEU:HD13	2.01	0.42
1:B:637:GLN:HB2	1:B:638:PRO:HD3	2.01	0.42
2:A:244:GLN:H	2:A:244:GLN:CD	2.28	0.42
1:B:274:PHE:HA	1:B:300:SER:HB3	2.02	0.42
1:B:501:ARG:HA	1:B:501:ARG:HD2	1.82	0.42
2:A:448:LEU:HB2	2:A:468:TYR:HB3	2.02	0.42
1:B:64:ARG:HE	1:B:64:ARG:HB2	1.54	0.42
1:B:141:VAL:HG11	1:B:157:PHE:HE2	1.83	0.42
2:A:521:LEU:O	2:A:524:THR:HG22	2.19	0.42
1:B:593:HIS:HB2	1:B:817:LEU:HD21	2.01	0.42
2:A:207:ILE:HD13	2:A:264:LEU:HD12	2.01	0.42
1:B:548:PRO:HG2	1:B:551:SER:HB3	2.02	0.42
2:A:194:MET:HE2	2:A:299:ILE:HG22	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:583:ILE:HD12	2:A:812:CYS:HB2	2.01	0.42
2:A:677:GLY:N	2:A:678:PRO:HD2	2.35	0.42
2:A:776:LEU:HB2	2:A:795:VAL:HG21	2.02	0.42
2:A:312:ASN:O	2:A:314:THR:HG23	2.19	0.41
1:B:319:GLY:HA2	1:B:488:HIS:CB	2.50	0.41
1:B:529:TYR:CD2	1:B:553:ARG:HA	2.55	0.41
1:B:530:ARG:HD3	1:B:533:PRO:HA	2.02	0.41
1:B:649:SER:OG	1:B:685:VAL:HG23	2.20	0.41
1:B:161:LEU:HD23	1:B:161:LEU:HA	1.88	0.41
1:B:745:PHE:HE1	1:B:765:THR:HG23	1.84	0.41
2:A:288:VAL:HG13	2:A:293:PHE:HD2	1.84	0.41
2:A:641:PHE:CZ	2:A:799:ASN:HB3	2.56	0.41
1:B:83:ILE:HD13	1:B:401:ALA:CB	2.50	0.41
1:B:137:ARG:HG3	1:B:138:VAL:HG13	2.03	0.41
1:B:547:SER:HB2	1:B:554:CYS:SG	2.60	0.41
1:B:746:LEU:HD12	1:B:746:LEU:HA	1.85	0.41
2:A:136:VAL:CG1	2:A:420:LEU:HD22	2.51	0.41
2:A:311:HIS:CE1	2:A:461:PRO:HB3	2.55	0.41
2:A:817:PHE:N	2:A:817:PHE:CD1	2.89	0.41
1:B:261:HIS:O	1:B:265:GLN:HG3	2.21	0.41
1:B:385:LEU:HD13	1:B:385:LEU:HA	1.93	0.41
1:B:515:HIS:HA	2:A:236:PHE:HB2	2.02	0.41
2:A:595:ILE:HG21	2:A:815:ILE:HD11	2.03	0.41
2:A:614:ALA:HB1	2:A:800:LEU:HD21	2.03	0.41
2:A:632:CYS:O	2:A:636:LEU:HB2	2.21	0.41
2:A:705:THR:HB	2:A:722:PRO:HG3	2.02	0.41
1:B:129:CYS:HB2	2:A:359:CYS:HB2	1.96	0.41
1:B:676:LEU:O	1:B:681:ALA:HB2	2.21	0.41
2:A:198:MET:SD	2:A:206:ILE:HG21	2.61	0.41
2:A:577:PHE:CE1	2:A:612:LEU:HG	2.56	0.41
1:B:769:LEU:HA	1:B:769:LEU:HD12	1.84	0.40
1:B:306:SER:O	1:B:310:MET:HG3	2.21	0.40
1:B:309:VAL:HG12	1:B:459:TRP:HH2	1.85	0.40
1:B:516:SER:HB3	2:A:263:LYS:HG2	2.03	0.40
1:B:102:THR:HB	1:B:109:ALA:HB2	2.03	0.40
1:B:204:PHE:HD1	1:B:204:PHE:HA	1.75	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	B	772/859 (90%)	750 (97%)	22 (3%)	0	100	100
2	A	779/848 (92%)	756 (97%)	23 (3%)	0	100	100
All	All	1551/1707 (91%)	1506 (97%)	45 (3%)	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	B	655/712 (92%)	640 (98%)	15 (2%)	45	69
2	A	708/760 (93%)	692 (98%)	16 (2%)	45	69
All	All	1363/1472 (93%)	1332 (98%)	31 (2%)	46	69

