



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 11:02 AM UTC

PDB ID : 8XLK / pdb_00008xlk
EMDB ID : EMD-38451
Title : Structure of native tri-heteromeric GluN1-GluN2A-GluN2B NMDA receptor
in rat cortex and hippocampus
Authors : Zhang, M.; Feng, J.; Li, Y.; Zhu, S.
Deposited on : 2023-12-26
Resolution : 4.20 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

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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:

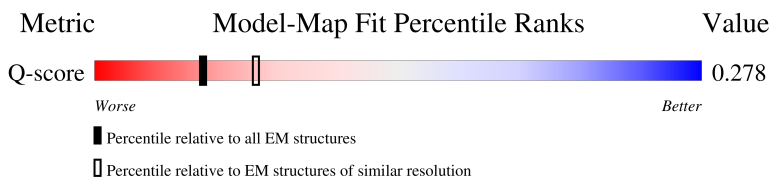
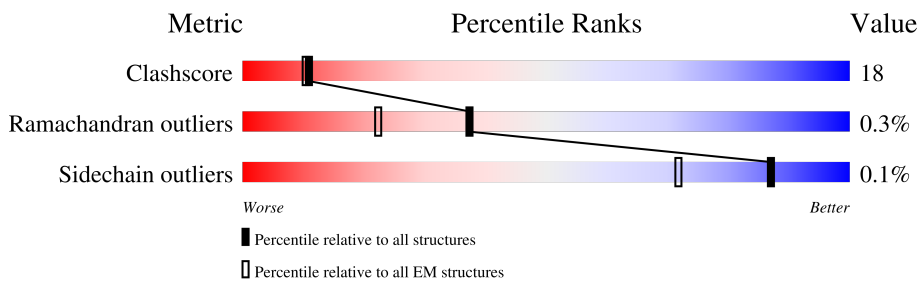
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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 4.20 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.










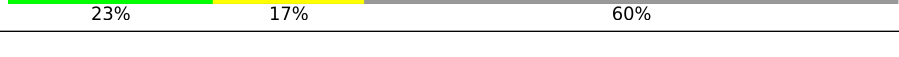
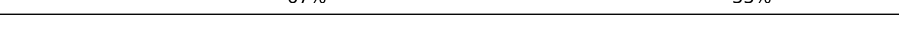
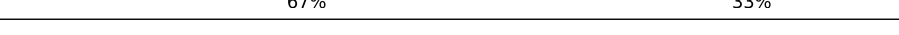
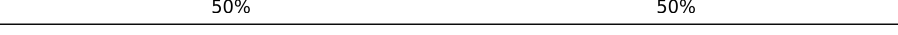
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	5410 (3.70 - 4.70)

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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	938	51% 34% 15%
1	C	938	54% 32% 15%
2	B	1464	36% 19% 46%
3	D	1482	34% 20% 47%

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Mol	Chain	Length	Quality of chain
4	E	140	 47% 34% 16%
4	I	140	 49% 35% 16%
5	F	131	 50% 34% 16%
5	J	131	 50% 32% 16%
6	G	227	 59% 40%
7	H	212	 67% 33%
8	K	248	 6% 24% 23% 53%
9	L	265	 6% 23% 17% 60%
10	M	3	 67% 33%
10	O	3	 67% 33%
11	N	2	 50% 50%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
13	7RC	B	1504	-	-	X	-

2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 34118 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 Glutamate receptor ionotropic, NMDA 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	800	Total	C	N	O	S	0	0
			6322	4023	1099	1165	35		
1	C	800	Total	C	N	O	S	0	0
			6325	4025	1099	1165	36		

- Molecule 2 is a protein called Glutamate receptor ionotropic, NMDA 2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	792	Total	C	N	O	S	0	0
			6279	4051	1025	1166	37		

- Molecule 3 is a protein called Glutamate receptor ionotropic, NMDA 2B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	792	Total	C	N	O	S	0	0
			6260	4026	1007	1184	43		

- Molecule 4 is a protein called Heavy Chain of GluN1 Fab, 4F11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	118	Total	C	N	O	S	0	0
			938	598	150	186	4		
4	I	118	Total	C	N	O	S	0	0
			938	598	150	186	4		

- Molecule 5 is a protein called Light Chain of GluN1 Fab, 4F11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	110	Total	C	N	O	S	0	0
			828	518	137	170	3		
5	J	110	Total	C	N	O	S	0	0
			822	512	137	170	3		

- Molecule 6 is a protein called Heavy Chain of GluN2A Fab, 28C.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	G	227	1693	1061	294	334	4	0	0

- Molecule 7 is a protein called Light Chain of GluN2A Fab, 28C.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	H	212	1576	983	268	320	5	0	0

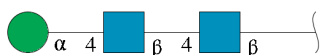
- Molecule 8 is a protein called Heavy Chain of GluN2B Fab2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	K	116	899	569	152	173	5	0	0

- Molecule 9 is a protein called Light Chain of GluN2B Fab2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	L	106	820	520	136	161	3	0	0

- Molecule 10 is an oligosaccharide called alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



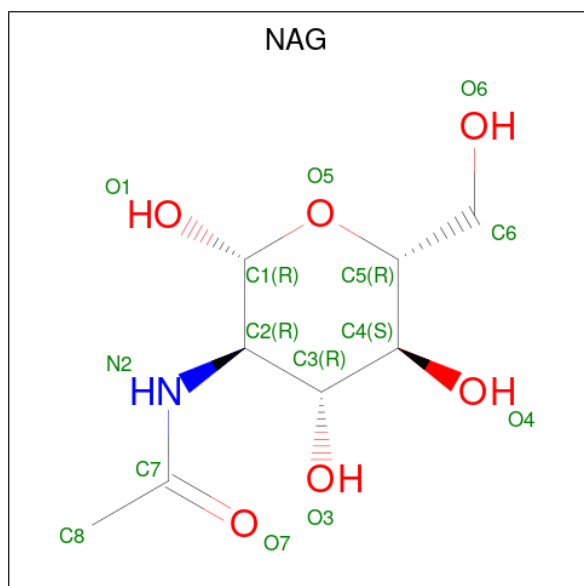
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	M	3	39	22	2	15	0	0
10	O	3	39	22	2	15	0	0

- Molecule 11 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	N	2	28	16	2	10	0	0

- Molecule 12 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



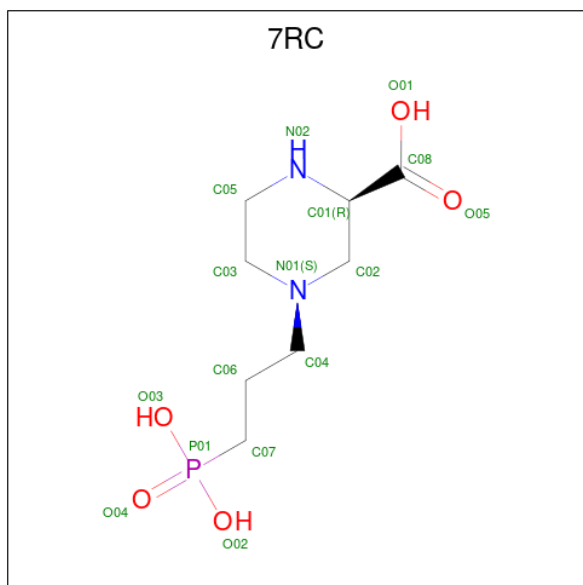
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
12	A	1	14	8	1	5	0
12	A	1	14	8	1	5	0
12	A	1	14	8	1	5	0
12	A	1	14	8	1	5	0
12	A	1	14	8	1	5	0
12	A	1	14	8	1	5	0
12	A	1	14	8	1	5	0
12	B	1	14	8	1	5	0
12	B	1	14	8	1	5	0
12	B	1	14	8	1	5	0

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
12	C	1	Total	C	N	O	0
			14	8	1	5	
12	C	1	Total	C	N	O	0
			14	8	1	5	
12	C	1	Total	C	N	O	0
			14	8	1	5	
12	C	1	Total	C	N	O	0
			14	8	1	5	
12	C	1	Total	C	N	O	0
			14	8	1	5	
12	C	1	Total	C	N	O	0
			14	8	1	5	
12	D	1	Total	C	N	O	0
			14	8	1	5	
12	D	1	Total	C	N	O	0
			14	8	1	5	
12	D	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 13 is (2R)-4-(3-phosphonopropyl)piperazine-2-carboxylic acid (CCD ID: 7RC) (formula: C₈H₁₇N₂O₅P).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
13	B	1	Total	C	N	O	P	0
			16	8	2	5	1	

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
13	D	1	16	8	2	5	1	0

• Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain C: 54% 32% 15%

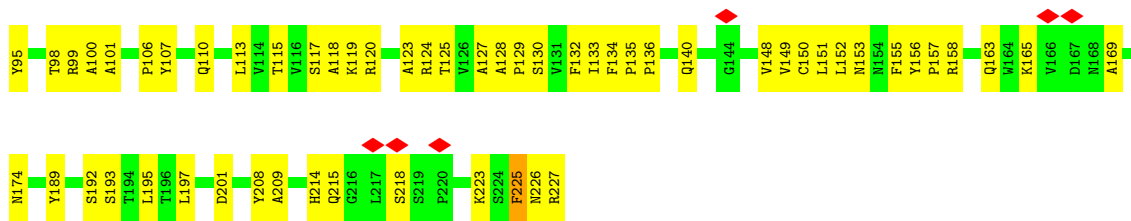
MET	THR	MET	HIS	LEU	LEU	THR	PHE	ALA	LEU	PHE	SER	CYS	SER	ALA	ALA	ASP	PRO	K25	N28	G30	V32	S34	T35	R36	K37	H38	E39	Q40	N41	F42	R43	E44	M47	Q48	A49	N50	K51	R52	H53	G54	S55	I58	H67	P68	K69	N70																					
A71	I72	Q73	M74	A75	V78	C79	I83	S84	S85	Q86	A89	H94	N99	F102	P106	Y109	T110	A111	G112	F113	Y114	R115	I116	L119	G120	L121	T122	T123	R124	M125	Y128	S132	I133	H134	L138	R139	P142	P143	S148	Y148	W151	R156	P159																								
L165	L166	V167	H171	E185	E186	R187	S84	K190	A191	E192	Q196	F197	D198	T201	K202	M203	V204	T205	A216	R217	L220	Y121	R122	E225	V231	Y232	R233	A234	A235	L238	N239	M240	W247	L248	V249	G250	E251	R252	E253	N257	A258	R259	K360	L361	Y261	A262	P263	G264	G265																		
I266	Q270	L271	E277	I281	S282	D283	V287	H293	E294	L295	L296	D198	I301	P304	C308	N311	G318	V324	L220	L221	V334	T335	V338	E339	F340	N341	G344	D345	R346	K347	F348	N350	Y351	Q453	M354	C455	L356	Q357	N358	R359	K360	L361	Y261	W362	Q363	V364	G365	I366																			
Y367	P374	K378	I379	I380	W381	P382	E385	T386	E387	R390	G391	V392	L400	V401	Q405	F408	Y410	V411	K412	P413	T414	M415	T419	K433	C436	P439	P444	P447	H448	H449	Q453	C454	C455	Y456	G457	F458	C459	I460	D461	L462	M470	L478																									
V479	A480	D481	G482	K483	T486	Q487	E488	R489	M492	K495	K496	E497	M499	G500	M501	M502	M512	I513	V514	A515	P516	L517	T518	I519	N520	M521	E522	R523	A524	Q525	Y526	I527	E528	F529	S530	K531	P532	F533	Q536	G537	L538	T539	I540	L541	K544	E545	I546	M547	P547	R548	L551	L552	D552														
S553	F554	M555	Q559	L562	W563	L564	L565	V570	L577	S584	PRO	PHE	GLY	ARG	PHE	LYS	VAL	ASN	GLU	P516	L517	T518	I519	N520	M521	E522	R523	A524	Q525	Y526	I527	E528	F529	S530	K531	P532	F533	Q536	G537	L538	T539	I540	L541	K544	E545	I546	M547	P547	R548	L551	L552	D552															
E662	R663	I664	I667	N668	D669	P670	R671	L672	R673	L680	T681	A682	T683	V684	K685	Q686	S687	S688	Q696	L699	S700	T701	M702	Y703	R704	F829	L830	H705	H706	N710	A714	I718	Q719	R722	L730	W731	D732	L736	L746	V747	F754	M630	I631	L632	G633	M634	V635	W636	L657	V772	S773																
I776	L777	K778	S779	H780	M785	R794	PRO	A806	T807	N812	I813	V814	K815	V816	F817	M818	L819	V820	A821	G822	V825	I828	F829	L830	I833	K841	ALA	ALA	ARG	ARG	GLY	ARG	GLY	GLY	ARG	LYS	ALA	MET	GLN	LEU	ALA	PHE	ALA	VAL	ASN	TRP	PRO	ARG	ARG	GLY	ALA	ASN	THR	VAL	LEU	PRO	ARG	ARG	ALA	ASN	THR	TLE	GLU	ARG	ASP	GLU	LYS
GLY	GLN	LEU	GLN	LEU	CYS	SER	ARG	ARG	HIS	ARG	GLU	SER	GLY	LEU	ALA	ALA	SER	ASN	PHE	LYS	ARG	ARG	GLY	GLY	GLY	GLY	ALA	ALA	LEU	GLN	LEU	ALA	ASN	GLN	LYS	VAL	THR	ASP	VAL	PRO	ARG	ARG	ARG	ALA	ALA	ASN	TLE	GLU	ARG	ASP	GLU	LYS															

