



## Full wwPDB EM Validation Report ⓘ

Apr 10, 2022 – 07:08 am BST

PDB ID : 7QNB  
EMDB ID : EMD-14073  
Title : Cryo-EM structure of human full-length beta3gamma2 GABA(A)R in complex with GABA and nanobody Nb25  
Authors : Sente, A.; Desai, R.; Naydenova, K.; Malinauskas, T.; Jounaidi, Y.; Miehling, J.; Zhou, X.; Masiulis, S.; Hardwick, S.W.; Chirgadze, D.Y.; Miller, K.W.; Aricescu, A.R.  
Deposited on : 2021-12-20  
Resolution : 3.10 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

---

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

EMDB validation analysis : 0.0.0.dev97  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.27

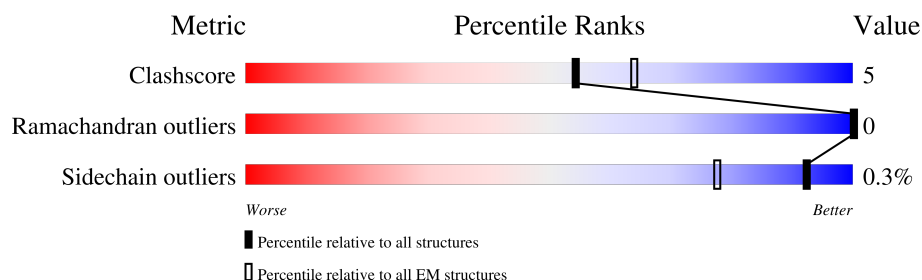
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.10 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<br>(#Entries) | EM structures<br>(#Entries) |
|-----------------------|-----------------------------|-----------------------------|
| Clashscore            | 158937                      | 4297                        |
| Ramachandran outliers | 154571                      | 4023                        |
| Sidechain outliers    | 154315                      | 3826                        |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1   | A     | 487    |                  |
| 1   | C     | 487    |                  |
| 2   | B     | 473    |                  |
| 2   | D     | 473    |                  |
| 2   | E     | 473    |                  |
| 3   | N     | 121    |                  |
| 4   | b     | 2      |                  |
| 4   | d     | 2      |                  |

Continued on next page...

*Continued from previous page...*

| Mol | Chain | Length | Quality of chain                        |
|-----|-------|--------|---|
| 4   | e     | 2      | <div><div></div>100%</div>              |
| 5   | F     | 5      | <div><div></div>60%<div></div>40%</div> |
| 5   | G     | 5      | <div><div></div>80%<div></div>20%</div> |
| 5   | H     | 5      | <div><div></div>80%<div></div>20%</div> |

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 14793 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 Gamma-aminobutyric acid type A receptor subunit gamma2.

| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 1   | A     | 328      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 2701  | 1766 | 443 | 477 | 15 |         |       |
| 1   | C     | 328      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 2701  | 1766 | 443 | 477 | 15 |         |       |

There are 124 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment               | Reference      |
|-------|---------|----------|--------|-----------------------|----------------|
| A     | -30     | MET      | -      | initiating methionine | UNP A0A2K5TLN2 |
| A     | -29     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -28     | ILE      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -27     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -26     | PRO      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -25     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -24     | PRO      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -23     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -22     | MET      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -21     | PRO      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -20     | ALA      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -19     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -18     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -17     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -16     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -15     | VAL      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -14     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -13     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -12     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -11     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -10     | VAL      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -9      | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -8      | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -7      | MET      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -6      | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -5      | CYS      | -      | expression tag        | UNP A0A2K5TLN2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment               | Reference      |
|-------|---------|----------|--------|-----------------------|----------------|
| A     | -4      | VAL      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -3      | ALA      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -2      | GLU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | -1      | THR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 0       | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 1       | GLN      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 2       | LYS      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 3       | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 4       | ASP      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 5       | ASP      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 6       | ASP      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 7       | TYR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 8       | GLU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 9       | ASP      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 10      | TYR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 11      | THR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 437     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 438     | THR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 439     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 440     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 441     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 442     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 443     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 444     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 445     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 446     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 447     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 448     | THR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 449     | GLU      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 450     | THR      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 451     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 452     | GLN      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 453     | VAL      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 454     | ALA      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 455     | PRO      | -      | expression tag        | UNP A0A2K5TLN2 |
| A     | 456     | ALA      | -      | expression tag        | UNP A0A2K5TLN2 |
| C     | -30     | MET      | -      | initiating methionine | UNP A0A2K5TLN2 |
| C     | -29     | GLY      | -      | expression tag        | UNP A0A2K5TLN2 |
| C     | -28     | ILE      | -      | expression tag        | UNP A0A2K5TLN2 |
| C     | -27     | LEU      | -      | expression tag        | UNP A0A2K5TLN2 |
| C     | -26     | PRO      | -      | expression tag        | UNP A0A2K5TLN2 |
| C     | -25     | SER      | -      | expression tag        | UNP A0A2K5TLN2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment        | Reference      |
|-------|---------|----------|--------|----------------|----------------|
| C     | -24     | PRO      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -23     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -22     | MET      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -21     | PRO      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -20     | ALA      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -19     | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -18     | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -17     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -16     | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -15     | VAL      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -14     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -13     | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -12     | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -11     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -10     | VAL      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -9      | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -8      | LEU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -7      | MET      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -6      | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -5      | CYS      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -4      | VAL      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -3      | ALA      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -2      | GLU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | -1      | THR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 0       | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 1       | GLN      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 2       | LYS      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 3       | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 4       | ASP      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 5       | ASP      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 6       | ASP      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 7       | TYR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 8       | GLU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 9       | ASP      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 10      | TYR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 11      | THR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 437     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 438     | THR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 439     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 440     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 441     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 442     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |

*Continued on next page...*

Continued from previous page...

| Chain | Residue | Modelled | Actual | Comment        | Reference      |
|-------|---------|----------|--------|----------------|----------------|
| C     | 443     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 444     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 445     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 446     | GLY      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 447     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 448     | THR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 449     | GLU      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 450     | THR      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 451     | SER      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 452     | GLN      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 453     | VAL      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 454     | ALA      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 455     | PRO      | -      | expression tag | UNP A0A2K5TLN2 |
| C     | 456     | ALA      | -      | expression tag | UNP A0A2K5TLN2 |

- Molecule 2 is a protein called Gamma-aminobutyric acid receptor subunit beta-3.

| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 2   | B     | 330      | Total | C    | N   | O   | S  | 1       | 0     |
|     |       |          | 2714  | 1780 | 440 | 478 | 16 |         |       |
| 2   | D     | 330      | Total | C    | N   | O   | S  | 1       | 0     |
|     |       |          | 2721  | 1784 | 441 | 480 | 16 |         |       |
| 2   | E     | 330      | Total | C    | N   | O   | S  | 1       | 0     |
|     |       |          | 2714  | 1780 | 440 | 478 | 16 |         |       |

- Molecule 3 is a protein called Nanobody Nb25.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 3   | N     | 121      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 940   | 593 | 161 | 182 | 4 |         |       |

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



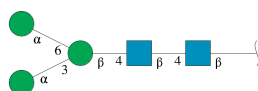
| Mol | Chain | Residues | Atoms |    |   |    |  | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|--|---------|-------|
| 4   | b     | 2        | Total | C  | N | O  |  | 0       | 0     |
|     |       |          | 28    | 16 | 2 | 10 |  |         |       |

Continued on next page...

Continued from previous page...

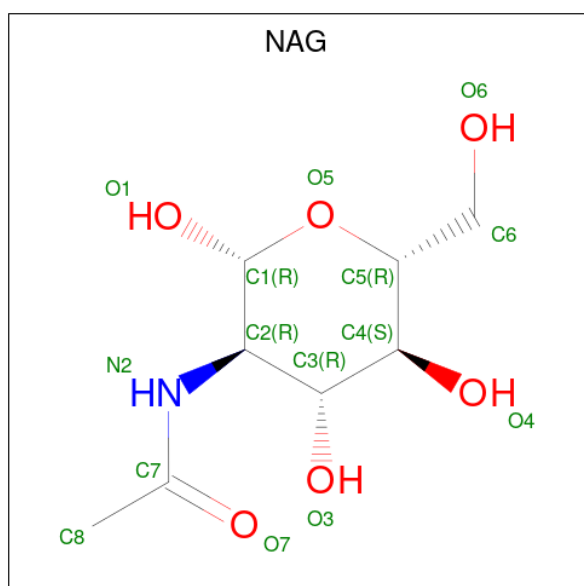
| Mol | Chain | Residues | Atoms |    |   |    | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|-------|
| 4   | d     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 28    | 16 | 2 | 10 |         |       |
| 4   | e     | 2        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 28    | 16 | 2 | 10 |         |       |

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-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 |
|-----|-------|----------|-------|----|---|----|---------|-------|
| 5   | F     | 5        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 61    | 34 | 2 | 25 |         |       |
| 5   | G     | 5        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 61    | 34 | 2 | 25 |         |       |
| 5   | H     | 5        | Total | C  | N | O  | 0       | 0     |
|     |       |          | 61    | 34 | 2 | 25 |         |       |

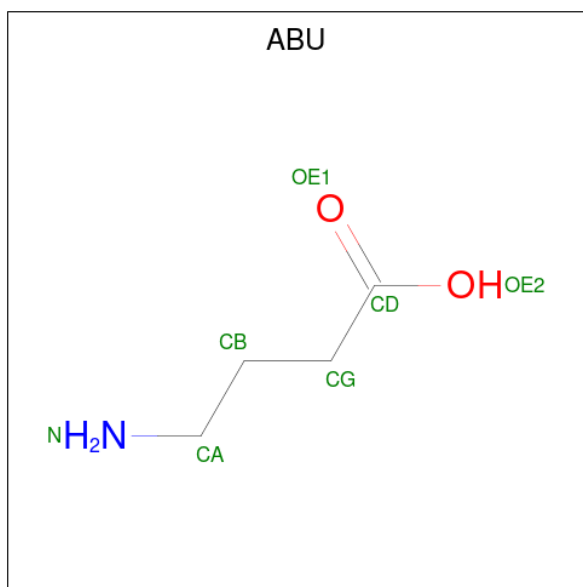
- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).





| Mol | Chain | Residues | Atoms |   |   |   | AltConf |
|-----|-------|----------|-------|---|---|---|---------|
| 6   | A     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |
| 6   | C     | 1        | Total | C | N | O | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |

- Molecule 7 is GAMMA-AMINO-BUTANOIC ACID (three-letter code: ABU) (formula:  $C_4H_9NO_2$ ) (labeled as "Ligand of Interest" by depositor).