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	185	ARG
1	B	216	ASP
1	B	341	HIS
1	B	458	LEU
1	B	509	ARG
1	B	517	CYS
1	B	558	ARG
1	B	578	LEU

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Mol	Chain	Res	Type
1	B	621	VAL
1	B	623	LEU
1	B	648	LEU
1	B	699	TYR
1	B	712	HIS
1	B	736	THR
1	B	800	LEU
2	A	159	LEU
2	A	291	GLN
2	A	302	GLU
2	A	363	CYS
2	A	373	PHE
2	A	495	CYS
2	A	553	LYS
2	A	558	PHE
2	A	620	VAL
2	A	621	TYR
2	A	629	THR
2	A	682	MET
2	A	737	LEU
2	A	755	ASN
2	A	798	LEU
2	A	815	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	239	HIS
1	B	336	GLN
1	B	429	ASN
1	B	488	HIS
1	B	532	ASN
1	B	592	HIS
1	B	627	GLN
2	A	190	HIS
2	A	255	GLN

5.3.3 RNA

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)

16 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	NAG	A	901	2	14,14,15	0.72	0	17,19,21	1.17	1 (5%)
3	NAG	A	906	2	14,14,15	0.88	1 (7%)	17,19,21	1.32	1 (5%)
3	NAG	A	907	2	14,14,15	0.70	0	17,19,21	1.15	1 (5%)
3	NAG	B	906	1	14,14,15	0.69	0	17,19,21	0.86	0
3	NAG	A	905	2	14,14,15	0.80	1 (7%)	17,19,21	2.28	3 (17%)
3	NAG	B	905	1	14,14,15	0.72	0	17,19,21	0.91	1 (5%)
3	NAG	A	904	2	14,14,15	0.70	0	17,19,21	0.79	0
3	NAG	B	908	1	14,14,15	0.70	0	17,19,21	1.62	4 (23%)
3	NAG	A	902	2	14,14,15	0.81	1 (7%)	17,19,21	1.70	3 (17%)
3	NAG	A	903	2	14,14,15	0.75	0	17,19,21	1.18	1 (5%)
3	NAG	A	908	2	14,14,15	0.71	0	17,19,21	0.86	0
3	NAG	B	903	1	14,14,15	0.71	0	17,19,21	1.17	1 (5%)
3	NAG	B	902	1	14,14,15	0.73	0	17,19,21	0.81	0
3	NAG	B	901	1	14,14,15	0.72	0	17,19,21	0.76	0
3	NAG	B	907	1	14,14,15	0.72	0	17,19,21	0.83	0
3	NAG	B	904	1	14,14,15	0.69	0	17,19,21	1.22	2 (11%)

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
3	NAG	A	901	2	-	2/6/23/26	0/1/1/1
3	NAG	A	906	2	-	2/6/23/26	0/1/1/1
3	NAG	A	907	2	-	2/6/23/26	0/1/1/1
3	NAG	B	906	1	-	3/6/23/26	0/1/1/1
3	NAG	A	905	2	-	4/6/23/26	0/1/1/1
3	NAG	B	905	1	-	2/6/23/26	0/1/1/1
3	NAG	A	904	2	-	0/6/23/26	0/1/1/1
3	NAG	B	908	1	-	3/6/23/26	0/1/1/1
3	NAG	A	902	2	-	0/6/23/26	0/1/1/1
3	NAG	A	903	2	-	2/6/23/26	0/1/1/1
3	NAG	A	908	2	-	2/6/23/26	0/1/1/1
3	NAG	B	903	1	-	2/6/23/26	0/1/1/1
3	NAG	B	902	1	-	0/6/23/26	0/1/1/1
3	NAG	B	901	1	-	0/6/23/26	0/1/1/1
3	NAG	B	907	1	-	2/6/23/26	0/1/1/1
3	NAG	B	904	1	-	2/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	906	NAG	C1-C2	2.44	1.55	1.52
3	A	905	NAG	C1-C2	2.04	1.55	1.52
3	A	902	NAG	C1-C2	2.02	1.55	1.52