• Molecule 2: Glutamate receptor ionotropic, NMDA 2A

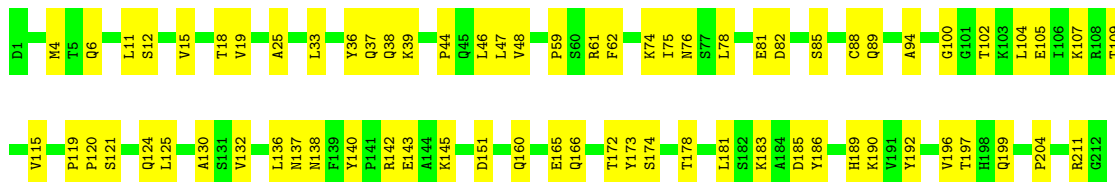
Chain B: 36% 19% 46%

MET	GLY	ARG	LEU	GLN	TYR	TRP	THR	LEU	LEU	VAL	LEU	PRO	ALA	LEU	LEU	VAL	TRP	ARG	ASP	PRO	ALA	L34	R35	I36	L39	L40	G41	H42	V46	T47	E48	R49	E50	L51	R52	N53	L54	V69	L73	M74	N75	R76	P79
K80	I83	L89	R94	I95	V99	A108	Q111	M112	L113	D114	Q119	I122	P123	I124	I127	H128	K129	S132	M133	I134	M135	D139	P140	T141	Q146	F147	G148	A149	Q152	Q153	Q154	A155	M158	L159	K160	I161	M162	Q163	W167	L172	T175		
F177	Y180	F183	F186	V191	D192	N193	W196	T204	T205	L206	D207	D212	Q216	V217	L219	K220	K221	V226	L227	L228	L229	Y230	C231	S232	E235	L248	Y251	D252	T256	V257	P258	V261	S274	V279	D282	D283	Y286	R291					

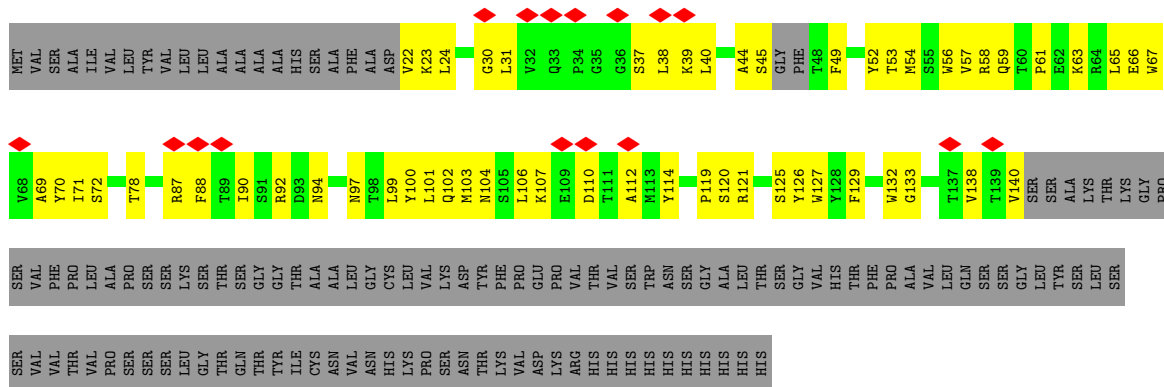
SER	TYR	GLU	TYR	LYS	ASP	GLU	LYS	TYR	TYR	VAL	Y762	M654	M561	E449	F344	A237	S149	P78
PHE	PRO	MET	PRO	LEU	PHE	PHE	PHE	GLN	GLN	PHE	5763	1655	M561	K456	E345	A237	I150	K79
ASP	GLN	PRO	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	1764	1656	V564	K456	E345	T238	I151	S80
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	TYR	TYR	ILE	1766	1657	M565	K457	E345	Y239	Q152	R84
THR	THR	THR	THR	THR	THR	THR	THR	HIS	HIS	ARG	1772	1661	M568	K458	E351	I240	Q153	D87
VAL	ASN	VAL	VAL	VAL	VAL	VAL	VAL	HIS	HIS	GLY	1775	1662	F459	K459	S352	A244	M157	L86
ALA	ASN	ALA	ALA	ALA	ALA	ALA	ALA	ASP	ASP	ILE	1777	1663	F580	F460	S352	L249	I160	M89
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1778	1667	D668	F461	S356	Y254	S90	D91
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1779	1670	PRO	I462	Q357	T255	Y164	R92
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1781	1671	ASN	L465	K361	V258	D165	Q95
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	VAL	1782	1672	TYR	Y476	L362	W166	Y167	G96
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	VAL	1783	1673	ASN	D477	V363	Y167	F169	F99
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	ALA	1784	1674	ARG	L478	I364	I168	S170	A107
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1785	1675	ARG	L479	I365	F169	Q105	E106
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1786	1676	ARG	L480	I366	F169	A107	A107
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1787	1677	ARG	L481	I367	F169	A109	A109
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1788	1678	ARG	L482	I368	F169	Q110	Q110
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1789	1679	ARG	L483	I369	F169	Q111	I111
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1790	1680	ARG	L484	I370	F169	Q112	L112
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1791	1681	ARG	L485	I371	F169	Q113	D113
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1792	1682	ARG	L486	I372	F169	Q114	F114
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1793	1683	ARG	L487	I373	F169	Q115	I115
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1794	1684	ARG	L488	I374	F169	Q116	S116
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1795	1685	ARG	L489	I375	F169	A107	A107
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1796	1686	ARG	L490	I376	F169	A109	A109
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1797	1687	ARG	L491	I377	F169	Q110	Q110
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1798	1688	ARG	L492	I378	F169	Q111	I111
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1799	1689	ARG	L493	I379	F169	Q112	L112
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1800	1690	ARG	L494	I380	F169	Q113	D113
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1801	1691	ARG	L495	I381	F169	Q114	F114
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1802	1692	ARG	L496	I382	F169	Q115	I115
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1803	1693	ARG	L497	I383	F169	Q116	S116
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1804	1694	ARG	L498	I384	F169	A107	A107
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1805	1695	ARG	L499	I385	F169	A109	A109
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1806	1696	ARG	L500	I386	F169	Q110	Q110
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1807	1697	ARG	L501	I387	F169	Q111	I111
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1808	1698	ARG	L502	I388	F169	Q112	L112
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1809	1699	ARG	L503	I389	F169	Q113	D113
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1810	1700	ARG	L504	I390	F169	Q114	F114
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1811	1701	ARG	L505	I391	F169	Q115	I115
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1812	1702	ARG	L506	I392	F169	Q116	S116
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1813	1703	ARG	L507	I393	F169	A107	A107
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1814	1704	ARG	L508	I394	F169	A109	A109
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1815	1705	ARG	L509	I395	F169	Q110	Q110
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1816	1706	ARG	L510	I396	F169	Q111	I111
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1817	1707	ARG	L511	I397	F169	Q112	L112
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1818	1708	ARG	L512	I398	F169	Q113	D113
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1819	1709	ARG	L513	I399	F169	Q114	F114
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1820	1710	ARG	L514	I400	F169	Q115	I115
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1821	1711	ARG	L515	I401	F169	Q116	S116
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1822	1712	ARG	L516	I402	F169	A107	A107
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1823	1713	ARG	L517	I403	F169	A109	A109
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1824	1714	ARG	L518	I404	F169	Q110	Q110
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1825	1715	ARG	L519	I405	F169	Q111	I111
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1826	1716	ARG	L520	I406	F169	Q112	L112
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1827	1717	ARG	L521	I407	F169	Q113	D113
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1828	1718	ARG	L522	I408	F169	Q114	F114
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1829	1719	ARG	L523	I409	F169	Q115	I115
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1830	1720	ARG	L524	I410	F169	Q116	S116
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1831	1721	ARG	L525	I411	F169	A107	A107
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1832	1722	ARG	L526	I412	F169	A109	A109
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1833	1723	ARG	L527	I413	F169	Q110	Q110
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1834	1724	ARG	L528	I414	F169	Q111	I111
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1835	1725	ARG	L529	I415	F169	Q112	L112
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1836	1726	ARG	L530	I416	F169	Q113	D113
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1837	1727	ARG	L531	I417	F169	Q114	F114
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1838	1728	ARG	L532	I418	F169	Q115	I115
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1839	1729	ARG	L533	I419	F169	Q116	S116
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1840	1730	ARG	L534	I420	F169	A107	A107
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1841	1731	ARG	L535	I421	F169	A109	A109
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1842	1732	ARG	L536	I422	F169	Q110	Q110
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1843	1733	ARG	L537	I423	F169	Q111	I111
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1844	1734	ARG	L538	I424	F169	Q112	L112
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1845	1735	ARG	L539	I425	F169	Q113	D113
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1846	1736	ARG	L540	I426	F169	Q114	F114
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1847	1737	ARG	L541	I427	F169	Q115	I115
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1848	1738	ARG	L542	I428	F169	Q116	S116
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1849	1739	ARG	L543	I429	F169	A107	A107
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1850	1740	ARG	L544	I430	F169	A109	A109
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1851	1741	ARG	L545	I431	F169	Q110	Q110
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1852	1742	ARG	L546	I432	F169	Q111	I111
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1853	1743	ARG	L547	I433	F169	Q112	L112
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1854	1744	ARG	L548	I434	F169	Q113	D113
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1855	1745	ARG	L549	I435	F169	Q114	F114
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1856	1746	ARG	L550	I436	F169	Q115	I115
GLY	ASN	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	GLY	1857	1747	ARG	L551	I437	F169	Q116	S116
THR	ASN	THR	THR	THR	THR	THR	THR	ASP	ASP	GLY	1858	1748	ARG	L552	I438	F169	A107	A107
ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	GLY	1859	1749	ARG	L553	I439	F169	A109	A109
THR	ASN	THR	THR															



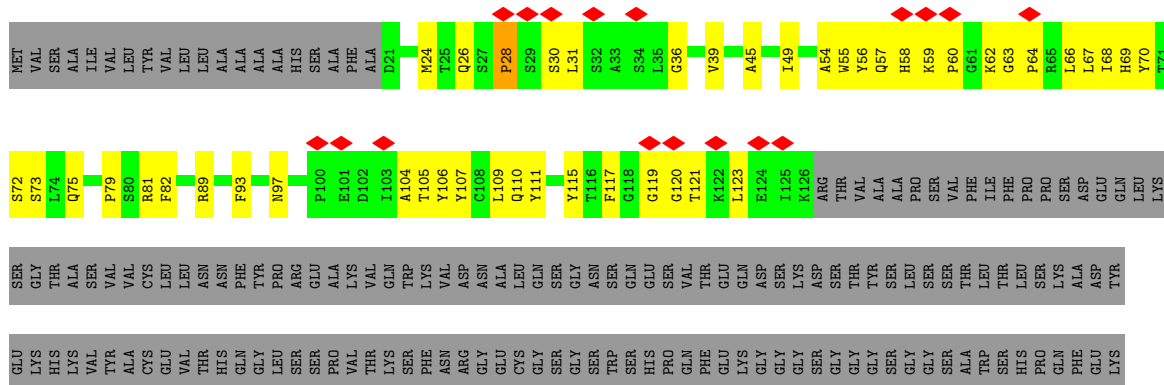
• Molecule 7: Light Chain of GluN2A Fab, 28C