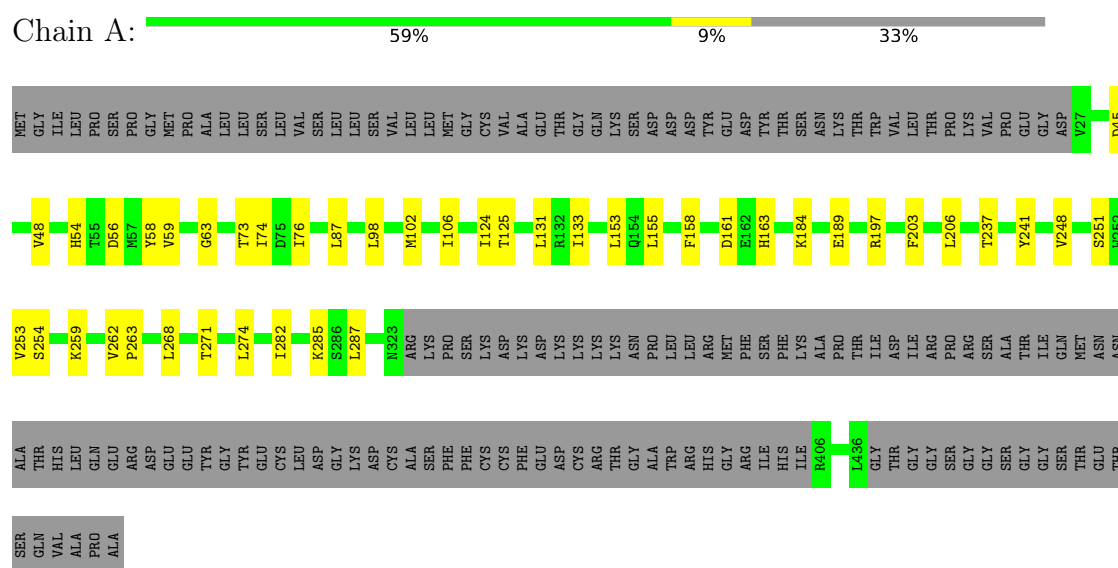


| Mol | Chain | Residues | Atoms |   |   |   | AltConf |
|-----|-------|----------|-------|---|---|---|---------|
| 7   | B     | 1        | Total | C | N | O | 0       |
|     |       |          | 7     | 4 | 1 | 2 |         |

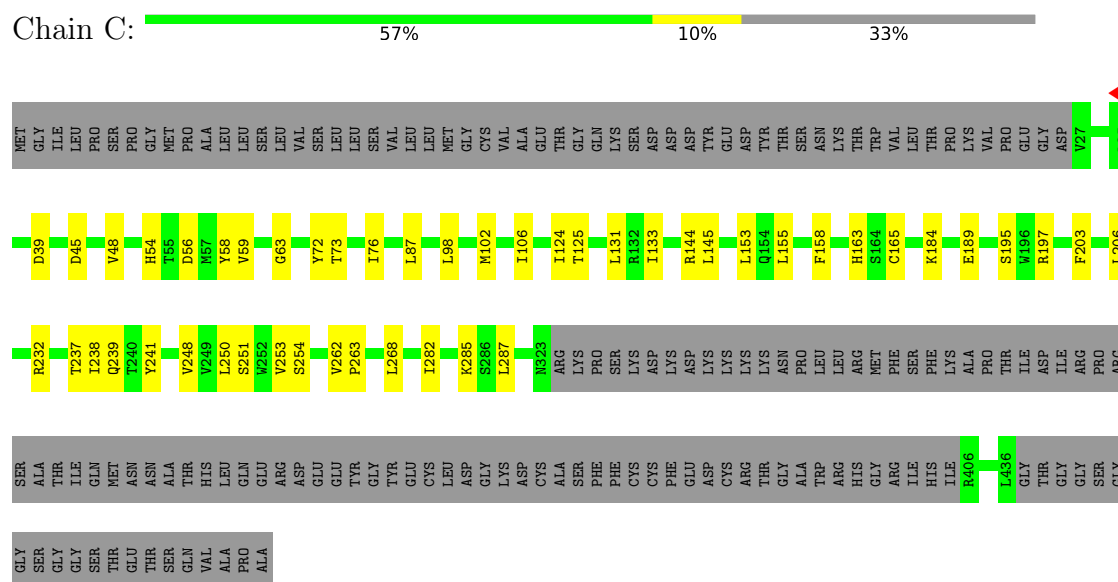
### 3 Residue-property plots

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

- Molecule 1: Gamma-aminobutyric acid type A receptor subunit gamma2



- Molecule 1: Gamma-aminobutyric acid type A receptor subunit gamma2



[illegible][illegible]

**Chain E:**

61%      9%      30%


MET TRP GLY LEU ALA GLY ARG PHE LEU GLY ILE PHE SER ALA PRO VAL LEU VAL VAL CYS CYS ALA GLN SER VAL ASN ASP PR7 N8 F11 I25 V36 I44 L59 Y66 D101 R117 L125 A134 Y143 D146 E147 Q148

L152 I164 I181 V194 S209 L210 R213 L218 L222 T233 S236 N243 Y244 D245 A252 L253 G254 I255 T256 T257 R269 L272 I275 K279 L285 M286 A300 T305 F306 F307 GLY ARG GLY PRO ALN ARG GLN TYR LEU ALA

LYS THR MET PRO ARG GLU HIS ASP GLY PHE LEU ASP ARG SER LYS SER GLU ASP ASN ARG VAL ASP ALA HIS GLY ASN ILE LEU LEU ARG THR SER LEU SER GLU VAL HIS ASN MET GLU ASN GLU VAL SER GLY ILE GLY ASP THR ARG ASN SER ALA ILE SER PHE ASP ASN SER GLY ILE TYR ARG LYS

GLN SER MET PRO ARG GLU HIS ASP GLY PHE LEU ASP ARG SER LYS SER GLU ASP THR D312 V313 R428 P432 V447 ASN

- Molecule 3: Nanobody Nb25

Chain N:  78% 22%



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

Chain b:  100%



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

Chain d:  50% 100%



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

Chain e:  100%



- Molecule 5: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:  60% 40%




- Molecule 5: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:  80% 20%



- Molecule 5:  $\alpha$ -D-mannopyranose-(1-3)-[ $\alpha$ -D-mannopyranose-(1-6)] $\beta$ -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose

Chain H:  80% 20%

|      |
|------|
| MAG1 |
| MAG2 |
| EMJ3 |
| MAM4 |
| MAM5 |

## 4 Experimental information

| Property                             | Value                                   | Source    |
|--------------------------------------|---|-----------|
| EM reconstruction method             | SINGLE PARTICLE                         | Depositor |
| Imposed symmetry                     | POINT, Not provided                     |           |
| Number of particles used             | 65867                                   | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF                       | Depositor |
| CTF correction method                | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope                           | FEI TITAN KRIOS                         | Depositor |
| Voltage (kV)                         | 300                                     | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 47.46                                   | Depositor |
| Minimum defocus (nm)                 | 700                                     | Depositor |
| Maximum defocus (nm)                 | 2100                                    | Depositor |
| Magnification                        | 130000                                  | Depositor |
| Image detector                       | GATAN K3 (6k x 4k)                      | Depositor |
| Maximum map value                    | 0.087                                   | Depositor |
| Minimum map value                    | -0.031                                  | Depositor |
| Average map value                    | 0.000                                   | Depositor |
| Map value standard deviation         | 0.003                                   | Depositor |
| Recommended contour level            | 0.008                                   | Depositor |
| Map size ( $\text{\AA}$ )            | 259.84, 259.84, 259.84                  | wwPDB     |
| Map dimensions                       | 290, 290, 290                           | wwPDB     |
| Map angles ( $^\circ$ )              | 90.0, 90.0, 90.0                        | wwPDB     |
| Pixel spacing ( $\text{\AA}$ )       | 0.89599997, 0.89599997, 0.89599997      | 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: MAN, BMA, ABU, 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   | A     | 0.24         | 0/2775  | 0.46        | 0/3779  |
| 1   | C     | 0.24         | 0/2775  | 0.46        | 0/3779  |
| 2   | B     | 0.25         | 0/2789  | 0.46        | 0/3795  |
| 2   | D     | 0.25         | 0/2794  | 0.46        | 0/3802  |
| 2   | E     | 0.25         | 0/2789  | 0.46        | 0/3795  |
| 3   | N     | 0.25         | 0/963   | 0.47        | 0/1304  |
| All | All   | 0.24         | 0/14885 | 0.46        | 0/20254 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1   | A     | 2701  | 0        | 2693     | 26      | 0            |
| 1   | C     | 2701  | 0        | 2693     | 33      | 0            |
| 2   | B     | 2714  | 0        | 2709     | 33      | 0            |
| 2   | D     | 2721  | 0        | 2706     | 41      | 0            |
| 2   | E     | 2714  | 0        | 2709     | 31      | 0            |
| 3   | N     | 940   | 0        | 887      | 15      | 0            |
| 4   | b     | 28    | 0        | 25       | 0       | 0            |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 4   | d     | 28    | 0        | 25       | 0       | 0            |
| 4   | e     | 28    | 0        | 25       | 0       | 0            |
| 5   | F     | 61    | 0        | 52       | 2       | 0            |
| 5   | G     | 61    | 0        | 52       | 1       | 0            |
| 5   | H     | 61    | 0        | 52       | 2       | 0            |
| 6   | A     | 14    | 0        | 13       | 0       | 0            |
| 6   | C     | 14    | 0        | 13       | 0       | 0            |
| 7   | B     | 7     | 0        | 5        | 1       | 0            |
| All | All   | 14793 | 0        | 14659    | 159     | 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 5.