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	905	NAG	C2-N2-C7	8.20	133.89	122.90
3	A	902	NAG	C1-O5-C5	5.70	119.83	112.19
3	A	903	NAG	C2-N2-C7	3.27	127.28	122.90
3	B	908	NAG	C1-O5-C5	-3.26	107.82	112.19
3	B	903	NAG	C2-N2-C7	3.21	127.20	122.90
3	A	901	NAG	C2-N2-C7	3.17	127.15	122.90
3	A	906	NAG	C2-N2-C7	3.14	127.10	122.90
3	B	904	NAG	C2-N2-C7	3.09	127.04	122.90
3	A	907	NAG	C2-N2-C7	3.05	126.99	122.90
3	A	905	NAG	C8-C7-N2	2.62	120.46	116.12
3	B	908	NAG	O5-C1-C2	-2.52	107.39	111.29
3	B	908	NAG	O4-C4-C3	-2.51	104.46	110.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	908	NAG	C3-C4-C5	2.50	114.76	110.23
3	A	902	NAG	C2-N2-C7	2.13	125.75	122.90
3	A	902	NAG	C3-C4-C5	-2.09	106.44	110.23
3	A	905	NAG	C1-C2-N2	2.04	113.65	110.43
3	B	905	NAG	C2-N2-C7	2.03	125.62	122.90
3	B	904	NAG	C1-O5-C5	2.00	114.87	112.19

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	905	NAG	C8-C7-N2-C2
3	B	905	NAG	O7-C7-N2-C2
3	B	906	NAG	C8-C7-N2-C2
3	B	906	NAG	O7-C7-N2-C2
3	B	907	NAG	C8-C7-N2-C2
3	B	907	NAG	O7-C7-N2-C2
3	B	908	NAG	C8-C7-N2-C2
3	B	908	NAG	O7-C7-N2-C2
3	A	905	NAG	C8-C7-N2-C2
3	A	905	NAG	O7-C7-N2-C2
3	A	908	NAG	C8-C7-N2-C2
3	A	908	NAG	O7-C7-N2-C2
3	B	908	NAG	O5-C5-C6-O6
3	B	906	NAG	O5-C5-C6-O6
3	B	903	NAG	C1-C2-N2-C7
3	A	901	NAG	C1-C2-N2-C7
3	A	907	NAG	C1-C2-N2-C7
3	B	903	NAG	C3-C2-N2-C7
3	A	901	NAG	C3-C2-N2-C7
3	A	903	NAG	C3-C2-N2-C7
3	A	906	NAG	C3-C2-N2-C7
3	A	907	NAG	C3-C2-N2-C7
3	B	904	NAG	C1-C2-N2-C7
3	A	903	NAG	C1-C2-N2-C7
3	A	905	NAG	C1-C2-N2-C7
3	A	906	NAG	C1-C2-N2-C7
3	B	904	NAG	C3-C2-N2-C7
3	A	905	NAG	C3-C2-N2-C7

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	906	NAG	1	0

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

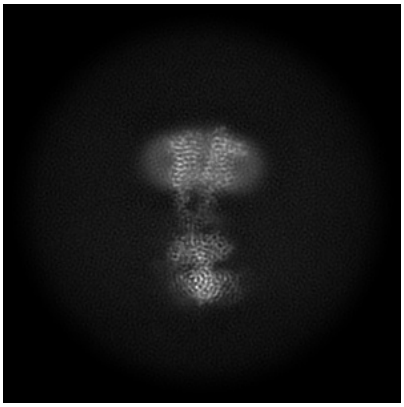
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-49612. These allow visual inspection of the internal detail of the map and identification of artifacts.

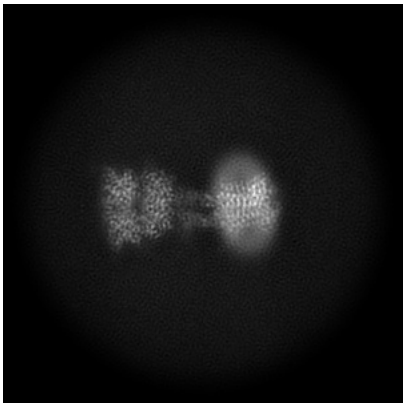
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