• Molecule 8: Heavy Chain of GluN2B Fab2



• Molecule 9: Light Chain of GluN2B Fab2



- Molecule 10: alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  67% 33%

MAG1
MAG2
MAM3

- Molecule 10: alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:  67% 33%

MAG1
MAG2
MAM3

- Molecule 11: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  50% 50%

MAG1
MAG2

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	45676	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	DIRECT ELECTRON DE-10 (5k x 4k)	Depositor
Maximum map value	29.940	Depositor
Minimum map value	-20.122	Depositor
Average map value	0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	0.85	Depositor
Map size (\AA)	342.72, 342.72, 342.72	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.071, 1.071, 1.071	Depositor

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, 7RC, MAN

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	0.13	0/6464	0.38	0/8757
1	C	0.13	0/6467	0.37	0/8760
2	B	0.13	0/6432	0.37	0/8736
3	D	0.14	0/6401	0.40	1/8674 (0.0%)
4	E	0.85	7/964 (0.7%)	1.00	8/1313 (0.6%)
4	I	0.15	0/964	0.43	0/1313
5	F	0.14	0/847	0.37	0/1152
5	J	0.54	3/840 (0.4%)	0.87	6/1143 (0.5%)
6	G	0.17	0/1727	0.49	0/2349
7	H	0.13	0/1607	0.37	0/2182
8	K	0.13	0/921	0.45	0/1247
9	L	0.15	0/840	0.47	0/1136
All	All	0.21	10/34474 (0.0%)	0.44	15/46762 (0.0%)

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
4	E	0	1
9	L	0	1
All	All	0	2

The worst 5 of 10 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	52	ASP	CA-CB	-12.42	1.34	1.53
4	E	52	ASP	CA-C	-11.53	1.37	1.53
4	E	51	SER	CA-C	10.98	1.67	1.52
4	E	52	ASP	C-N	9.13	1.46	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	J	109	TYR	CA-C	8.18	1.63	1.52

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	52	ASP	N-CA-CB	-16.13	86.08	110.60
4	E	74	TYR	N-CA-C	-14.42	95.82	113.41
4	E	52	ASP	CA-C-O	-13.26	103.83	121.73
5	J	110	TYR	N-CA-C	9.96	125.62	109.59
5	J	107	ALA	O-C-N	-9.90	112.74	123.04

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	E	52	ASP	Mainchain
9	L	28	PRO	Peptide

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	6322	0	6287	247	0
1	C	6325	0	6295	235	0
2	B	6279	0	6193	220	0
3	D	6260	0	6165	231	0
4	E	938	0	883	55	0
4	I	938	0	883	37	0
5	F	828	0	788	37	0
5	J	822	0	781	51	0
6	G	1693	0	1685	80	0
7	H	1576	0	1537	53	0
8	K	899	0	862	48	0
9	L	820	0	799	39	0
10	M	39	0	34	0	0
10	O	39	0	34	0	0
11	N	28	0	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
12	A	98	0	90	0	0
12	B	42	0	39	1	0
12	C	98	0	91	1	0
12	D	42	0	39	1	0
13	B	16	0	0	7	0
13	D	16	0	0	6	0
All	All	34118	0	33510	1244	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.

The worst 5 of 1244 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:D:762:TYR:OH	13:D:1504:7RC:C05	1.93	1.16
6:G:130:SER:HB2	6:G:153:ASN:O	1.55	1.05
1:C:410:TYR:HB2	1:C:456:TYR:O	1.59	1.02
1:C:350:ASN:HA	1:C:367:TYR:O	1.59	1.00
2:B:485:HIS:CG	13:B:1504:7RC:O05	2.18	0.97

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	796/938 (85%)	758 (95%)	37 (5%)	1 (0%)	48 82
1	C	796/938 (85%)	758 (95%)	36 (4%)	2 (0%)	36 71
2	B	788/1464 (54%)	743 (94%)	44 (6%)	1 (0%)	48 82
3	D	788/1482 (53%)	730 (93%)	57 (7%)	1 (0%)	48 82
4	E	116/140 (83%)	104 (90%)	9 (8%)	3 (3%)	4 26

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	I	116/140 (83%)	109 (94%)	7 (6%)	0	100	100
5	F	108/131 (82%)	96 (89%)	12 (11%)	0	100	100
5	J	108/131 (82%)	92 (85%)	14 (13%)	2 (2%)	6	32
6	G	225/227 (99%)	189 (84%)	35 (16%)	1 (0%)	30	66
7	H	210/212 (99%)	204 (97%)	6 (3%)	0	100	100
8	K	112/248 (45%)	106 (95%)	6 (5%)	0	100	100
9	L	104/265 (39%)	89 (86%)	15 (14%)	0	100	100
All	All	4267/6316 (68%)	3978 (93%)	278 (6%)	11 (0%)	37	71

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	659	VAL
1	C	545	GLU
4	E	53	TYR
6	G	225	PHE
1	A	811	GLU

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	689/806 (86%)	689 (100%)	0	100	100
1	C	690/806 (86%)	690 (100%)	0	100	100
2	B	695/1308 (53%)	695 (100%)	0	100	100
3	D	691/1299 (53%)	691 (100%)	0	100	100
4	E	104/119 (87%)	103 (99%)	1 (1%)	68	75
4	I	104/119 (87%)	104 (100%)	0	100	100
5	F	90/104 (86%)	90 (100%)	0	100	100
5	J	89/104 (86%)	88 (99%)	1 (1%)	65	73
6	G	181/181 (100%)	181 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	H	169/169 (100%)	169 (100%)	0	100	100
8	K	95/205 (46%)	95 (100%)	0	100	100
9	L	91/221 (41%)	91 (100%)	0	100	100
All	All	3688/5441 (68%)	3686 (100%)	2 (0%)	87	88

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	E	51	SER
5	J	110	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 35 such sidechains are listed below:

Mol	Chain	Res	Type
7	H	160	GLN
7	H	189	HIS
5	J	57	ASN
2	B	839	HIS
2	B	697	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](#)

8 monosaccharides 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
10	NAG	M	1	10,1	14,14,15	0.30	0	17,19,21	0.42	0
10	NAG	M	2	10	14,14,15	0.23	0	17,19,21	0.42	0
10	MAN	M	3	10	11,11,12	0.79	0	15,15,17	1.35	2 (13%)
11	NAG	N	1	11,2	14,14,15	0.63	1 (7%)	17,19,21	0.67	0
11	NAG	N	2	11	14,14,15	0.23	0	17,19,21	0.48	0
10	NAG	O	1	10,1	14,14,15	0.25	0	17,19,21	0.41	0
10	NAG	O	2	10	14,14,15	0.21	0	17,19,21	0.48	0
10	MAN	O	3	10	11,11,12	0.81	0	15,15,17	1.11	2 (13%)

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
10	NAG	M	1	10,1	-	2/6/23/26	0/1/1/1
10	NAG	M	2	10	-	2/6/23/26	0/1/1/1
10	MAN	M	3	10	-	2/2/19/22	1/1/1/1
11	NAG	N	1	11,2	-	2/6/23/26	0/1/1/1
11	NAG	N	2	11	-	2/6/23/26	0/1/1/1
10	NAG	O	1	10,1	-	1/6/23/26	0/1/1/1
10	NAG	O	2	10	-	2/6/23/26	0/1/1/1
10	MAN	O	3	10	-	2/2/19/22	1/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	N	1	NAG	O5-C1	-2.23	1.39	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	M	3	MAN	C1-O5-C5	4.21	117.83	112.19
10	O	3	MAN	C1-O5-C5	3.12	116.36	112.19
10	M	3	MAN	O2-C2-C3	-2.18	105.64	110.15
10	O	3	MAN	O2-C2-C3	-2.06	105.88	110.15

There are no chirality outliers.

5 of 15 torsion outliers are listed below:

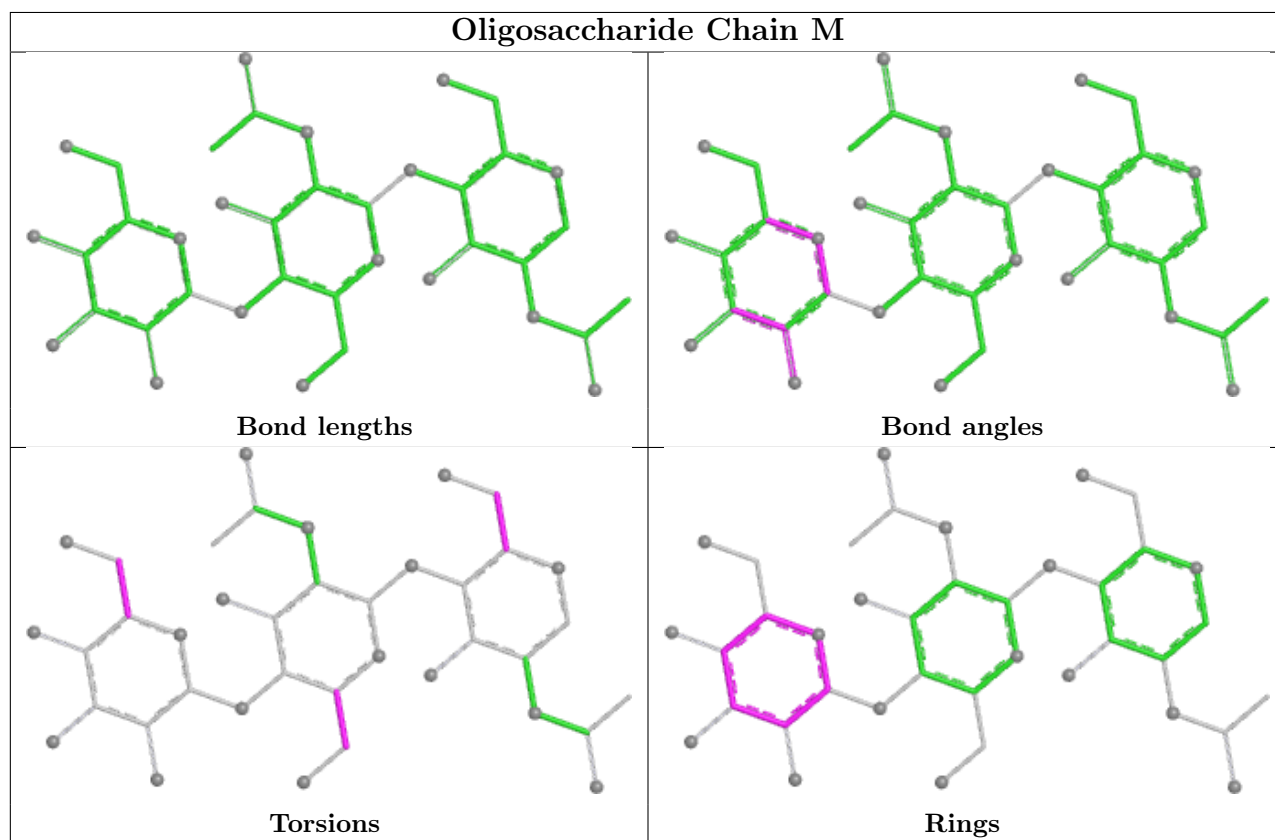
Mol	Chain	Res	Type	Atoms
10	O	2	NAG	O5-C5-C6-O6
10	M	2	NAG	O5-C5-C6-O6
10	M	1	NAG	O5-C5-C6-O6
10	O	2	NAG	C4-C5-C6-O6
10	O	3	MAN	O5-C5-C6-O6