All (159) 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) |
|--------------------|------------------|--------------------------|-------------------|
| 2:B:272:LEU:HD13   | 2:B:279:LYS:HE3  | 1.67                     | 0.77              |
| 2:D:272:LEU:HD13   | 2:D:279:LYS:HE3  | 1.67                     | 0.75              |
| 2:E:272:LEU:HD13   | 2:E:279:LYS:HE3  | 1.67                     | 0.75              |
| 3:N:478:THR:HG22   | 3:N:510:VAL:H    | 1.57                     | 0.68              |
| 2:B:44[A]:ILE:HD12 | 2:B:59:LEU:HD11  | 1.76                     | 0.67              |
| 1:A:253:VAL:HG13   | 2:B:300:ALA:HB2  | 1.76                     | 0.66              |
| 2:D:238:VAL:HG13   | 2:E:300:ALA:HB2  | 1.76                     | 0.65              |
| 2:E:44[A]:ILE:HD12 | 2:E:59:LEU:HD11  | 1.80                     | 0.63              |
| 1:A:282:ILE:HD12   | 1:A:285:LYS:HG3  | 1.81                     | 0.62              |
| 1:C:282:ILE:HD12   | 1:C:285:LYS:HG3  | 1.81                     | 0.62              |
| 1:A:155:LEU:HD13   | 1:A:287:LEU:HD22 | 1.82                     | 0.60              |
| 1:C:155:LEU:HD13   | 1:C:287:LEU:HD22 | 1.82                     | 0.60              |
| 2:B:243:ASN:ND2    | 2:B:245:ASP:OD2  | 2.35                     | 0.59              |
| 2:B:146:ASP:OD2    | 2:B:148:GLN:NE2  | 2.33                     | 0.59              |
| 2:E:243:ASN:ND2    | 2:E:245:ASP:OD2  | 2.35                     | 0.59              |
| 2:D:243:ASN:ND2    | 2:D:245:ASP:OD2  | 2.35                     | 0.59              |
| 2:E:146:ASP:OD2    | 2:E:148:GLN:NE2  | 2.33                     | 0.58              |
| 1:C:144:ARG:NH1    | 2:D:98:PHE:O     | 2.36                     | 0.58              |
| 2:B:275:ILE:HD11   | 2:B:279:LYS:HD3  | 1.86                     | 0.58              |
| 2:E:275:ILE:HD11   | 2:E:279:LYS:HD3  | 1.86                     | 0.58              |
| 2:D:146:ASP:OD2    | 2:D:148:GLN:NE2  | 2.33                     | 0.57              |
| 2:D:223:LEU:HD11   | 2:E:286:MET:HG3  | 1.85                     | 0.57              |
| 2:D:44:ILE:HD12    | 2:D:59:LEU:HD11  | 1.88                     | 0.56              |
| 2:D:275:ILE:HD11   | 2:D:279:LYS:HD3  | 1.86                     | 0.56              |
| 1:C:250:LEU:HD22   | 2:D:296:LEU:HD23 | 1.87                     | 0.56              |

*Continued on next page...*



*Continued from previous page...*

| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:N:447:TYR:HE1  | 3:N:457:ILE:HG13 | 1.70                     | 0.55              |
| 2:D:256:THR:HG21 | 2:E:255:ILE:HD13 | 1.89                     | 0.55              |
| 1:A:98:LEU:HD13  | 1:A:102:MET:HG2  | 1.89                     | 0.55              |
| 1:C:98:LEU:HD13  | 1:C:102:MET:HG2  | 1.89                     | 0.55              |
| 1:A:59:VAL:HA    | 1:A:76:ILE:HG22  | 1.89                     | 0.55              |
| 3:N:6:GLU:OE2    | 3:N:505:GLY:N    | 2.33                     | 0.54              |
| 2:E:269:ARG:HE   | 2:E:285:LEU:HD12 | 1.72                     | 0.54              |
| 2:D:101:ASP:HA   | 2:D:134:ALA:HA   | 1.89                     | 0.54              |
| 2:B:101:ASP:HA   | 2:B:134:ALA:HA   | 1.89                     | 0.53              |
| 1:C:59:VAL:HA    | 1:C:76:ILE:HG22  | 1.89                     | 0.53              |
| 2:D:269:ARG:HE   | 2:D:285:LEU:HD12 | 1.72                     | 0.53              |
| 2:B:269:ARG:HE   | 2:B:285:LEU:HD12 | 1.72                     | 0.53              |
| 1:C:63:GLY:HA2   | 1:C:197:ARG:HB3  | 1.91                     | 0.53              |
| 2:E:101:ASP:HA   | 2:E:134:ALA:HA   | 1.89                     | 0.53              |
| 1:A:63:GLY:HA2   | 1:A:197:ARG:HB3  | 1.91                     | 0.52              |
| 2:D:179:GLU:HA   | 3:N:444:SER:HB2  | 1.92                     | 0.52              |
| 1:A:271:THR:HG21 | 2:B:255:ILE:HD13 | 1.93                     | 0.51              |
| 1:C:63:GLY:N     | 1:C:73:THR:O     | 2.40                     | 0.51              |
| 1:A:248:VAL:O    | 1:A:251:SER:OG   | 2.24                     | 0.51              |
| 1:C:248:VAL:O    | 1:C:251:SER:OG   | 2.24                     | 0.51              |
| 2:D:66[A]:TYR:CZ | 2:D:125:LEU:HD13 | 2.46                     | 0.51              |
| 1:C:253:VAL:HG13 | 2:D:300:ALA:HB2  | 1.93                     | 0.50              |
| 1:C:232:ARG:NE   | 2:D:276:PRO:HG3  | 2.27                     | 0.50              |
| 2:D:117:ARG:HB3  | 2:D:125:LEU:HB3  | 1.93                     | 0.50              |
| 2:D:428:ARG:O    | 2:D:432:PRO:HD2  | 2.11                     | 0.50              |
| 2:E:117:ARG:HB3  | 2:E:125:LEU:HB3  | 1.93                     | 0.50              |
| 1:A:203:PHE:HZ   | 1:A:206:LEU:HB2  | 1.77                     | 0.50              |
| 2:E:428:ARG:O    | 2:E:432:PRO:HD2  | 2.11                     | 0.50              |
| 1:A:58:TYR:HD1   | 1:A:189:GLU:HB3  | 1.77                     | 0.50              |
| 2:B:213:ARG:HB2  | 5:F:1:NAG:H81    | 1.93                     | 0.50              |
| 2:B:143:TYR:CZ   | 2:B:272:LEU:HD21 | 2.47                     | 0.49              |
| 2:D:143:TYR:CZ   | 2:D:272:LEU:HD21 | 2.47                     | 0.49              |
| 2:E:143:TYR:CZ   | 2:E:272:LEU:HD21 | 2.47                     | 0.49              |
| 2:B:428:ARG:O    | 2:B:432:PRO:HD2  | 2.11                     | 0.49              |
| 2:D:44:ILE:HG21  | 2:D:181:ILE:HD11 | 1.95                     | 0.49              |
| 2:B:117:ARG:HB3  | 2:B:125:LEU:HB3  | 1.94                     | 0.49              |
| 2:E:8:ASN:HB3    | 2:E:11:PHE:HB3   | 1.95                     | 0.49              |
| 2:B:110:THR:HG22 | 1:C:145:LEU:HD11 | 1.95                     | 0.48              |
| 2:E:194:VAL:HB   | 2:E:209:SER:HB3  | 1.96                     | 0.48              |
| 1:A:45:ASP:HB3   | 1:A:48:VAL:HB    | 1.95                     | 0.48              |
| 1:C:58:TYR:HD1   | 1:C:189:GLU:HB3  | 1.77                     | 0.48              |

*Continued on next page...*

*Continued from previous page...*

| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:203:PHE:HZ   | 1:C:206:LEU:HB2  | 1.77                     | 0.48              |
| 1:C:232:ARG:HD2  | 2:D:276:PRO:HG3  | 1.95                     | 0.48              |
| 1:C:45:ASP:HB3   | 1:C:48:VAL:HB    | 1.95                     | 0.48              |
| 2:D:8:ASN:HB3    | 2:D:11:PHE:HB3   | 1.95                     | 0.48              |
| 3:N:411:ALA:O    | 3:N:464:ASN:ND2  | 2.47                     | 0.48              |
| 3:N:460:ASP:OD1  | 3:N:460:ASP:N    | 2.45                     | 0.48              |
| 3:N:405:LEU:HD13 | 3:N:473:LEU:HD11 | 1.96                     | 0.47              |
| 2:D:194:VAL:HB   | 2:D:209:SER:HB3  | 1.96                     | 0.47              |
| 2:E:213:ARG:HH11 | 5:H:1:NAG:H81    | 1.79                     | 0.47              |
| 1:A:63:GLY:N     | 1:A:73:THR:O     | 2.40                     | 0.47              |
| 3:N:420:ILE:HB   | 3:N:486:LYS:HB3  | 1.97                     | 0.47              |
| 2:B:8:ASN:HB3    | 2:B:11:PHE:HB3   | 1.95                     | 0.47              |
| 2:B:194:VAL:HB   | 2:B:209:SER:HB3  | 1.96                     | 0.47              |
| 1:A:54:HIS:HB3   | 1:A:184:LYS:HG2  | 1.97                     | 0.46              |
| 2:B:218:ILE:HG13 | 2:B:222:ILE:HG12 | 1.97                     | 0.46              |
| 2:B:254:GLY:O    | 2:B:257:THR:OG1  | 2.31                     | 0.46              |
| 1:C:238:ILE:HG23 | 2:D:286:MET:HG3  | 1.97                     | 0.46              |
| 1:A:254:SER:HB2  | 1:A:268:LEU:HD22 | 1.98                     | 0.46              |
| 2:E:213:ARG:HB2  | 5:H:1:NAG:H81    | 1.98                     | 0.46              |
| 2:E:233:THR:O    | 2:E:236:SER:OG   | 2.28                     | 0.46              |
| 2:D:218:ILE:HG13 | 2:D:222:ILE:HG12 | 1.97                     | 0.45              |
| 2:D:252:ALA:HA   | 2:D:255:ILE:HD11 | 1.98                     | 0.45              |
| 2:D:254:GLY:O    | 2:D:257:THR:OG1  | 2.31                     | 0.45              |
| 2:E:66:TYR:CZ    | 2:E:125:LEU:HD13 | 2.51                     | 0.45              |
| 2:E:252:ALA:HA   | 2:E:255:ILE:HD11 | 1.98                     | 0.45              |
| 2:E:218:ILE:HG13 | 2:E:222:ILE:HG12 | 1.97                     | 0.45              |
| 3:N:457:ILE:HG12 | 3:N:468:LEU:HD13 | 1.98                     | 0.45              |
| 1:C:54:HIS:HB3   | 1:C:184:LYS:HG2  | 1.97                     | 0.45              |
| 1:C:195:SER:HA   | 2:D:137:MET:HG3  | 1.98                     | 0.45              |
| 3:N:421:MET:HG3  | 3:N:466:VAL:HG21 | 1.99                     | 0.45              |
| 1:C:268:LEU:HD12 | 2:D:251:VAL:HG13 | 1.99                     | 0.45              |
| 2:B:306:PHE:HB2  | 2:B:313:VAL:HG11 | 1.99                     | 0.44              |
| 2:B:66:TYR:CZ    | 2:B:125:LEU:HD13 | 2.52                     | 0.44              |
| 2:E:305:ILE:HG13 | 2:E:313:VAL:HG22 | 2.00                     | 0.44              |
| 3:N:486:LYS:HB2  | 3:N:499:TYR:CE2  | 2.52                     | 0.44              |
| 2:B:13:LYS:HD2   | 1:C:39:ASP:HB2   | 1.98                     | 0.44              |
| 2:B:252:ALA:HA   | 2:B:255:ILE:HD11 | 1.98                     | 0.44              |
| 2:B:305:ILE:HG13 | 2:B:313:VAL:HG22 | 2.00                     | 0.44              |
| 1:C:254:SER:HB2  | 1:C:268:LEU:HD22 | 1.98                     | 0.44              |
| 3:N:422:GLY:HA2  | 3:N:437:ALA:HA   | 2.00                     | 0.44              |
| 1:C:106:ILE:HD11 | 1:C:131:LEU:HD11 | 2.00                     | 0.44              |