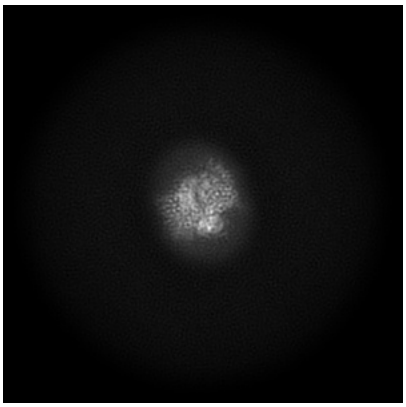
6.1.1 Primary map



X



Y

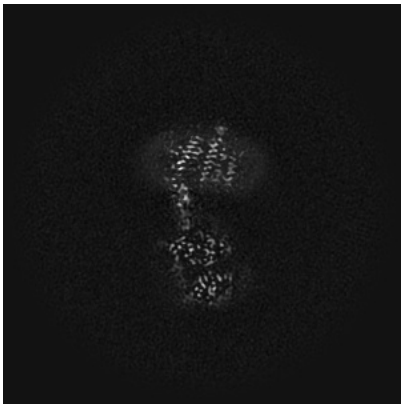


Z

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

6.2 Central slices

6.2.1 Primary map



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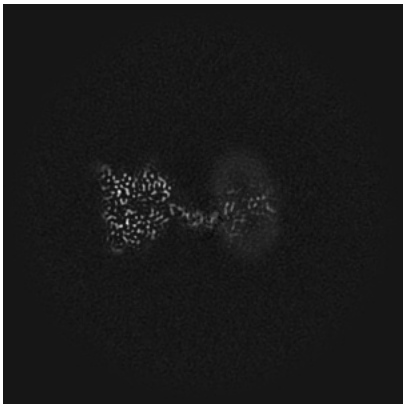
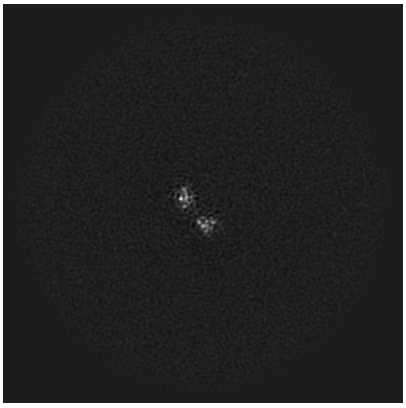


Y Index: 226

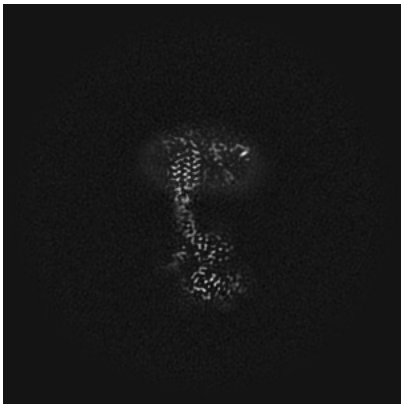


Z Index: 228

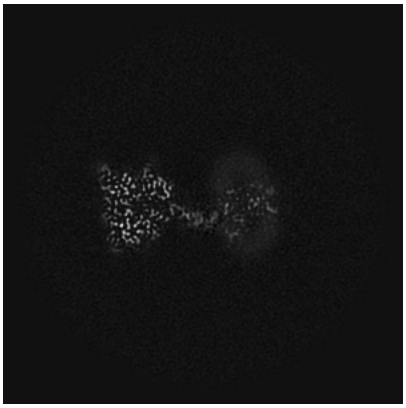
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

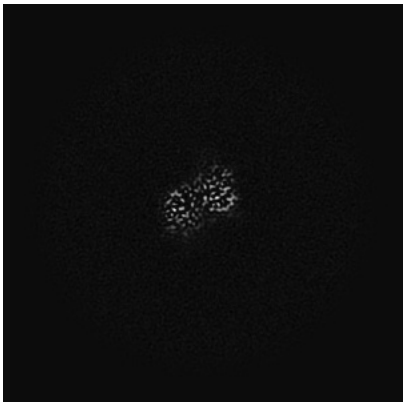
6.3.1 Primary map



X Index: 236



Y Index: 225

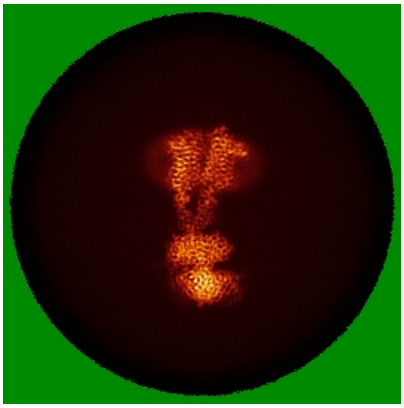


Z Index: 139

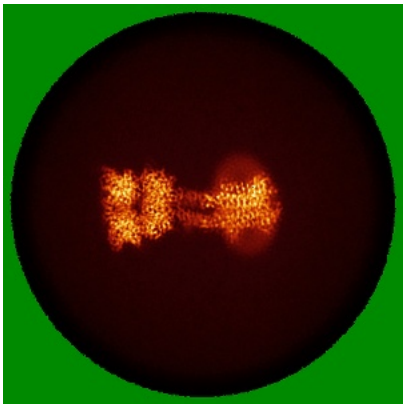
The images above show the largest variance slices of the map in three orthogonal directions.