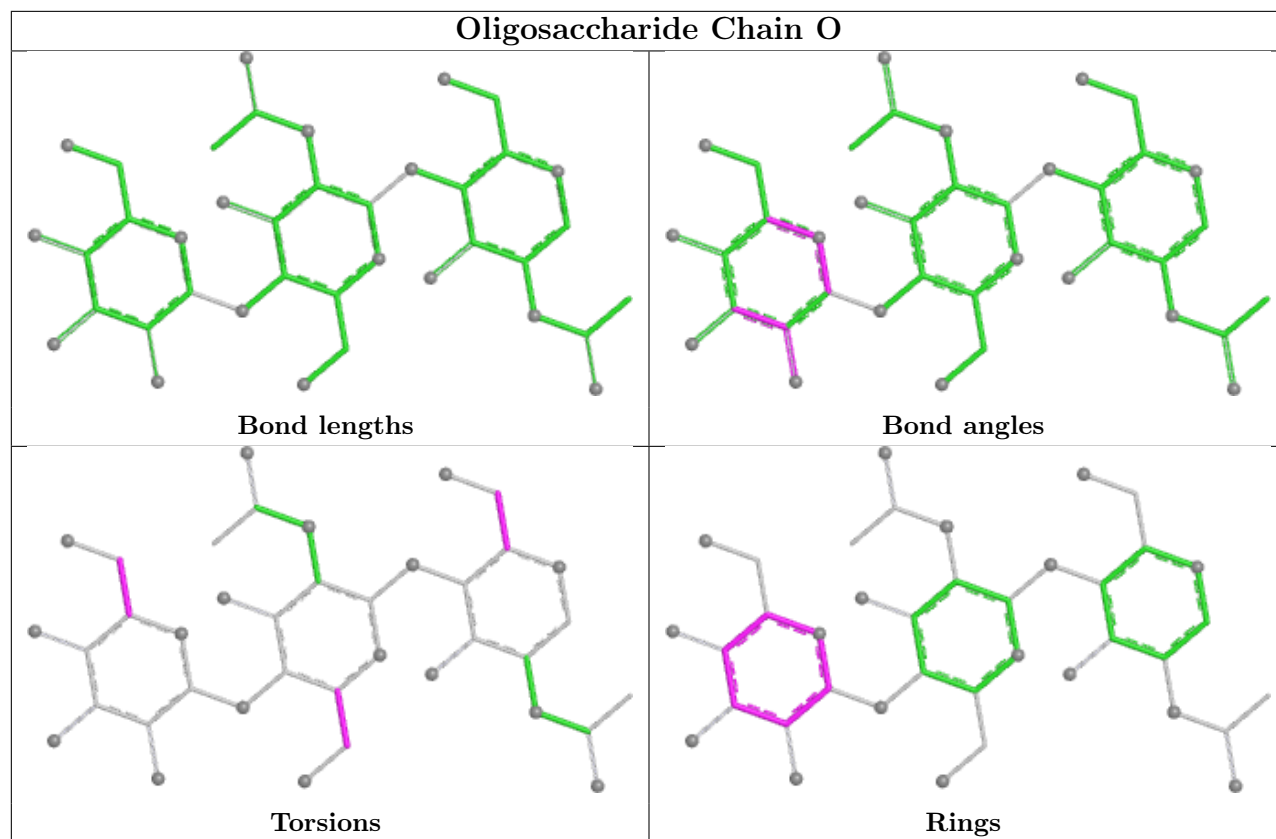
All (2) ring outliers are listed below:

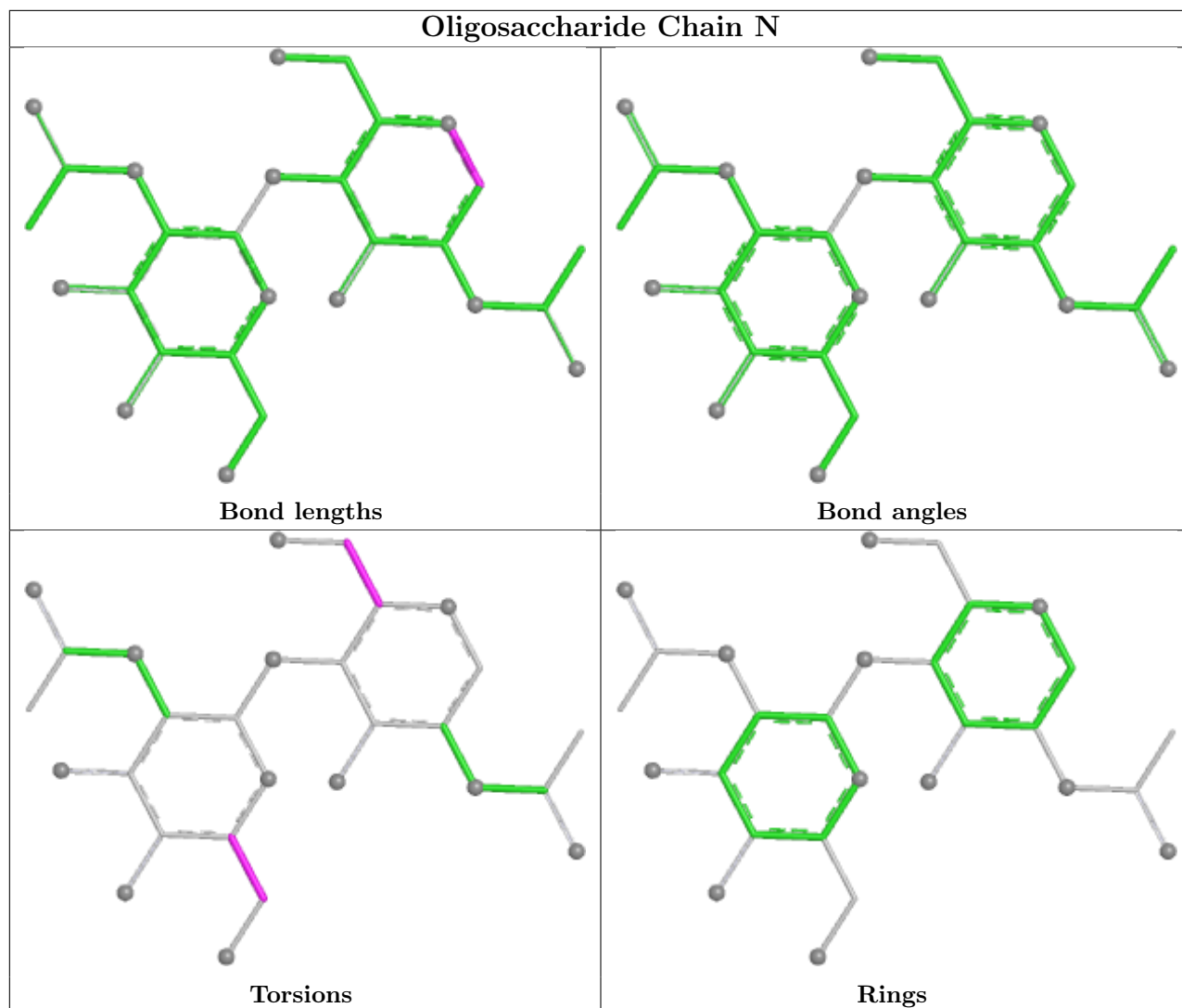
Mol	Chain	Res	Type	Atoms
10	O	3	MAN	C1-C2-C3-C4-C5-O5
10	M	3	MAN	C1-C2-C3-C4-C5-O5

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.







5.6 Ligand geometry [i](#)

22 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	$\# Z > 2$
12	NAG	A	1006	1	14,14,15	0.26	0	17,19,21	0.48	0
12	NAG	C	1001	1	14,14,15	0.29	0	17,19,21	0.36	0
12	NAG	C	1006	1	14,14,15	0.22	0	17,19,21	0.40	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
12	NAG	B	1503	2	14,14,15	0.35	0	17,19,21	0.66	1 (5%)
12	NAG	C	1003	1	14,14,15	0.28	0	17,19,21	0.49	0
12	NAG	A	1001	1	14,14,15	0.22	0	17,19,21	0.40	0
13	7RC	B	1504	-	16,16,16	1.88	1 (6%)	18,22,22	1.91	3 (16%)
12	NAG	C	1005	1	14,14,15	0.28	0	17,19,21	0.38	0
13	7RC	D	1504	-	16,16,16	1.87	1 (6%)	18,22,22	1.71	5 (27%)
12	NAG	B	1501	2	14,14,15	0.27	0	17,19,21	0.45	0
12	NAG	D	1503	3	14,14,15	0.43	0	17,19,21	1.16	2 (11%)
12	NAG	C	1002	1	14,14,15	0.43	0	17,19,21	0.39	0
12	NAG	A	1007	1	14,14,15	0.41	0	17,19,21	1.15	2 (11%)
12	NAG	B	1502	2	14,14,15	0.27	0	17,19,21	0.48	0
12	NAG	A	1002	1	14,14,15	0.42	0	17,19,21	1.15	2 (11%)
12	NAG	A	1005	1	14,14,15	0.25	0	17,19,21	0.44	0
12	NAG	C	1004	1	14,14,15	0.40	0	17,19,21	0.44	0
12	NAG	D	1501	3	14,14,15	0.27	0	17,19,21	0.44	0
12	NAG	A	1004	1	14,14,15	0.24	0	17,19,21	0.43	0
12	NAG	A	1003	1	14,14,15	0.24	0	17,19,21	0.45	0
12	NAG	D	1502	3	14,14,15	0.26	0	17,19,21	0.42	0
12	NAG	C	1007	1	14,14,15	0.19	0	17,19,21	0.39	0

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
12	NAG	A	1006	1	-	2/6/23/26	0/1/1/1
12	NAG	C	1001	1	-	2/6/23/26	0/1/1/1
12	NAG	C	1006	1	-	2/6/23/26	0/1/1/1
12	NAG	B	1503	2	-	0/6/23/26	0/1/1/1
12	NAG	C	1003	1	-	2/6/23/26	0/1/1/1
12	NAG	A	1001	1	-	3/6/23/26	0/1/1/1
13	7RC	B	1504	-	-	4/11/21/21	0/1/1/1
12	NAG	C	1005	1	-	2/6/23/26	0/1/1/1
13	7RC	D	1504	-	-	0/11/21/21	0/1/1/1
12	NAG	B	1501	2	-	2/6/23/26	0/1/1/1
12	NAG	D	1503	3	-	0/6/23/26	0/1/1/1
12	NAG	C	1002	1	-	0/6/23/26	0/1/1/1
12	NAG	A	1007	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	NAG	B	1502	2	-	2/6/23/26	0/1/1/1
12	NAG	A	1002	1	-	0/6/23/26	0/1/1/1
12	NAG	A	1005	1	-	2/6/23/26	0/1/1/1
12	NAG	C	1004	1	-	1/6/23/26	0/1/1/1
12	NAG	D	1501	3	-	1/6/23/26	0/1/1/1
12	NAG	A	1004	1	-	2/6/23/26	0/1/1/1
12	NAG	A	1003	1	-	2/6/23/26	0/1/1/1
12	NAG	D	1502	3	-	3/6/23/26	0/1/1/1
12	NAG	C	1007	1	-	4/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
13	B	1504	7RC	P01-C07	6.47	1.85	1.78
13	D	1504	7RC	P01-C07	6.42	1.85	1.78

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	B	1504	7RC	P01-C07-C06	-5.70	107.92	114.94
13	D	1504	7RC	P01-C07-C06	-4.25	109.71	114.94
13	D	1504	7RC	C03-N01-C02	2.60	113.86	109.53
13	B	1504	7RC	C04-N01-C02	-2.38	105.90	111.69
12	A	1007	NAG	C8-C7-N2	2.37	120.05	116.12

There are no chirality outliers.

5 of 36 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	B	1504	7RC	C06-C07-P01-O03
13	B	1504	7RC	C06-C07-P01-O04
12	A	1006	NAG	O5-C5-C6-O6
12	A	1005	NAG	C4-C5-C6-O6
12	B	1502	NAG	O5-C5-C6-O6

There are no ring outliers.