*Continued on next page...*

*Continued from previous page...*

| Atom-1             | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|--------------------|------------------|--------------------------|-------------------|
| 1:C:232:ARG:CD     | 2:D:276:PRO:HG3  | 2.48                     | 0.44              |
| 2:D:255:ILE:H      | 2:D:255:ILE:HG13 | 1.50                     | 0.43              |
| 2:E:44[A]:ILE:HG21 | 2:E:181:ILE:HD11 | 1.98                     | 0.43              |
| 2:E:306:PHE:HB2    | 2:E:313:VAL:HG11 | 1.99                     | 0.43              |
| 2:D:306:PHE:HB2    | 2:D:313:VAL:HG11 | 2.00                     | 0.43              |
| 3:N:427:ALA:HB3    | 3:N:430:LYS:HD2  | 2.00                     | 0.43              |
| 2:D:36:VAL:HG13    | 2:D:164:ILE:HG13 | 2.00                     | 0.43              |
| 2:D:305:ILE:HG13   | 2:D:313:VAL:HG22 | 2.00                     | 0.43              |
| 3:N:419:PRO:HA     | 3:N:440:TRP:HD1  | 1.83                     | 0.43              |
| 1:A:106:ILE:HD11   | 1:A:131:LEU:HD11 | 2.00                     | 0.43              |
| 2:B:44[A]:ILE:HG21 | 2:B:181:ILE:HD11 | 2.01                     | 0.43              |
| 2:D:194:VAL:HG11   | 5:G:2:NAG:H2     | 2.00                     | 0.43              |
| 1:A:274:LEU:HD23   | 2:B:259:LEU:HD11 | 2.00                     | 0.43              |
| 2:E:36:VAL:HG13    | 2:E:164:ILE:HG13 | 2.00                     | 0.43              |
| 1:A:237:THR:HA     | 1:A:241:TYR:HD2  | 1.84                     | 0.42              |
| 1:C:237:THR:HA     | 1:C:241:TYR:HD2  | 1.84                     | 0.42              |
| 2:B:36:VAL:HG13    | 2:B:164:ILE:HG13 | 2.00                     | 0.42              |
| 2:D:233:THR:O      | 2:D:236:SER:OG   | 2.28                     | 0.42              |
| 2:D:305:ILE:HD11   | 2:D:313:VAL:HA   | 2.02                     | 0.42              |
| 1:A:124:ILE:HA     | 1:A:125:THR:HA   | 1.75                     | 0.42              |
| 2:B:152:LEU:N      | 2:B:210:LEU:O    | 2.52                     | 0.42              |
| 2:E:44[B]:ILE:HG21 | 2:E:181:ILE:HD11 | 2.00                     | 0.42              |
| 1:A:262:VAL:HB     | 1:A:263:PRO:HD3  | 2.02                     | 0.41              |
| 1:C:262:VAL:HB     | 1:C:263:PRO:HD3  | 2.02                     | 0.41              |
| 2:E:254:GLY:O      | 2:E:257:THR:OG1  | 2.31                     | 0.41              |
| 1:C:56:ASP:OD1     | 1:C:56:ASP:N     | 2.53                     | 0.41              |
| 2:D:152:LEU:N      | 2:D:210:LEU:O    | 2.53                     | 0.41              |
| 1:A:74:ILE:HG12    | 1:A:76:ILE:HG23  | 2.03                     | 0.41              |
| 1:A:153:LEU:HD22   | 1:A:163:HIS:ND1  | 2.35                     | 0.41              |
| 2:B:44[B]:ILE:HG21 | 2:B:181:ILE:HD11 | 2.03                     | 0.41              |
| 2:E:255:ILE:H      | 2:E:255:ILE:HG13 | 1.50                     | 0.41              |
| 2:B:233:THR:O      | 2:B:236:SER:OG   | 2.28                     | 0.41              |
| 2:D:86:ARG:CZ      | 2:E:25:ILE:HD12  | 2.51                     | 0.41              |
| 3:N:424:PHE:HB3    | 3:N:432:ARG:HG2  | 2.01                     | 0.41              |
| 1:A:56:ASP:OD1     | 1:A:56:ASP:N     | 2.53                     | 0.41              |
| 2:B:255:ILE:H      | 2:B:255:ILE:HG13 | 1.50                     | 0.41              |
| 2:E:152:LEU:N      | 2:E:210:LEU:O    | 2.52                     | 0.41              |
| 1:C:158:PHE:CD2    | 1:C:287:LEU:HD11 | 2.56                     | 0.41              |
| 2:E:305:ILE:HD11   | 2:E:313:VAL:HA   | 2.02                     | 0.41              |
| 2:B:43:ASP:HB3     | 2:B:62:TYR:HB2   | 2.03                     | 0.41              |
| 2:B:155:GLU:OE2    | 7:B:501:ABU:N    | 2.54                     | 0.41              |

*Continued on next page...*

Continued from previous page...

| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:124:ILE:HA   | 1:C:125:THR:HA   | 1.74                     | 0.41              |
| 2:B:194:VAL:HG11 | 5:F:2:NAG:H2     | 2.03                     | 0.41              |
| 1:C:239:GLN:OE1  | 2:D:269:ARG:HG3  | 2.21                     | 0.41              |
| 1:A:87:LEU:HD13  | 1:A:133:ILE:HD13 | 2.03                     | 0.40              |
| 1:A:161:ASP:OD1  | 1:A:161:ASP:N    | 2.53                     | 0.40              |
| 1:C:87:LEU:HD13  | 1:C:133:ILE:HD13 | 2.03                     | 0.40              |
| 2:D:140:LEU:O    | 2:D:279:LYS:HG2  | 2.21                     | 0.40              |
| 1:A:259:LYS:HE2  | 1:A:259:LYS:HB3  | 1.97                     | 0.40              |
| 1:C:72:TYR:CE1   | 1:C:165:CYS:HB3  | 2.57                     | 0.40              |
| 1:A:158:PHE:CD2  | 1:A:287:LEU:HD11 | 2.56                     | 0.40              |
| 1:C:153:LEU:HD22 | 1:C:163:HIS:ND1  | 2.35                     | 0.40              |

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed        | Favoured   | Allowed | Outliers | Percentiles |     |
|-----|-------|-----------------|------------|---------|----------|-------------|-----|
| 1   | A     | 324/487 (66%)   | 312 (96%)  | 12 (4%) | 0        | 100         | 100 |
| 1   | C     | 324/487 (66%)   | 312 (96%)  | 12 (4%) | 0        | 100         | 100 |
| 2   | B     | 327/473 (69%)   | 326 (100%) | 1 (0%)  | 0        | 100         | 100 |
| 2   | D     | 327/473 (69%)   | 326 (100%) | 1 (0%)  | 0        | 100         | 100 |
| 2   | E     | 327/473 (69%)   | 326 (100%) | 1 (0%)  | 0        | 100         | 100 |
| 3   | N     | 117/121 (97%)   | 115 (98%)  | 2 (2%)  | 0        | 100         | 100 |
| All | All   | 1746/2514 (70%) | 1717 (98%) | 29 (2%) | 0        | 100         | 100 |

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed        | Rotameric   | Outliers | Percentiles |     |
|-----|-------|-----------------|-------------|----------|-------------|-----|
| 1   | A     | 303/437 (69%)   | 303 (100%)  | 0        | 100         | 100 |
| 1   | C     | 303/437 (69%)   | 303 (100%)  | 0        | 100         | 100 |
| 2   | B     | 298/417 (72%)   | 297 (100%)  | 1 (0%)   | 92          | 96  |
| 2   | D     | 298/417 (72%)   | 297 (100%)  | 1 (0%)   | 92          | 96  |
| 2   | E     | 298/417 (72%)   | 297 (100%)  | 1 (0%)   | 92          | 96  |
| 3   | N     | 97/97 (100%)    | 96 (99%)    | 1 (1%)   | 76          | 90  |
| All | All   | 1597/2222 (72%) | 1593 (100%) | 4 (0%)   | 92          | 96  |

All (4) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2   | B     | 275 | ILE  |
| 2   | D     | 275 | ILE  |
| 2   | E     | 275 | ILE  |
| 3   | N     | 459 | ARG  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 258 | ASN  |
| 1   | A     | 323 | ASN  |
| 1   | C     | 323 | ASN  |
| 2   | D     | 267 | HIS  |