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

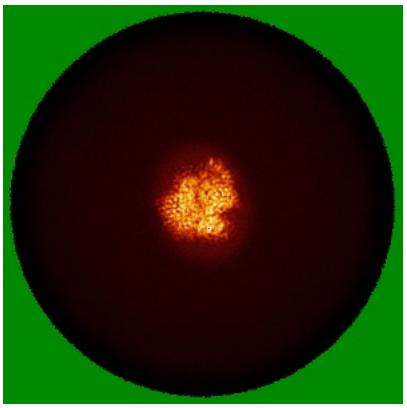
6.4.1 Primary map



X



Y

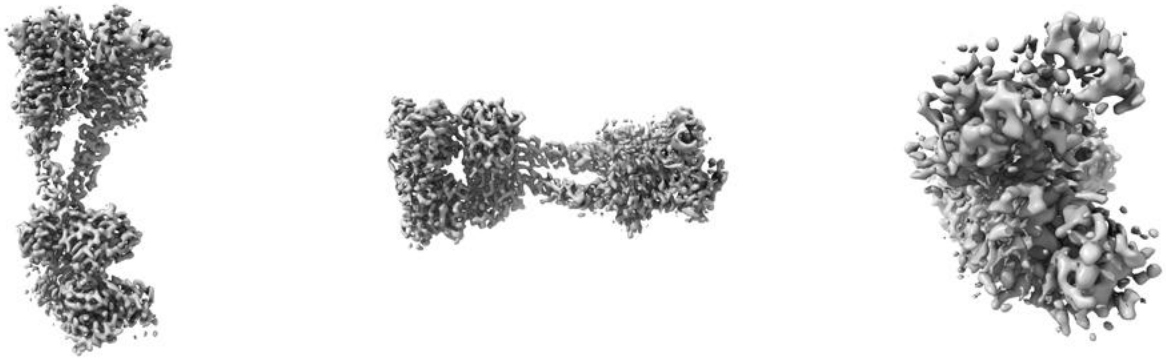


Z

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

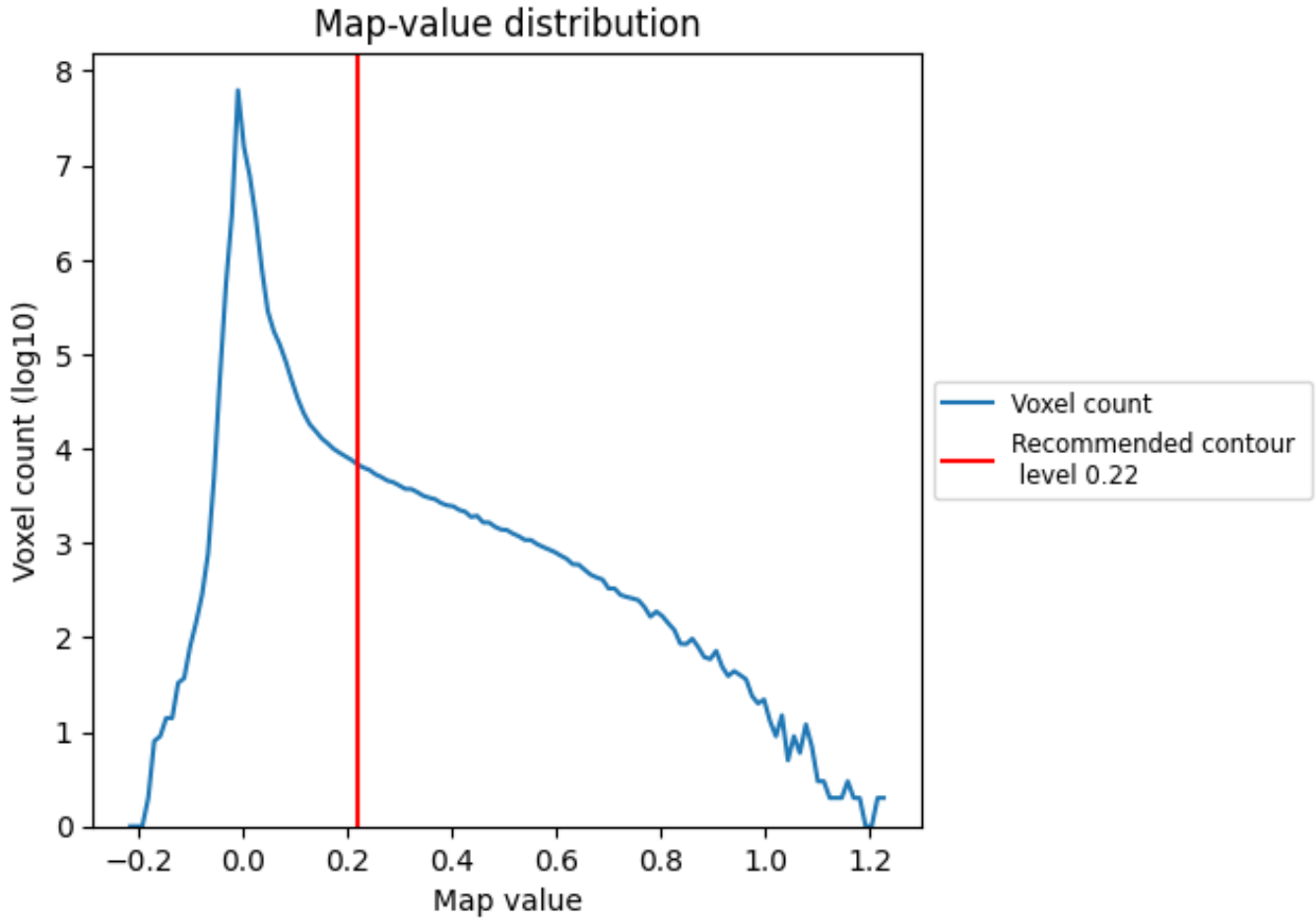
6.6 Mask visualisation (i)