5 monomers are involved in 16 short contacts:

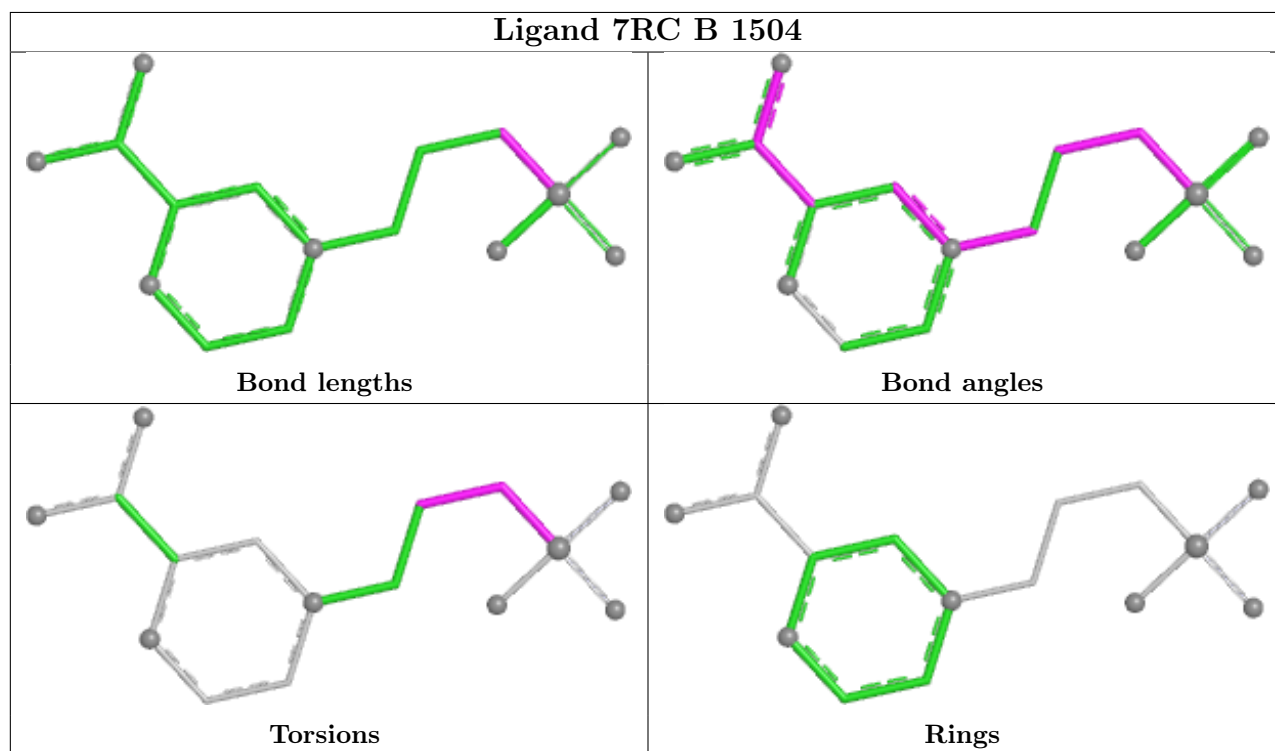
Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	B	1503	NAG	1	0

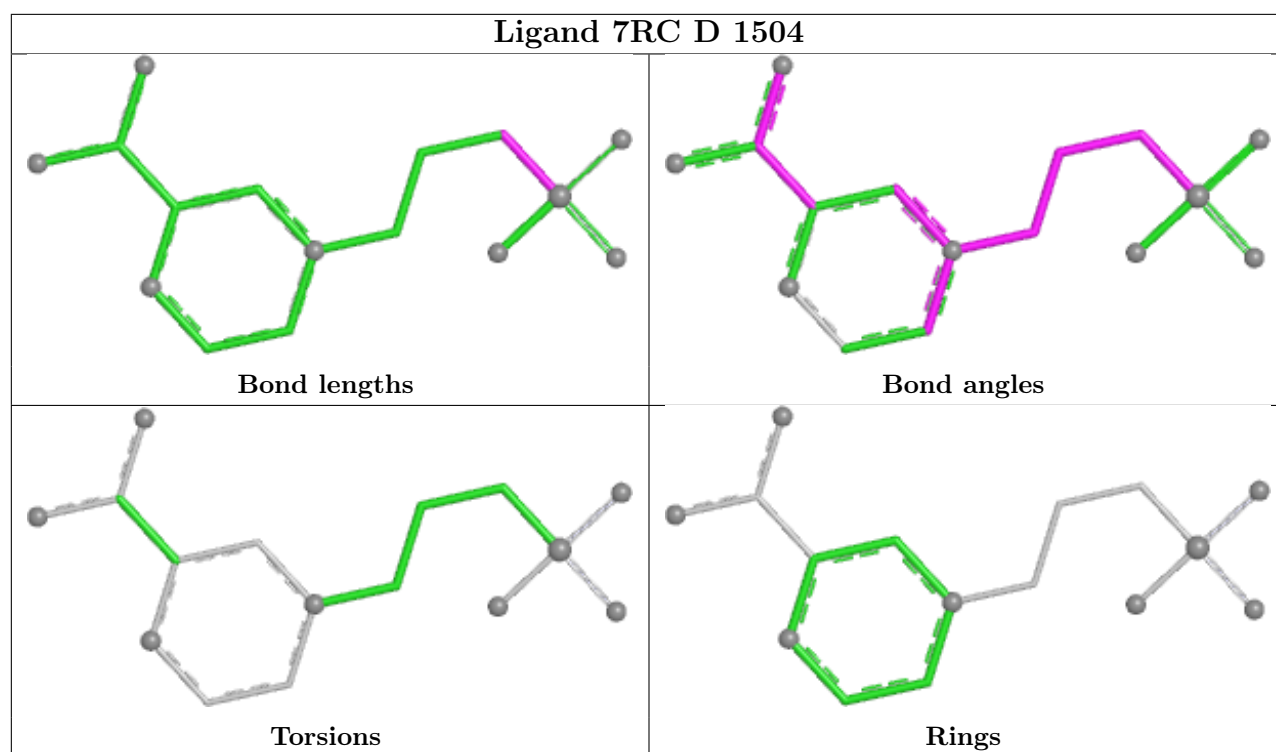
Continued on next page...

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	B	1504	7RC	7	0
13	D	1504	7RC	6	0
12	C	1002	NAG	1	0
12	D	1502	NAG	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

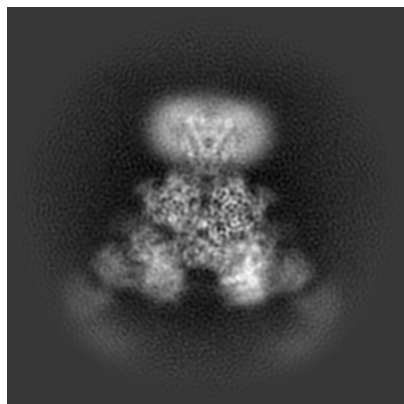
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-38451. These allow visual inspection of the internal detail of the map and identification of artifacts.

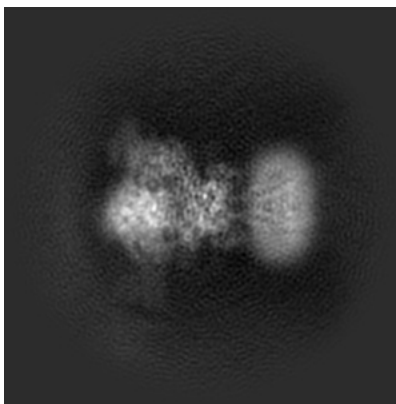
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

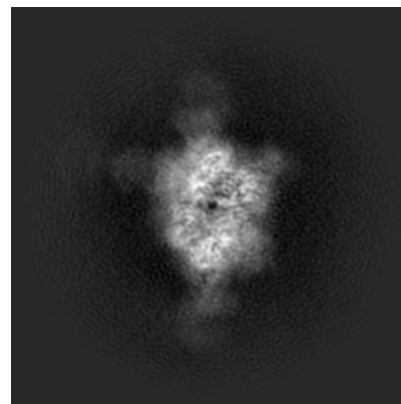
6.1.1 Primary map



X

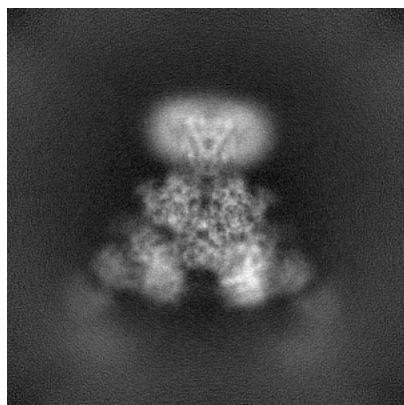


Y

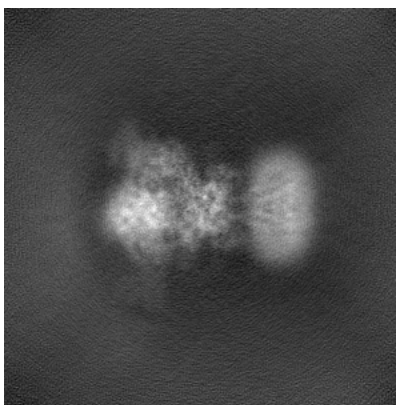


Z

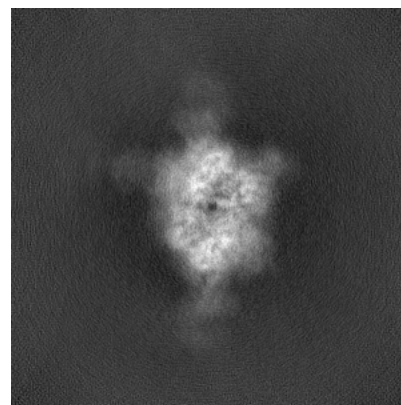
6.1.2 Raw map



X



Y

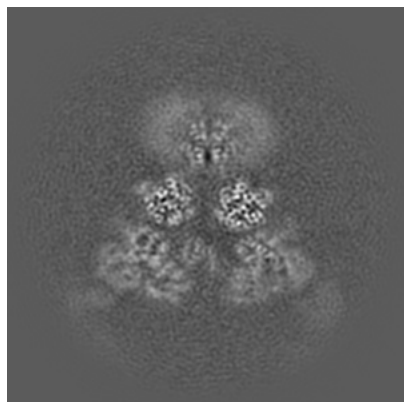


Z

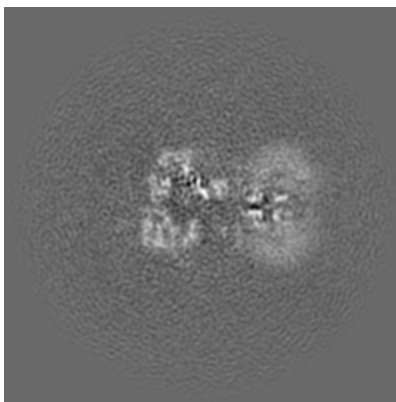
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

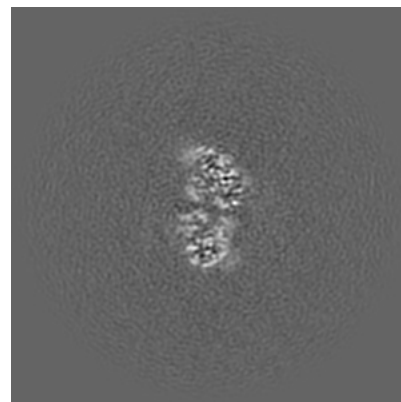
6.2.1 Primary map



X Index: 160

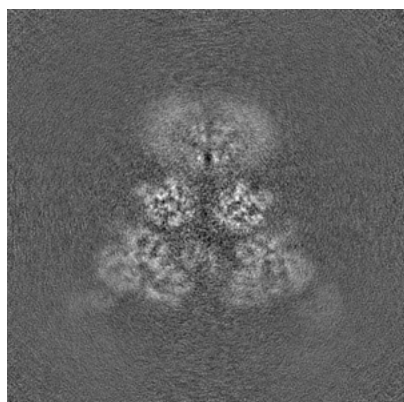


Y Index: 160

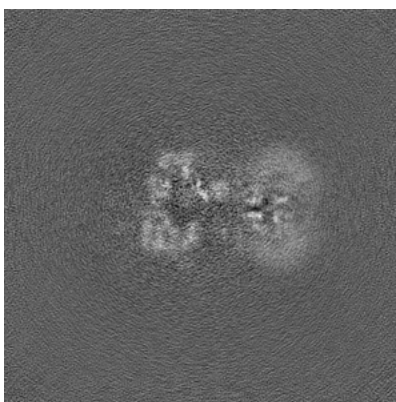


Z Index: 160

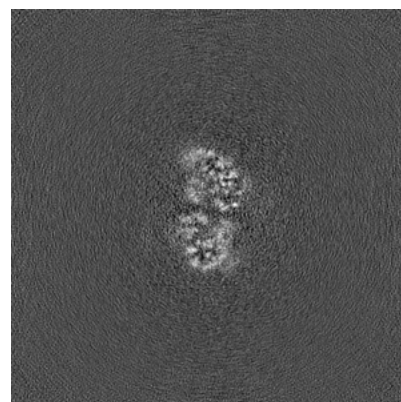
6.2.2 Raw map



X Index: 160



Y Index: 160

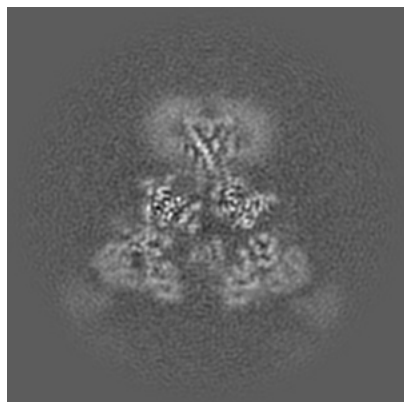


Z Index: 160

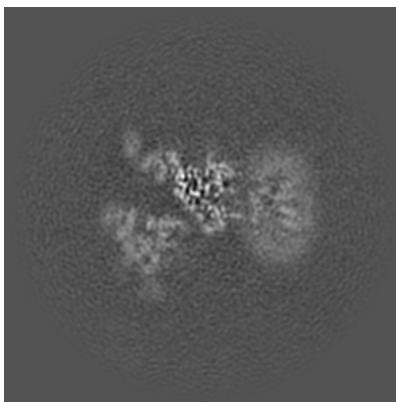
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