### 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](#)

21 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 | $\# Z  > 2$ |
| 5   | NAG  | F     | 1   | 2,5  | 14,14,15     | 0.24 | 0           | 17,19,21    | 0.40 | 0           |
| 5   | NAG  | F     | 2   | 5    | 14,14,15     | 0.22 | 0           | 17,19,21    | 0.47 | 0           |
| 5   | BMA  | F     | 3   | 5    | 11,11,12     | 0.60 | 0           | 15,15,17    | 0.78 | 0           |
| 5   | MAN  | F     | 4   | 5    | 11,11,12     | 0.19 | 0           | 15,15,17    | 0.25 | 0           |
| 5   | MAN  | F     | 5   | 5    | 11,11,12     | 0.20 | 0           | 15,15,17    | 0.25 | 0           |
| 5   | NAG  | G     | 1   | 2,5  | 14,14,15     | 0.24 | 0           | 17,19,21    | 0.42 | 0           |
| 5   | NAG  | G     | 2   | 5    | 14,14,15     | 0.22 | 0           | 17,19,21    | 0.48 | 0           |
| 5   | BMA  | G     | 3   | 5    | 11,11,12     | 0.62 | 0           | 15,15,17    | 0.84 | 0           |
| 5   | MAN  | G     | 4   | 5    | 11,11,12     | 0.21 | 0           | 15,15,17    | 0.23 | 0           |
| 5   | MAN  | G     | 5   | 5    | 11,11,12     | 0.21 | 0           | 15,15,17    | 0.23 | 0           |
| 5   | NAG  | H     | 1   | 2,5  | 14,14,15     | 0.26 | 0           | 17,19,21    | 0.44 | 0           |
| 5   | NAG  | H     | 2   | 5    | 14,14,15     | 0.24 | 0           | 17,19,21    | 0.55 | 0           |
| 5   | BMA  | H     | 3   | 5    | 11,11,12     | 0.68 | 0           | 15,15,17    | 0.93 | 0           |
| 5   | MAN  | H     | 4   | 5    | 11,11,12     | 0.21 | 0           | 15,15,17    | 0.26 | 0           |
| 5   | MAN  | H     | 5   | 5    | 11,11,12     | 0.19 | 0           | 15,15,17    | 0.24 | 0           |
| 4   | NAG  | b     | 1   | 2,4  | 14,14,15     | 0.23 | 0           | 17,19,21    | 0.43 | 0           |
| 4   | NAG  | b     | 2   | 4    | 14,14,15     | 0.24 | 0           | 17,19,21    | 0.45 | 0           |
| 4   | NAG  | d     | 1   | 2,4  | 14,14,15     | 0.24 | 0           | 17,19,21    | 0.37 | 0           |
| 4   | NAG  | d     | 2   | 4    | 14,14,15     | 0.22 | 0           | 17,19,21    | 0.42 | 0           |
| 4   | NAG  | e     | 1   | 2,4  | 14,14,15     | 0.24 | 0           | 17,19,21    | 0.37 | 0           |
| 4   | NAG  | e     | 2   | 4    | 14,14,15     | 0.23 | 0           | 17,19,21    | 0.40 | 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   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 5   | NAG  | F     | 1   | 2,5  | -       | 0/6/23/26 | 0/1/1/1 |
| 5   | NAG  | F     | 2   | 5    | -       | 0/6/23/26 | 0/1/1/1 |
| 5   | BMA  | F     | 3   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 5   | MAN  | F     | 4   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 5   | MAN  | F     | 5   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 5   | NAG  | G     | 1   | 2,5  | -       | 0/6/23/26 | 0/1/1/1 |
| 5   | NAG  | G     | 2   | 5    | -       | 0/6/23/26 | 0/1/1/1 |
| 5   | BMA  | G     | 3   | 5    | -       | 2/2/19/22 | 0/1/1/1 |
| 5   | MAN  | G     | 4   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 5   | MAN  | G     | 5   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 5   | NAG  | H     | 1   | 2,5  | -       | 0/6/23/26 | 0/1/1/1 |
| 5   | NAG  | H     | 2   | 5    | -       | 0/6/23/26 | 0/1/1/1 |
| 5   | BMA  | H     | 3   | 5    | -       | 2/2/19/22 | 0/1/1/1 |
| 5   | MAN  | H     | 4   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 5   | MAN  | H     | 5   | 5    | -       | 0/2/19/22 | 0/1/1/1 |
| 4   | NAG  | b     | 1   | 2,4  | -       | 0/6/23/26 | 0/1/1/1 |
| 4   | NAG  | b     | 2   | 4    | -       | 0/6/23/26 | 0/1/1/1 |
| 4   | NAG  | d     | 1   | 2,4  | -       | 0/6/23/26 | 0/1/1/1 |
| 4   | NAG  | d     | 2   | 4    | -       | 0/6/23/26 | 0/1/1/1 |
| 4   | NAG  | e     | 1   | 2,4  | -       | 0/6/23/26 | 0/1/1/1 |
| 4   | NAG  | e     | 2   | 4    | -       | 0/6/23/26 | 0/1/1/1 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

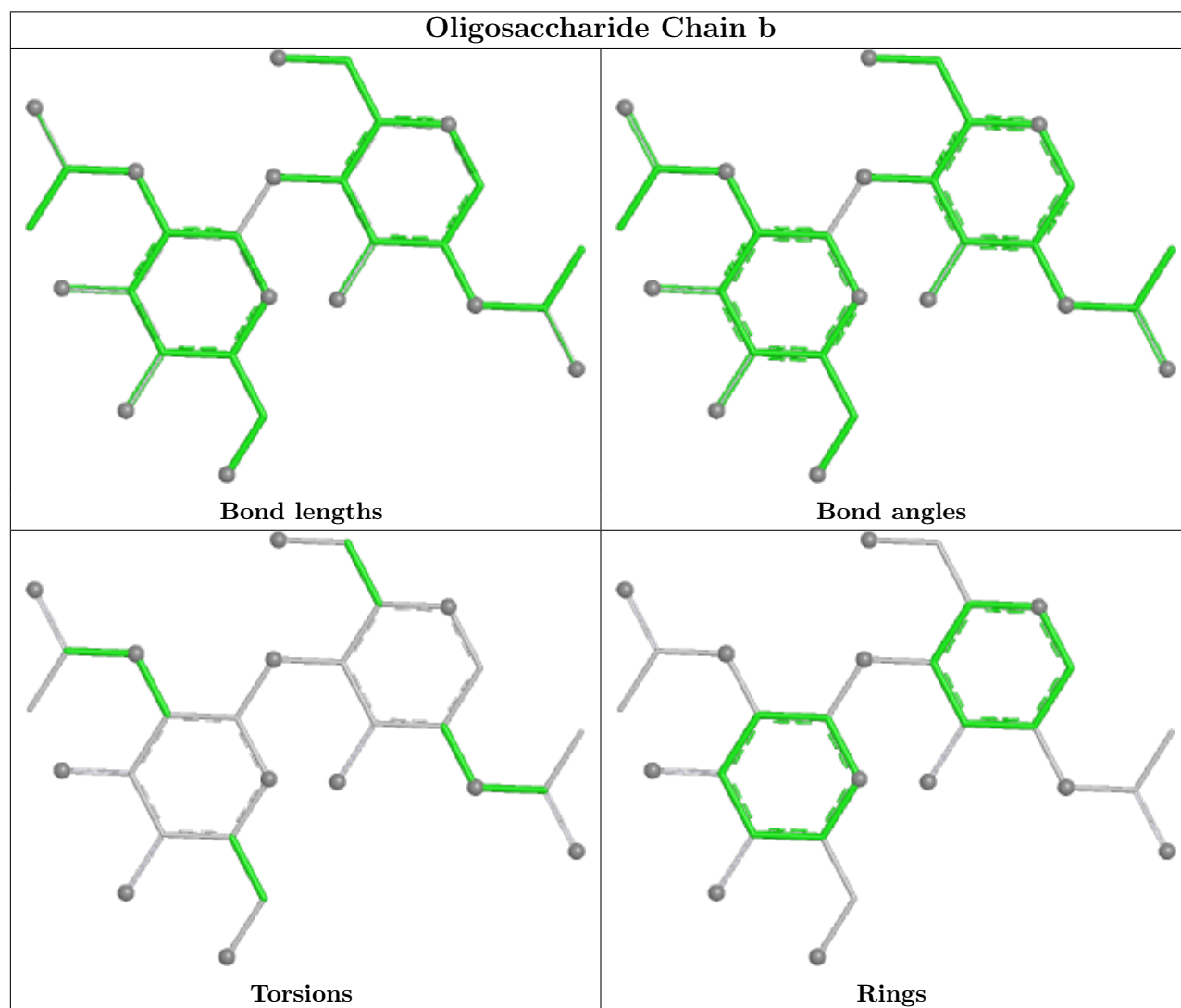
| Mol | Chain | Res | Type | Atoms       |
|-----|-------|-----|------|-------------|
| 5   | G     | 3   | BMA  | C4-C5-C6-O6 |
| 5   | G     | 3   | BMA  | O5-C5-C6-O6 |
| 5   | H     | 3   | BMA  | C4-C5-C6-O6 |
| 5   | H     | 3   | BMA  | O5-C5-C6-O6 |

There are no ring outliers.

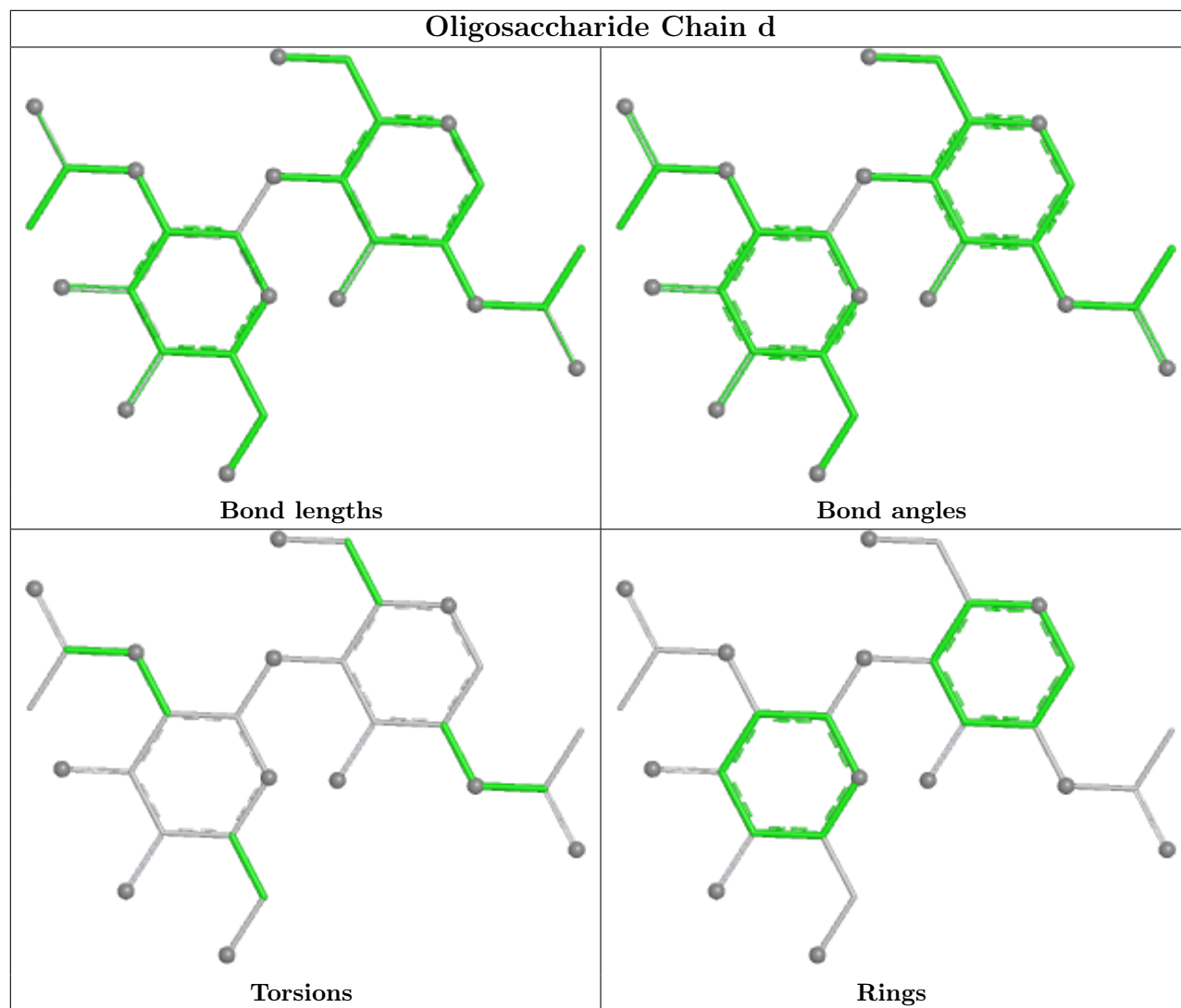
4 monomers are involved in 5 short contacts:

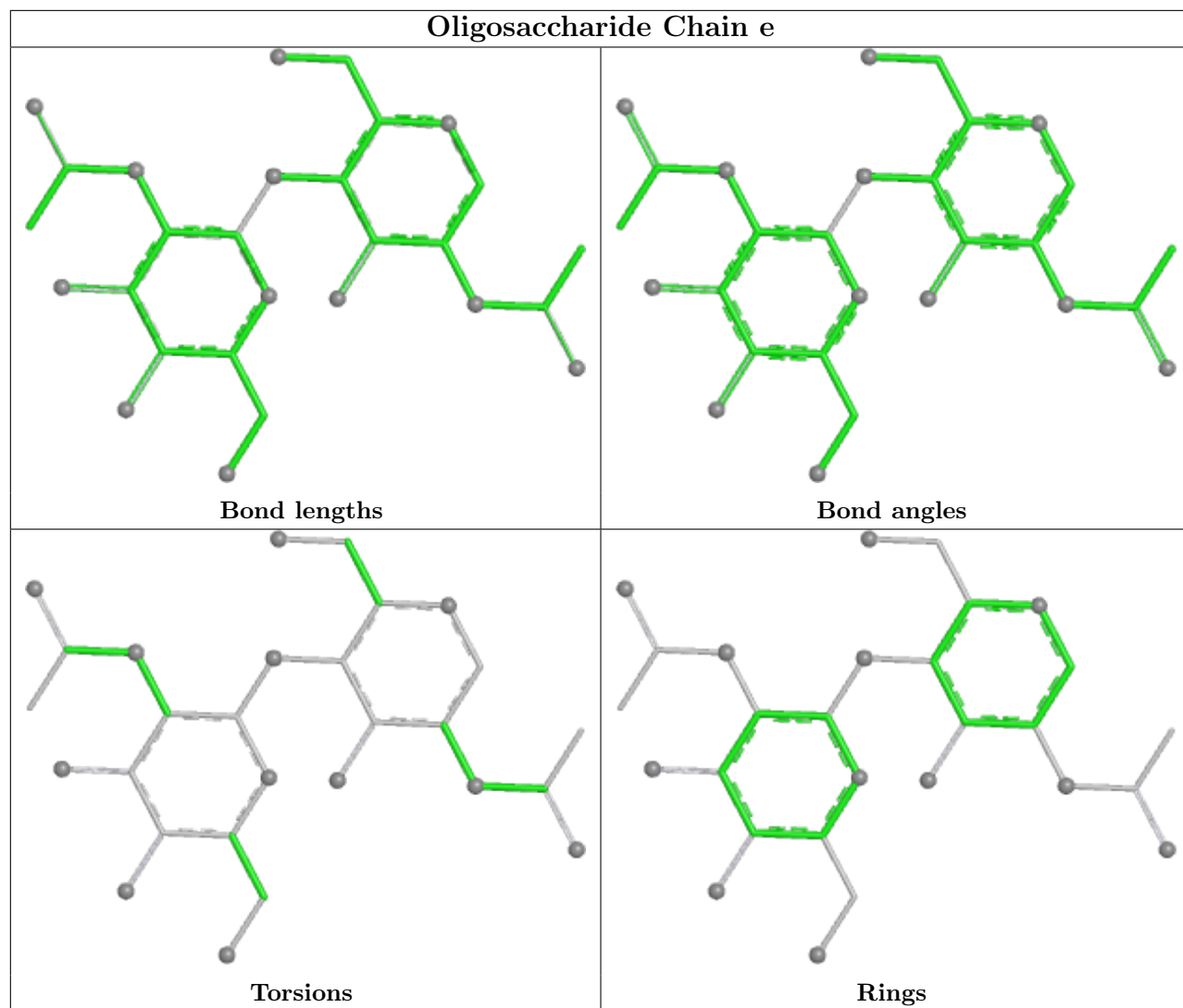
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 5   | G     | 2   | NAG  | 1       | 0            |
| 5   | F     | 1   | NAG  | 1       | 0            |
| 5   | F     | 2   | NAG  | 1       | 0            |
| 5   | H     | 1   | NAG  | 2       | 0            |

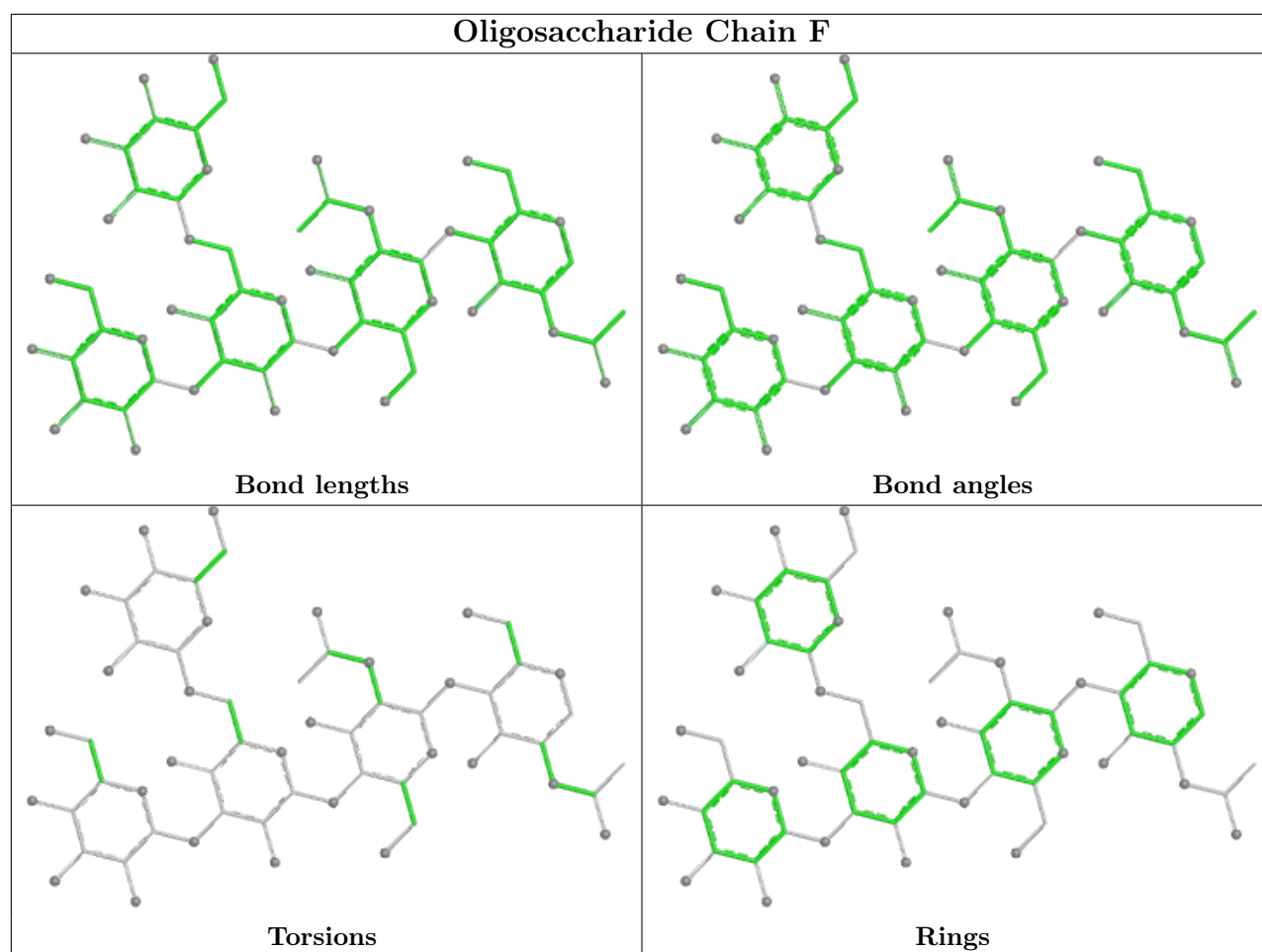
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