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

7 Map analysis

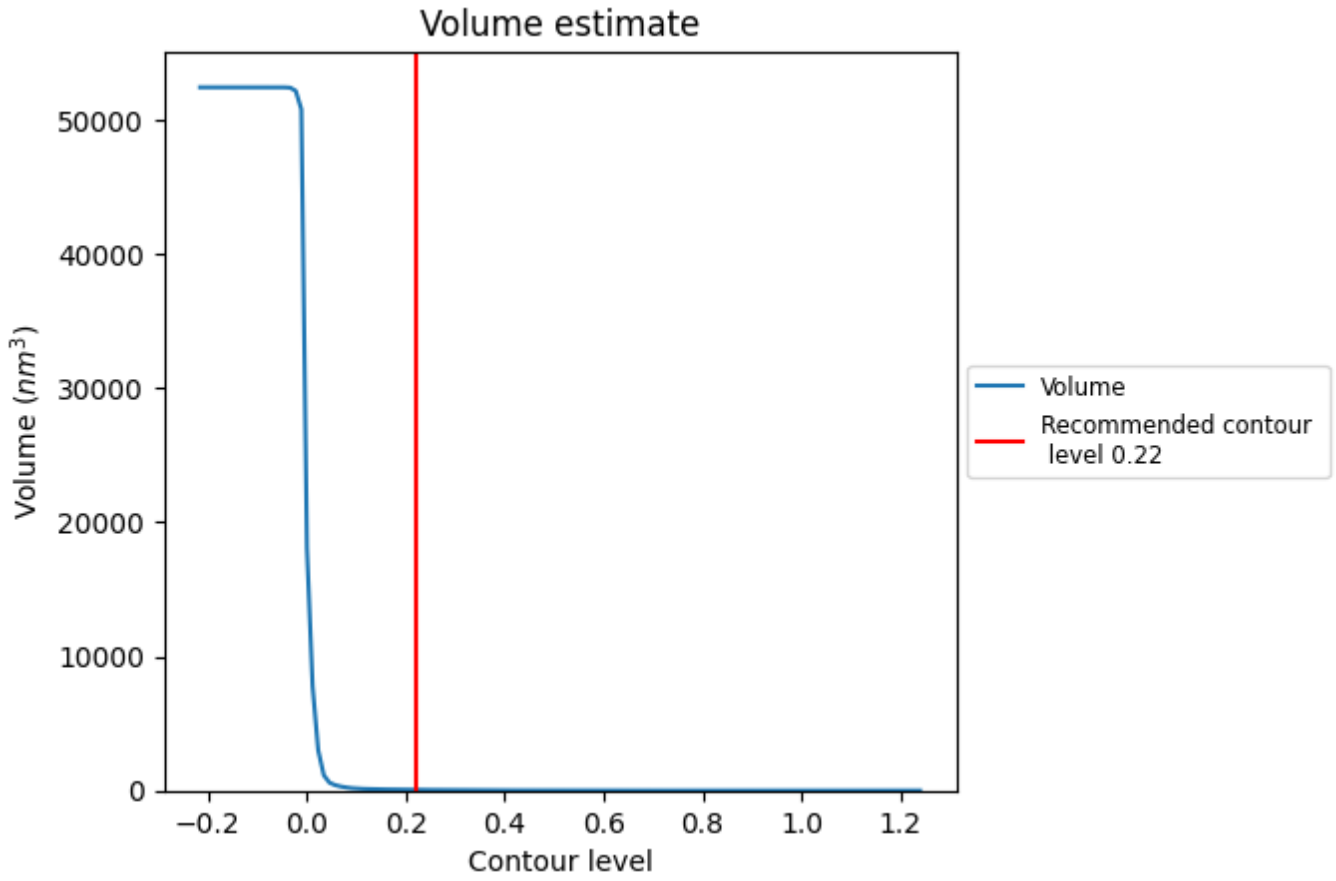
This section contains the results of statistical analysis of the map.