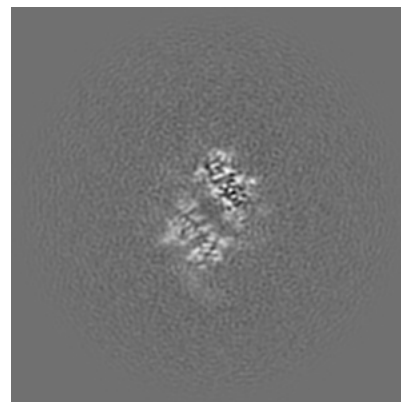
6.3.1 Primary map



X Index: 154

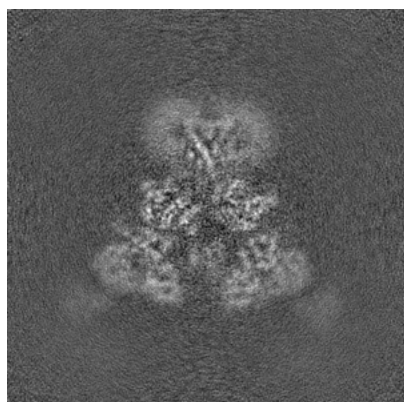


Y Index: 176

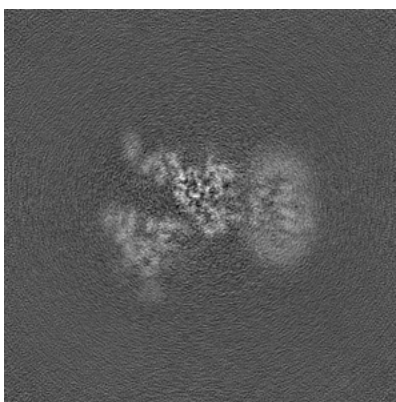


Z Index: 151

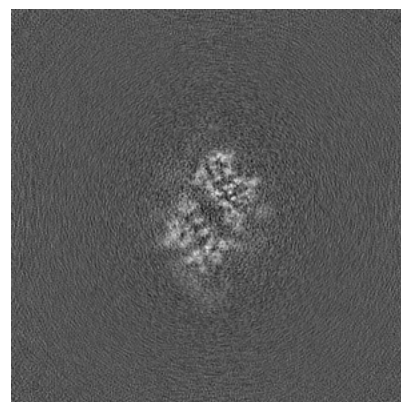
6.3.2 Raw map



X Index: 155



Y Index: 176

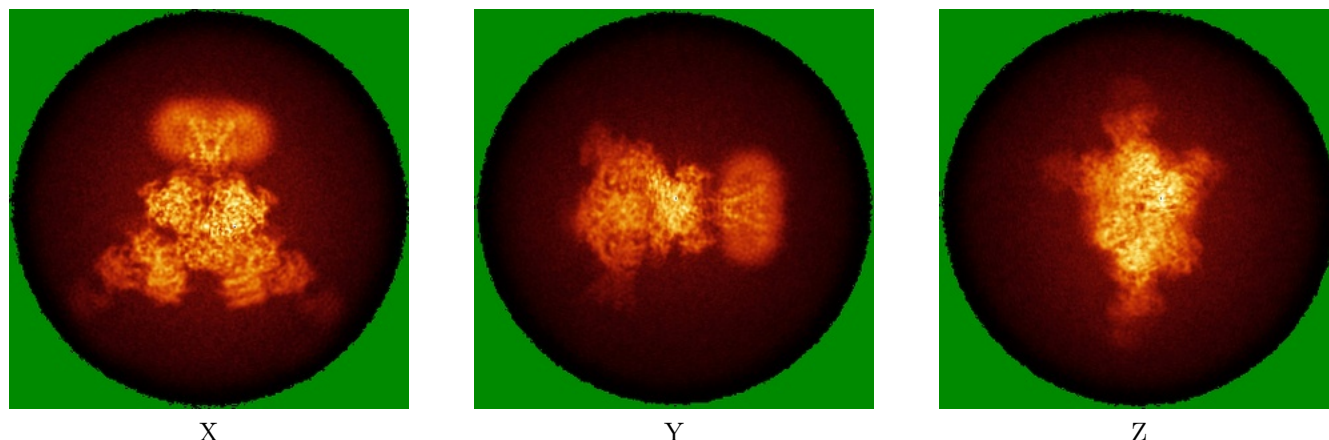


Z Index: 150

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

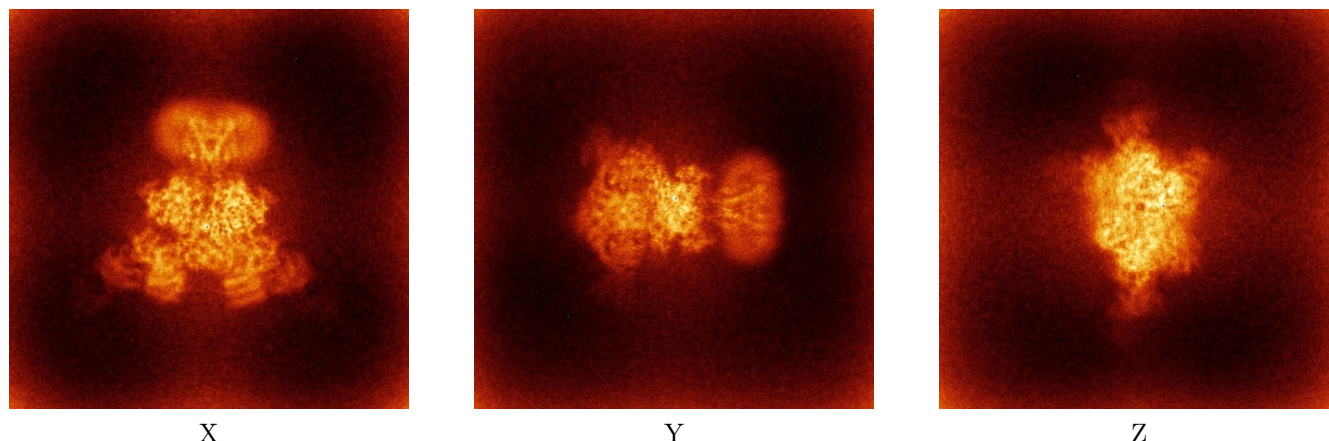


X

Y

Z

6.4.2 Raw map



X

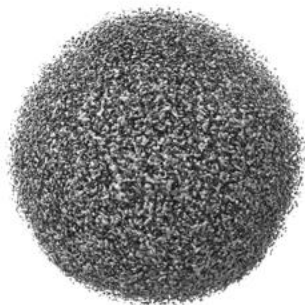
Y

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



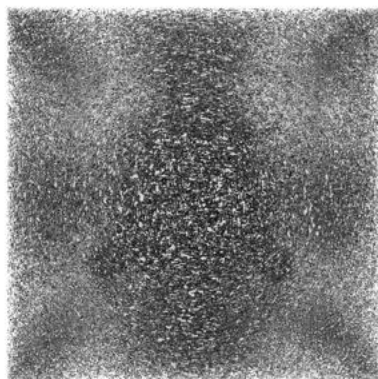
Y



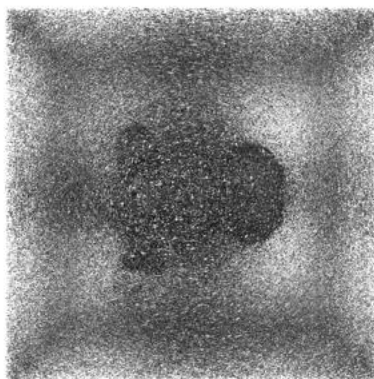
Z

The images above show the 3D surface view of the map at the recommended contour level 0.85. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

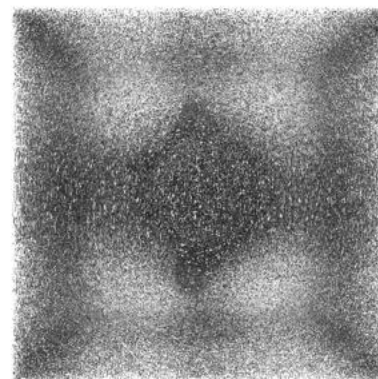
6.5.2 Raw map



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

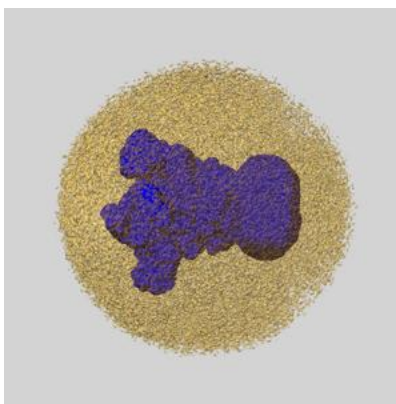
A mask typically either:

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

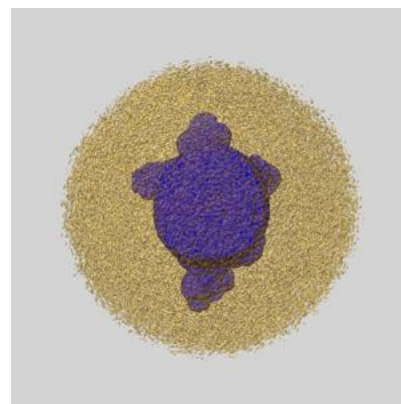
6.6.1 emd_38451_msk_1.map [i](#)