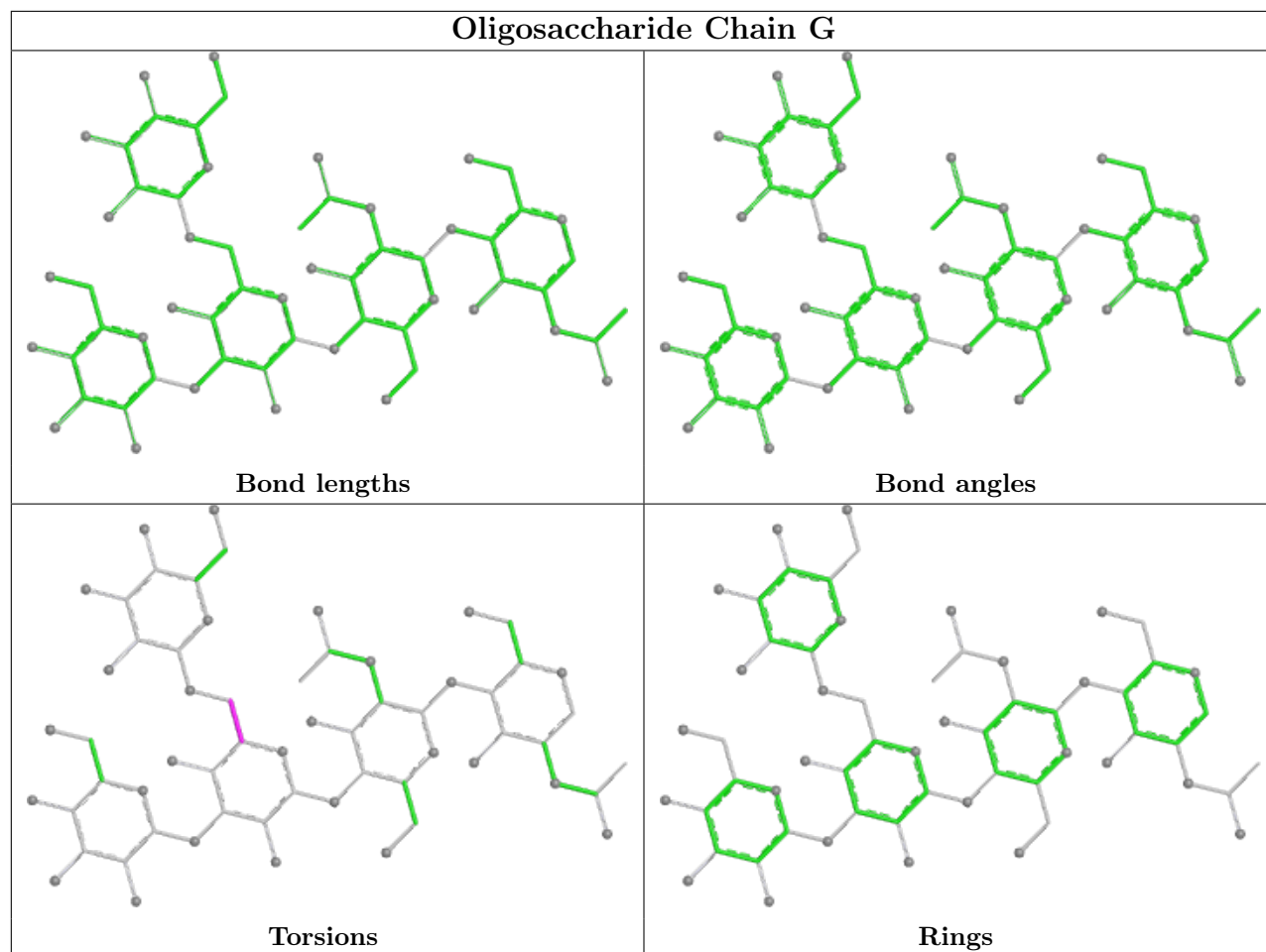


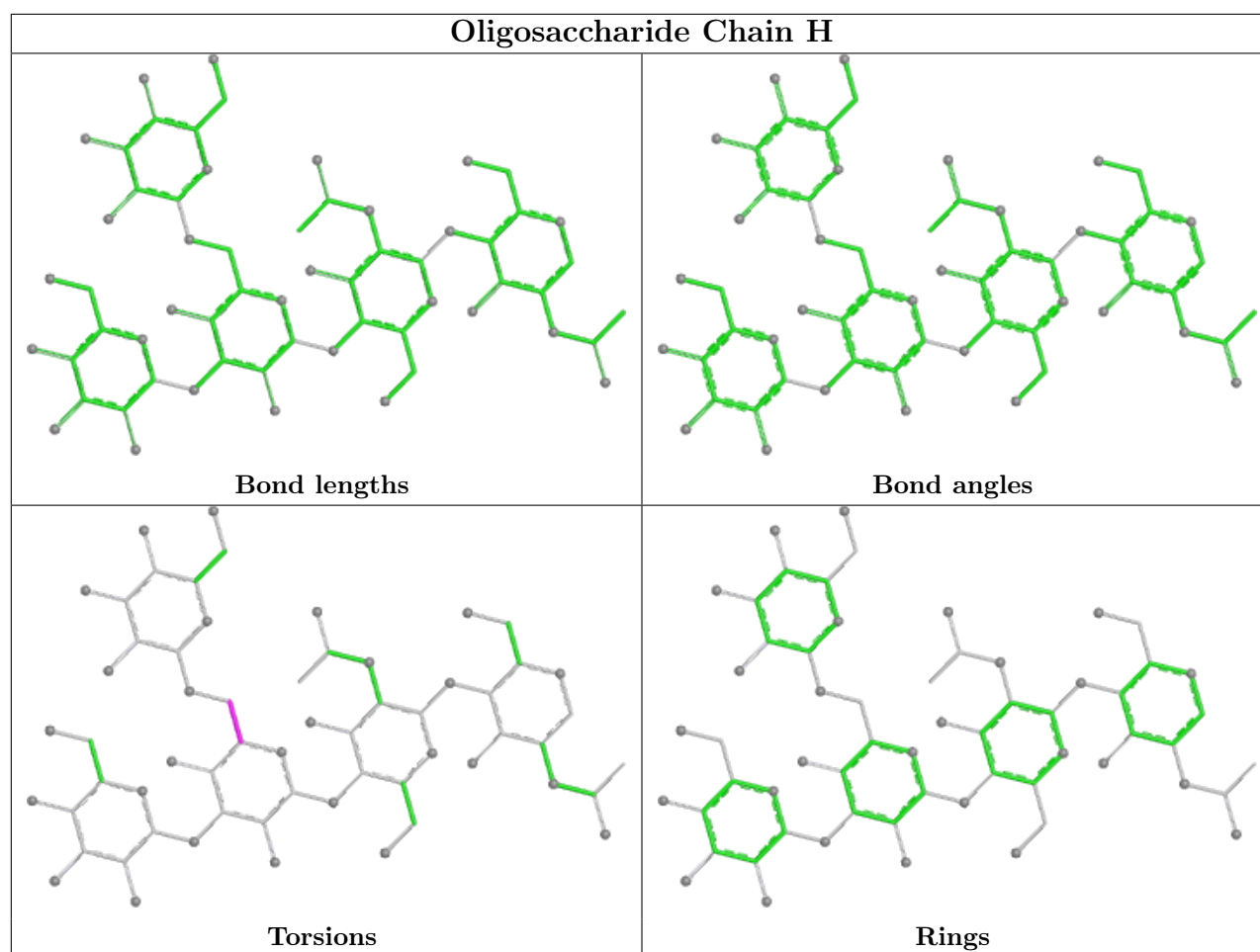












## 5.6 Ligand geometry [i](#)

3 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 | $\# Z  > 2$ |
| 7   | ABU  | B     | 501 | -    | 3,6,6        | 0.13 | 0           | 2,6,6       | 0.03 | 0           |
| 6   | NAG  | A     | 501 | 1    | 14,14,15     | 0.21 | 0           | 17,19,21    | 0.49 | 0           |
| 6   | NAG  | C     | 501 | 1    | 14,14,15     | 0.22 | 0           | 17,19,21    | 0.46 | 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   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 7   | ABU  | B     | 501 | -    | -       | 0/2/4/4   | -       |
| 6   | NAG  | A     | 501 | 1    | -       | 1/6/23/26 | 0/1/1/1 |
| 6   | NAG  | C     | 501 | 1    | -       | 1/6/23/26 | 0/1/1/1 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

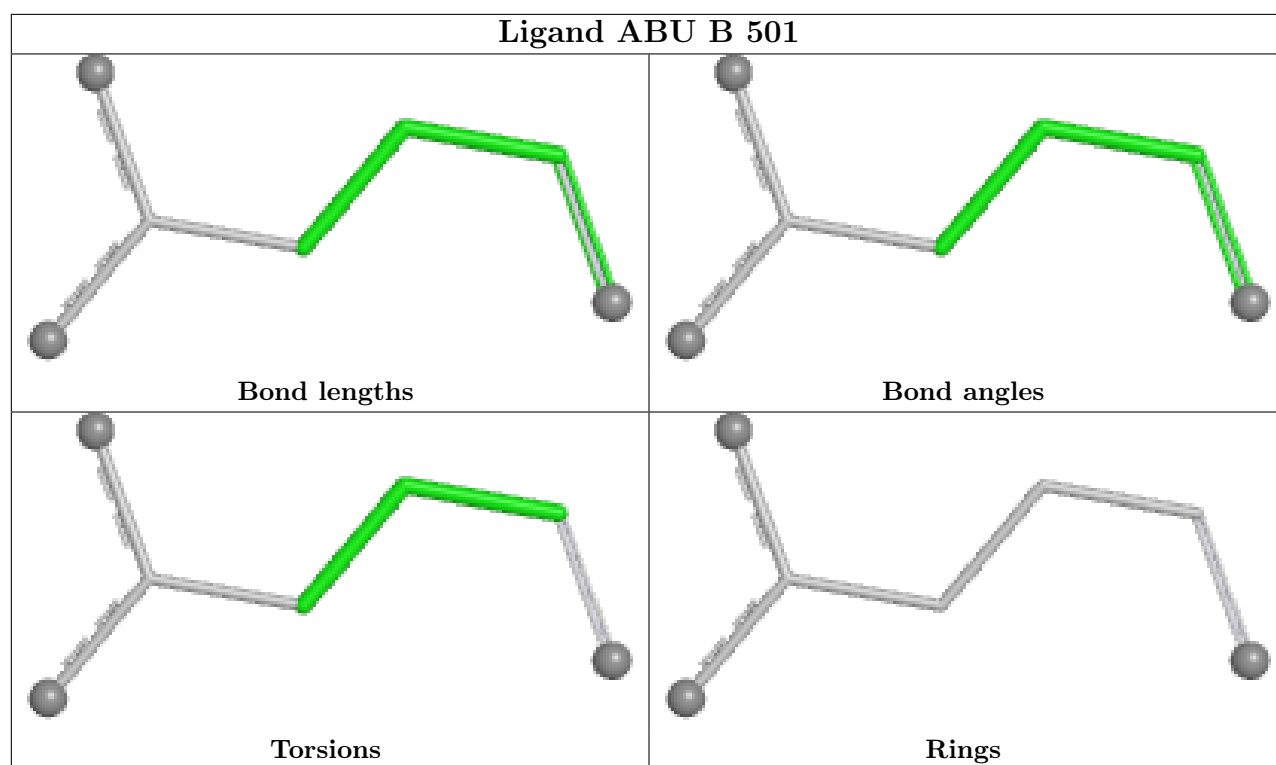
| Mol | Chain | Res | Type | Atoms       |
|-----|-------|-----|------|-------------|
| 6   | C     | 501 | NAG  | O5-C5-C6-O6 |
| 6   | A     | 501 | NAG  | O5-C5-C6-O6 |

There are no ring outliers.