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 57 nm^3; this corresponds to an approximate mass of 51 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

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

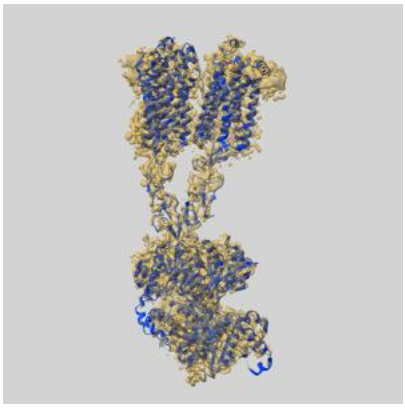
8 Fourier-Shell correlation (i)

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

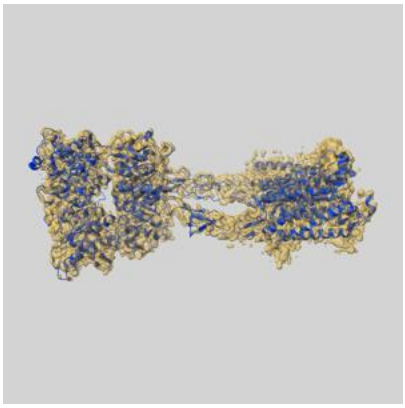
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-49612 and PDB model 9NOS. Per-residue inclusion information can be found in section 3 on page 7.

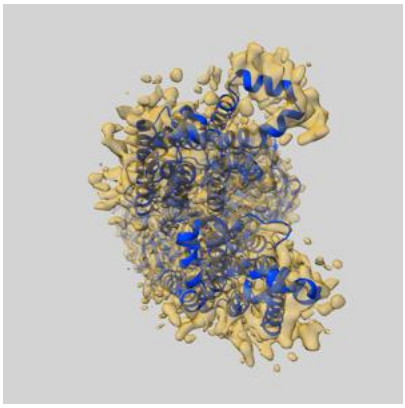
9.1 Map-model overlay



X



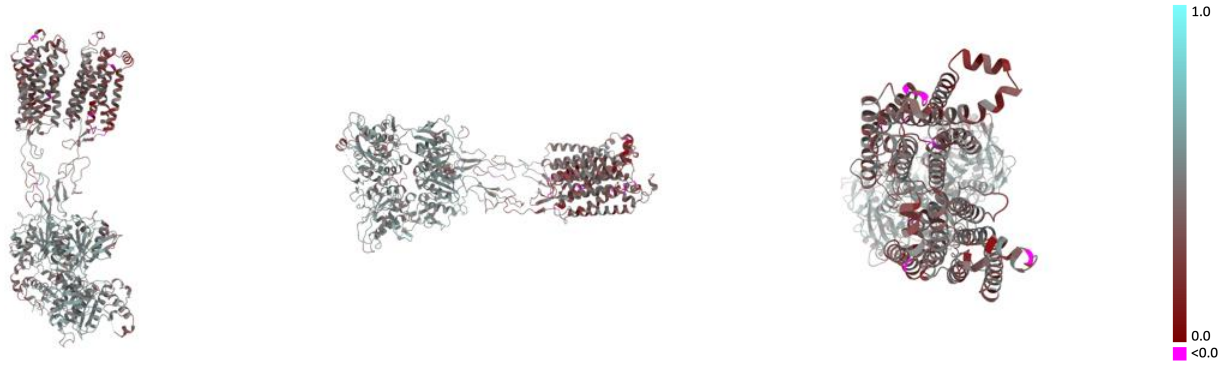
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.22 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.

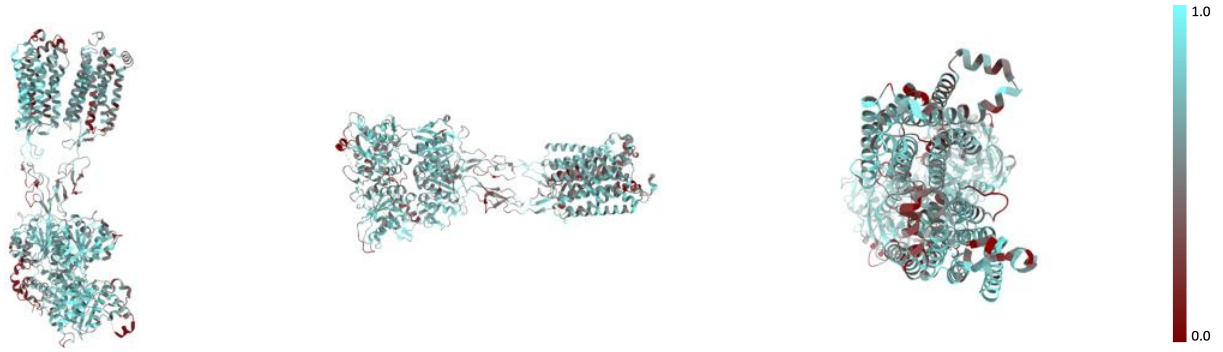
9.2 Q-score mapped to coordinate model (i)



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.