X



Y

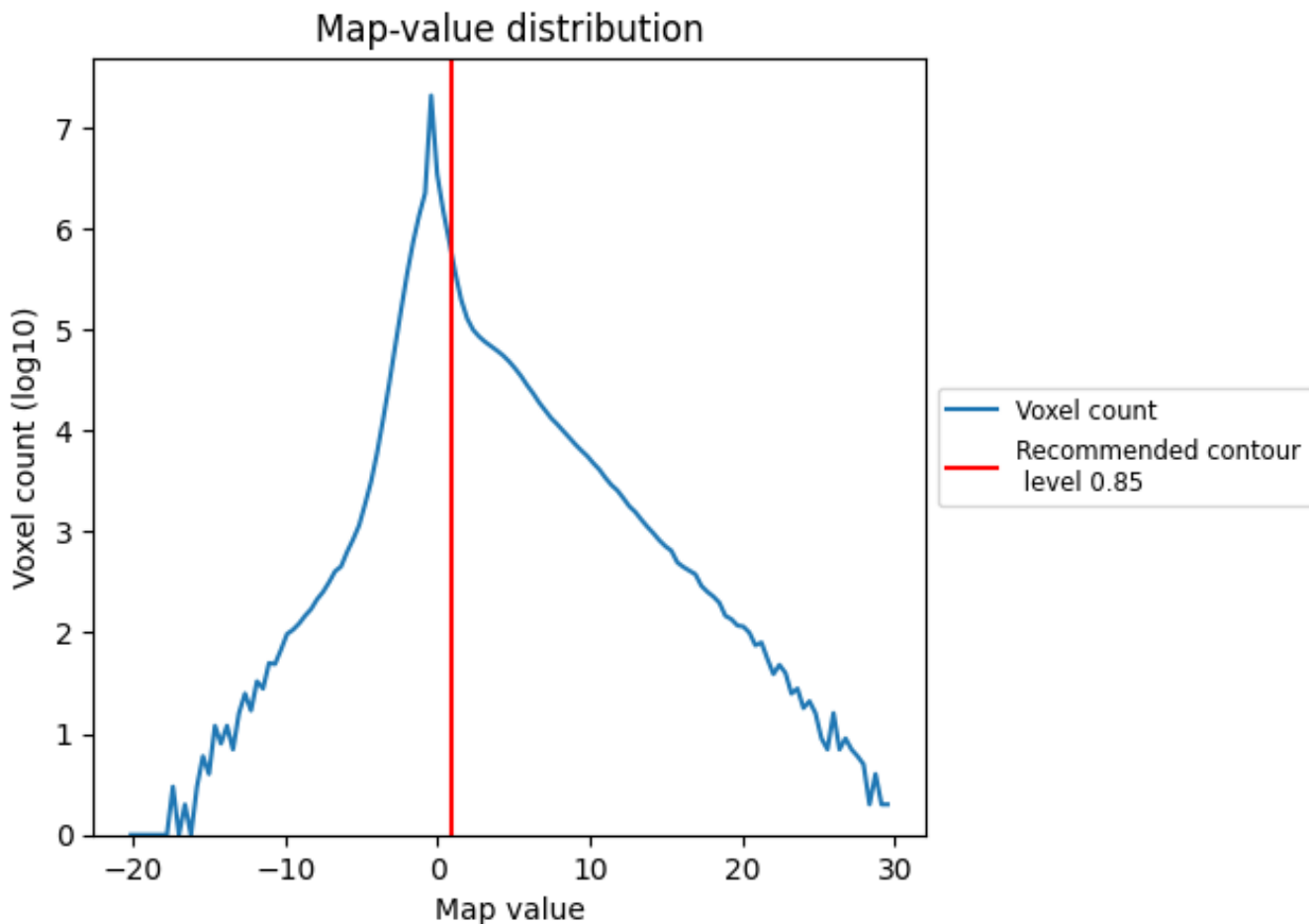


Z

7 Map analysis [i](#)

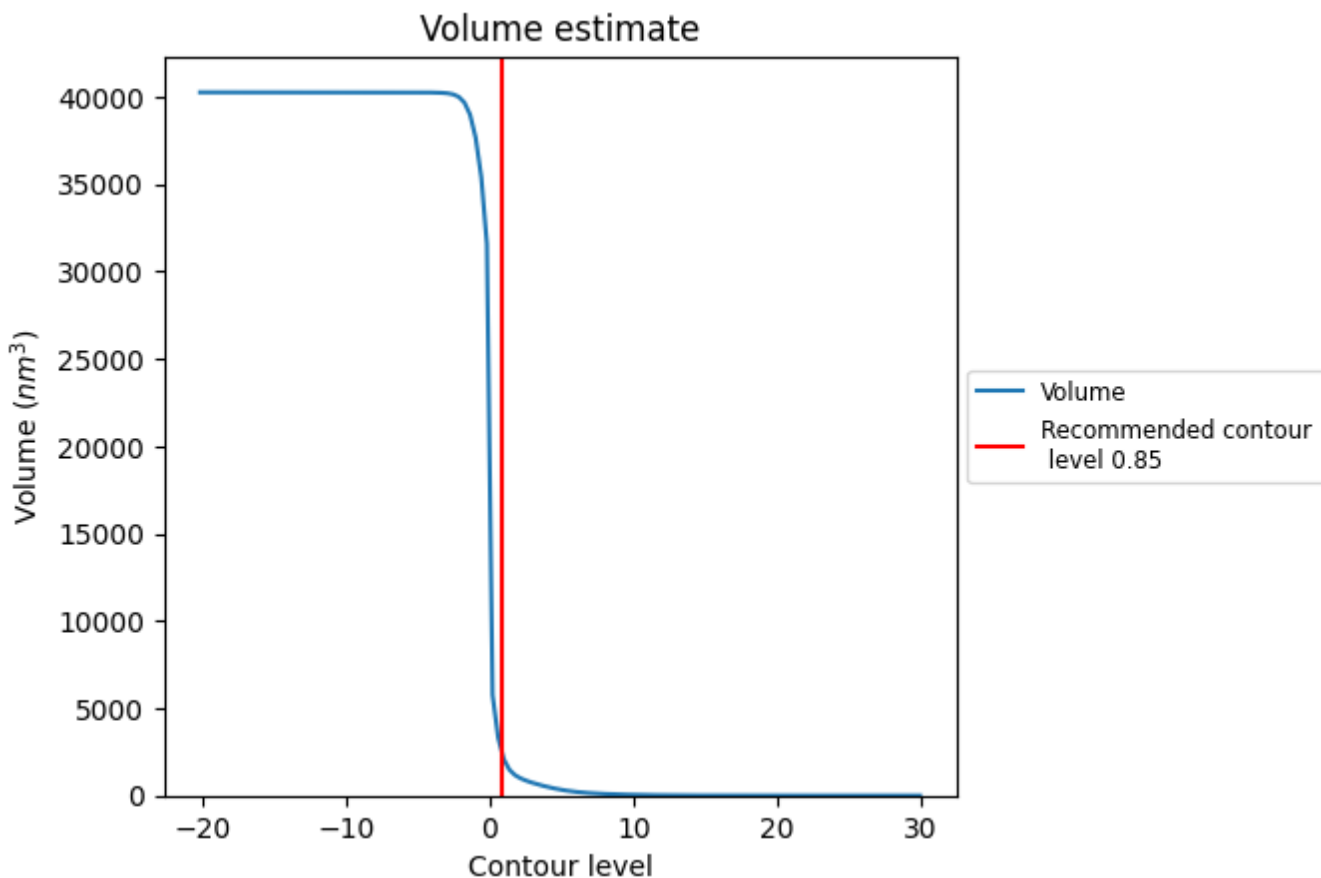
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

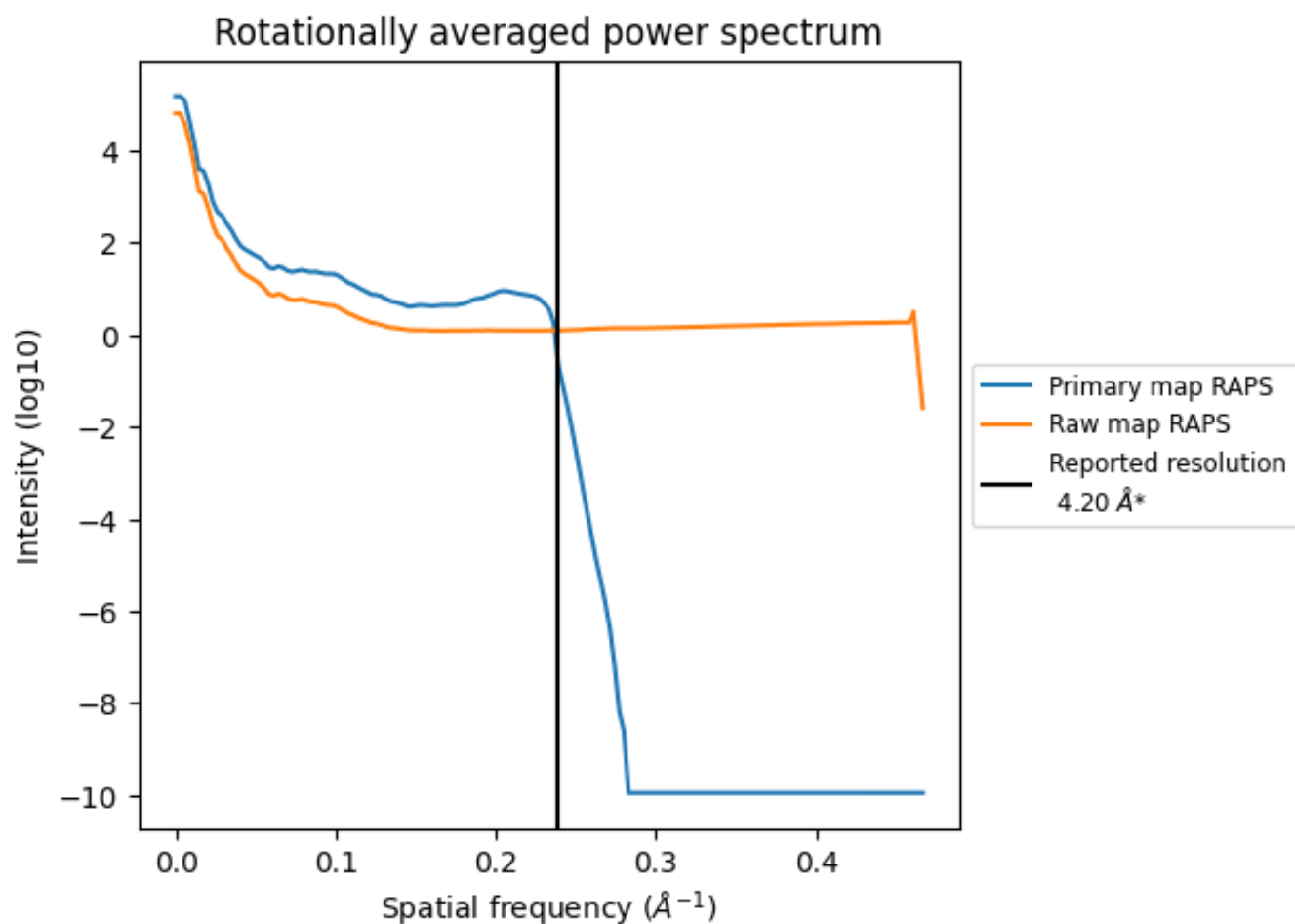
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2547 nm³; this corresponds to an approximate mass of 2300 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](#)