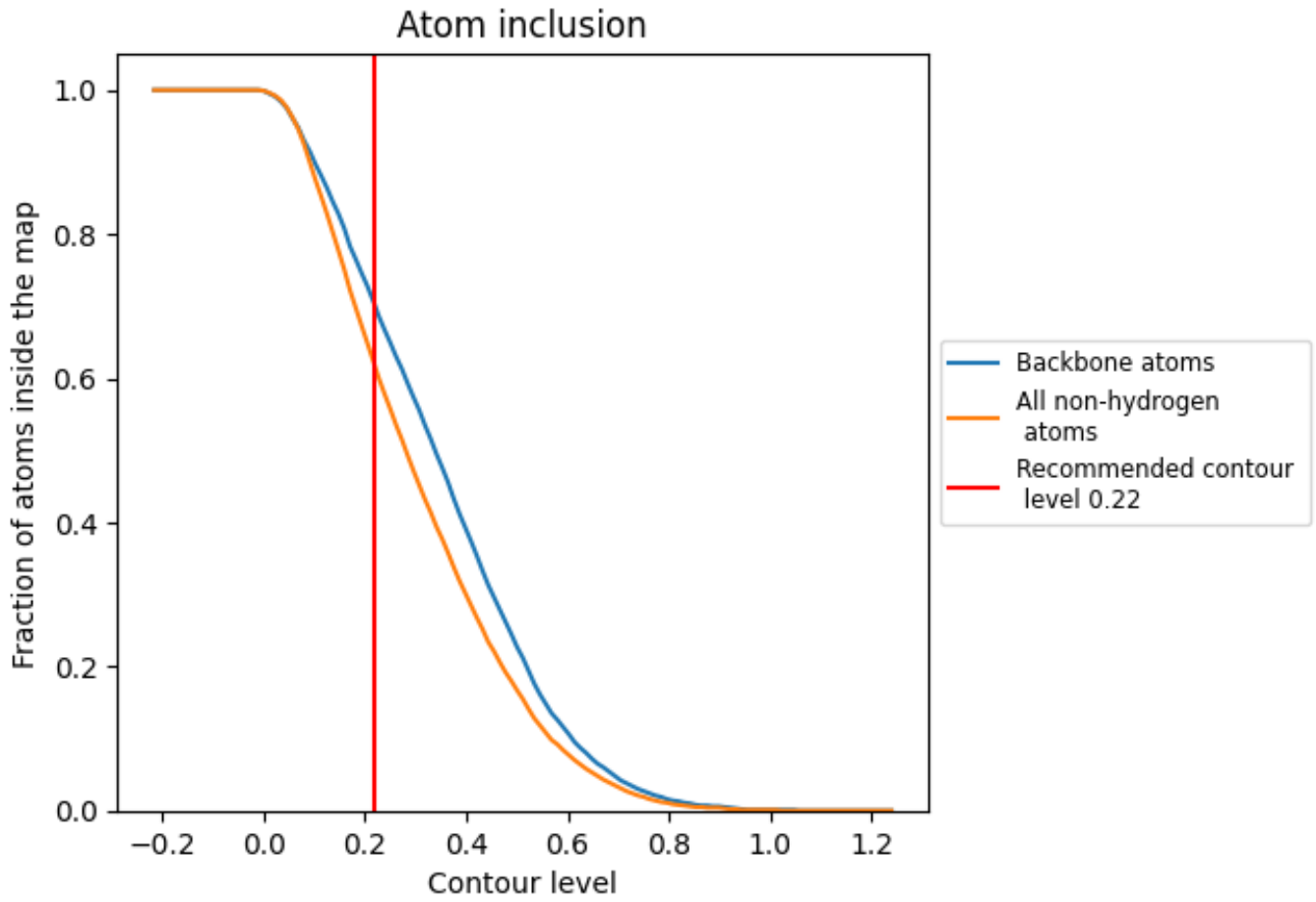
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.22).

9.4 Atom inclusion (i)



At the recommended contour level, 70% of all backbone atoms, 62% 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 (0.22) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6160	0.4450
A	0.5980	0.4360
B	0.6350	0.4530