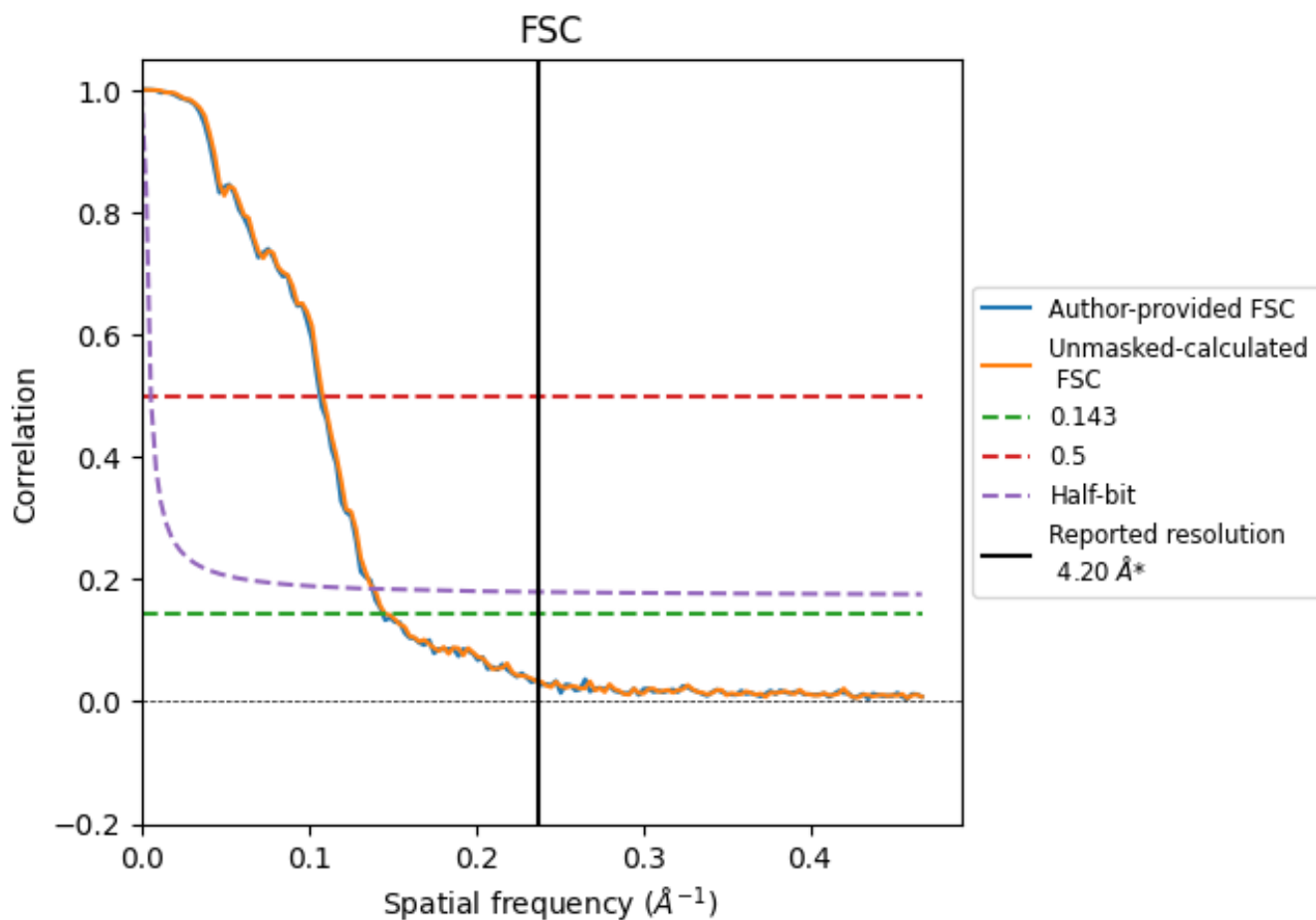


*Reported resolution corresponds to spatial frequency of 0.238 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.238 Å⁻¹

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.20	-	-
Author-provided FSC curve	6.93	9.35	7.23
Unmasked-calculated*	6.85	9.22	7.19

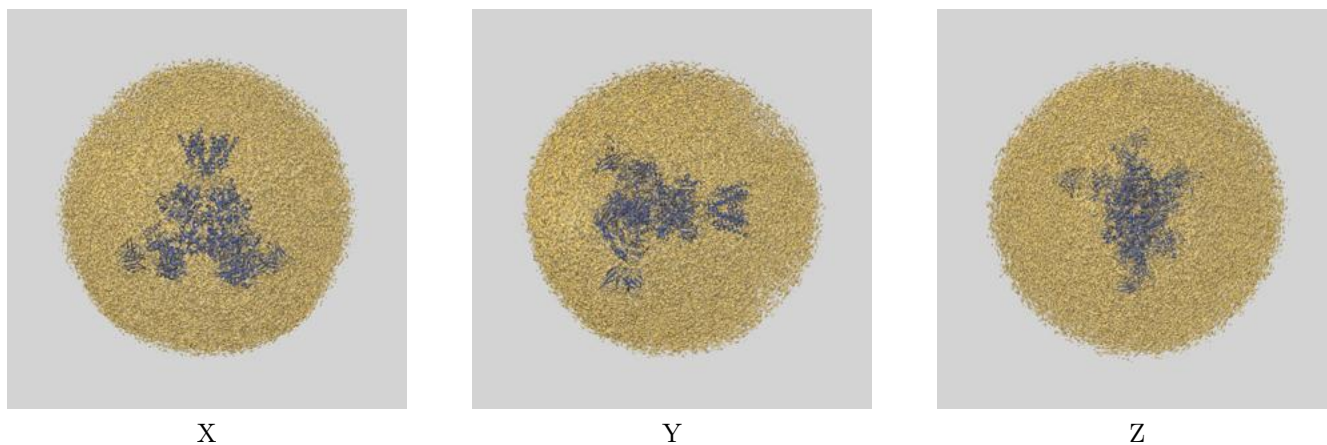
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 6.93 differs from the reported value 4.2 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.85 differs from the reported value 4.2 by more than 10 %

9 Map-model fit [i](#)

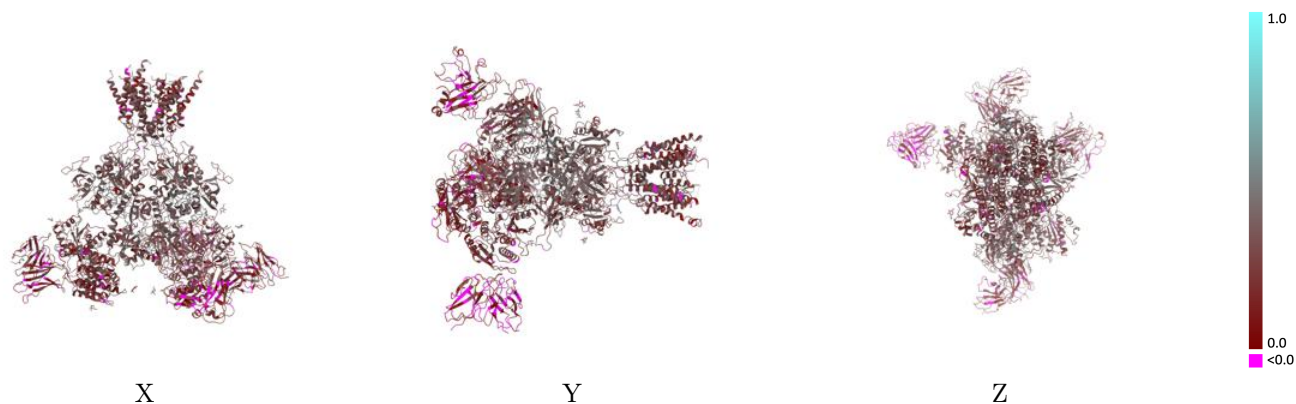
This section contains information regarding the fit between EMDB map EMD-38451 and PDB model 8XLK. Per-residue inclusion information can be found in section 3 on page 9.

9.1 Map-model overlay [i](#)



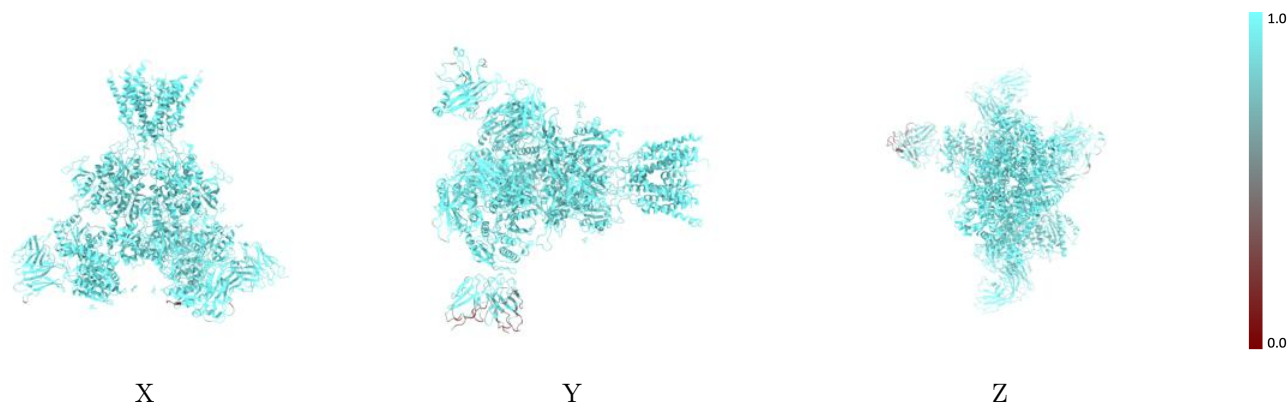
The images above show the 3D surface view of the map at the recommended contour level 0.85 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



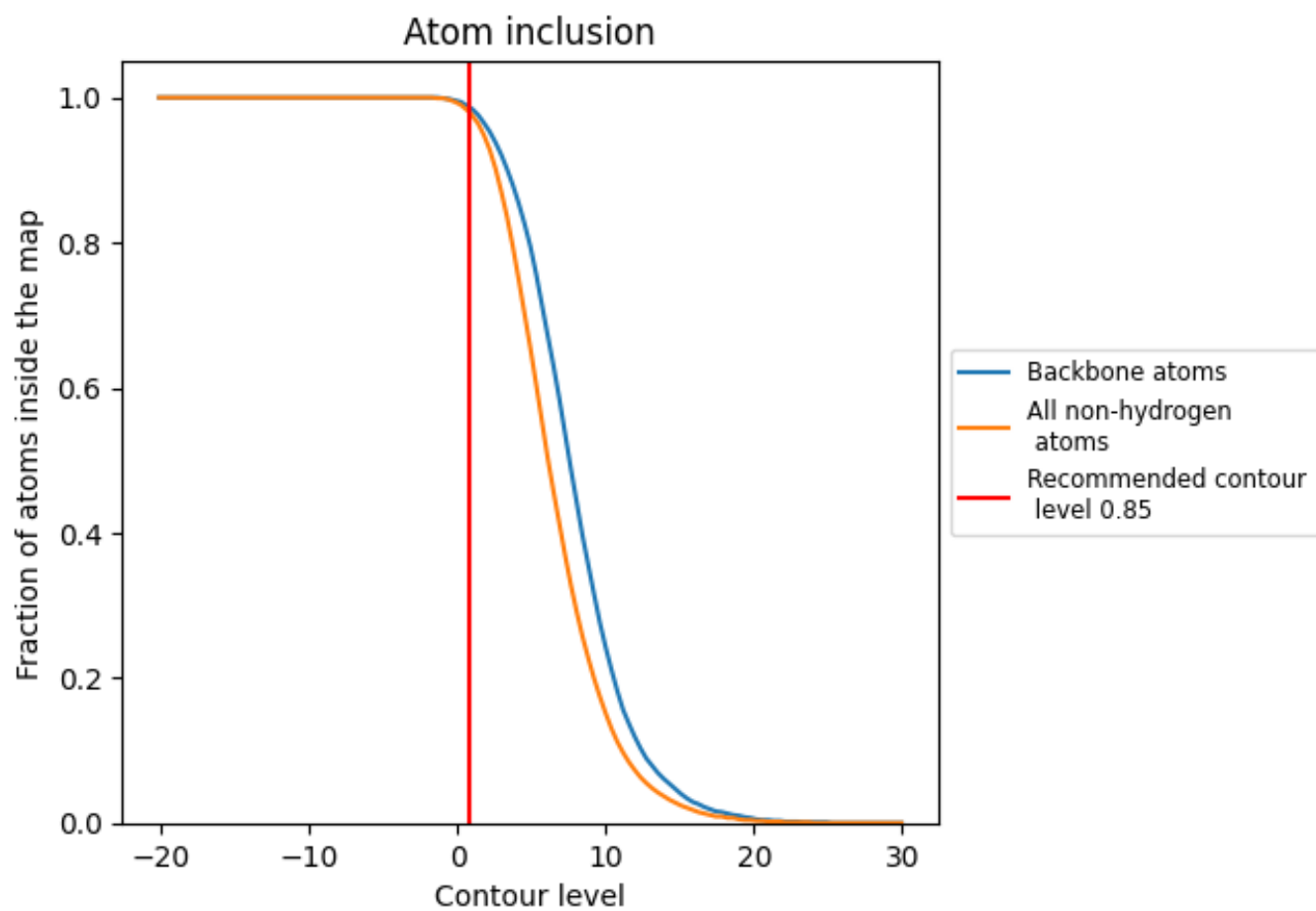
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.85).

































9.4 Atom inclusion [i](#)



At the recommended contour level, 99% of all backbone atoms, 98% 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 (0.85) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9790	 0.2780
A	 0.9950	 0.3110
B	 0.9930	 0.3300
C	 0.9930	 0.3080
D	 0.9920	 0.2890
E	 0.9760	 0.1930
F	 0.9990	 0.1970
G	 0.9530	 0.2290
H	 0.9860	 0.2520
I	 0.9880	 0.1660
J	 0.9980	 0.2190
K	 0.7550	 0.0500
L	 0.7600	 0.0320
M	 1.0000	 0.3810
N	 0.9290	 0.3400
O	 1.0000	 0.3680