1 monomer is involved in 1 short contact:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 7   | B     | 501 | ABU  | 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](#)

The following chains have linkage breaks:

| Mol | Chain | Number of breaks |
|-----|-------|------------------|
| 3   | N     | 1                |

All chain breaks are listed below:

| Model | Chain | Residue-1 | Atom-1 | Residue-2 | Atom-2 | Distance (Å) |
|-------|-------|-----------|--------|-----------|--------|--------------|
| 1     | N     | 13:GLN    | C      | 403:GLY   | N      | 5.63         |

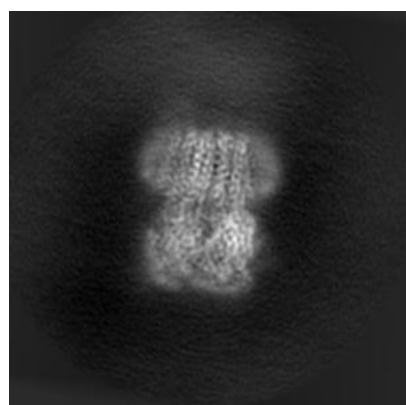
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14073. These allow visual inspection of the internal detail of the map and identification of artifacts.

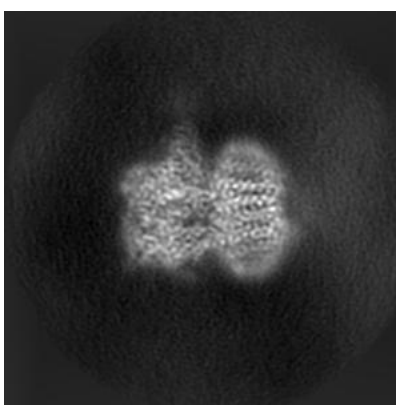
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

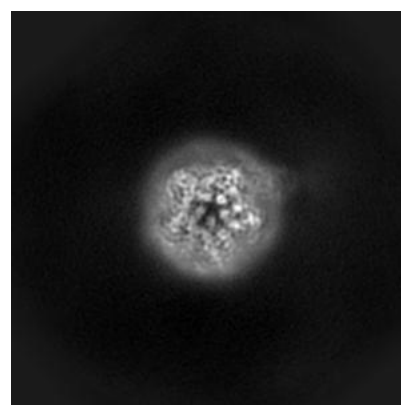
#### 6.1.1 Primary map



X



Y

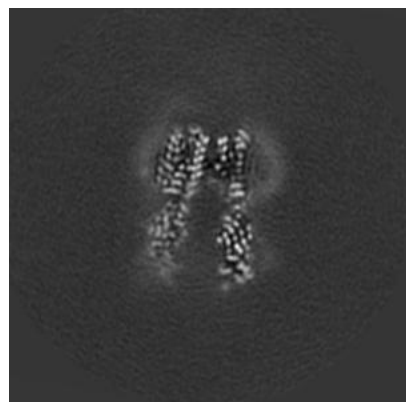


Z

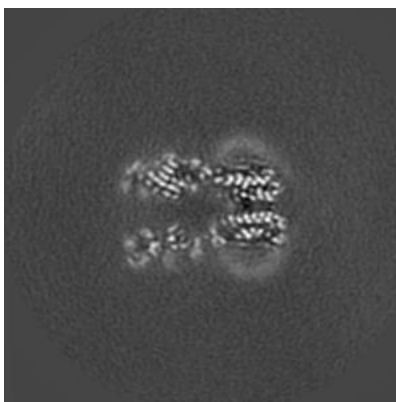
The images above show the map projected in three orthogonal directions.

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

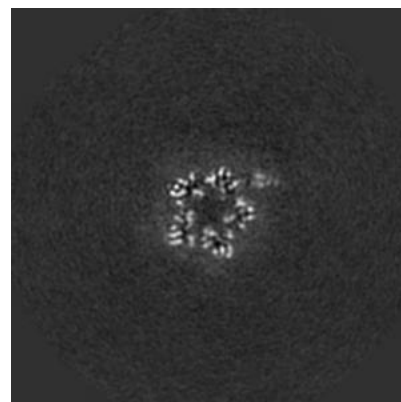
#### 6.2.1 Primary map



X Index: 145



Y Index: 145



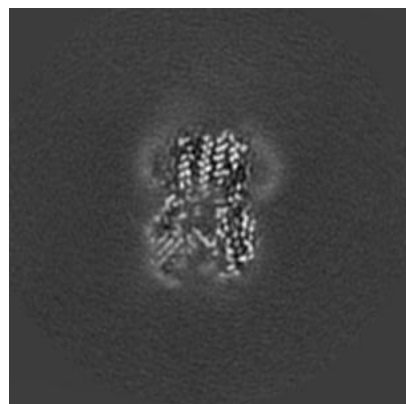
Z Index: 145



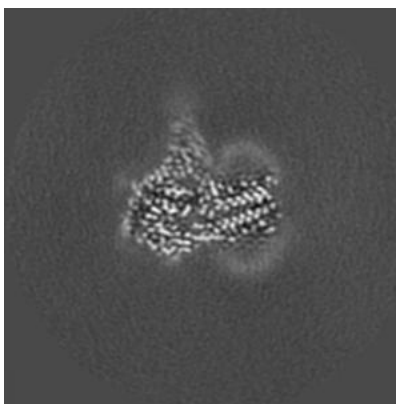
The images above show central slices of the map in three orthogonal directions.

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

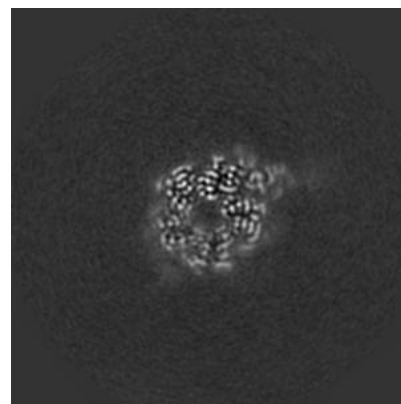
### 6.3.1 Primary map



X Index: 154



Y Index: 164



Z Index: 121

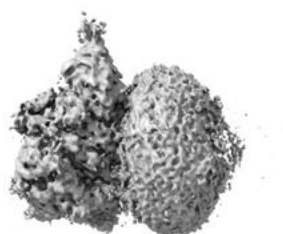
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.008. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

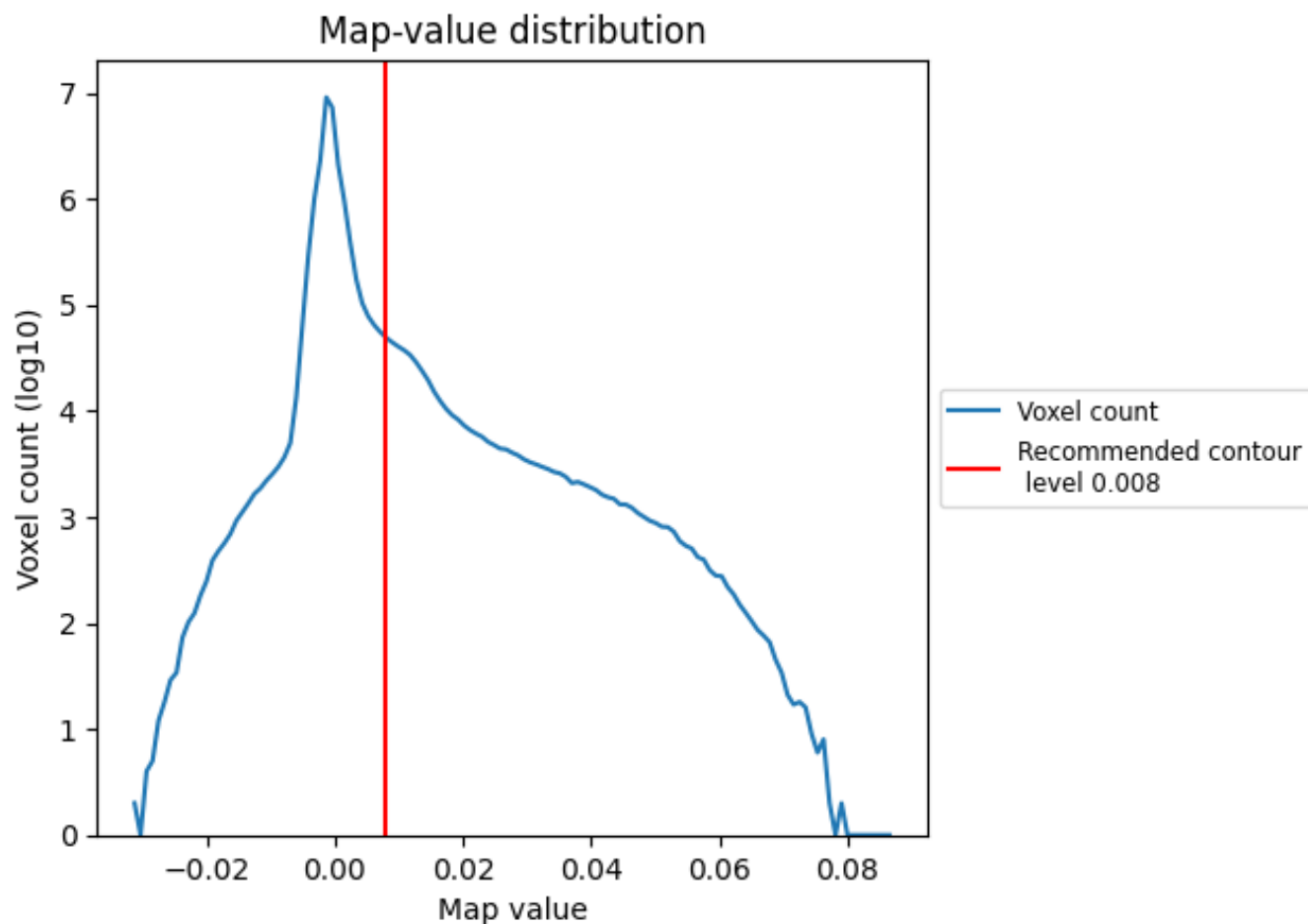
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

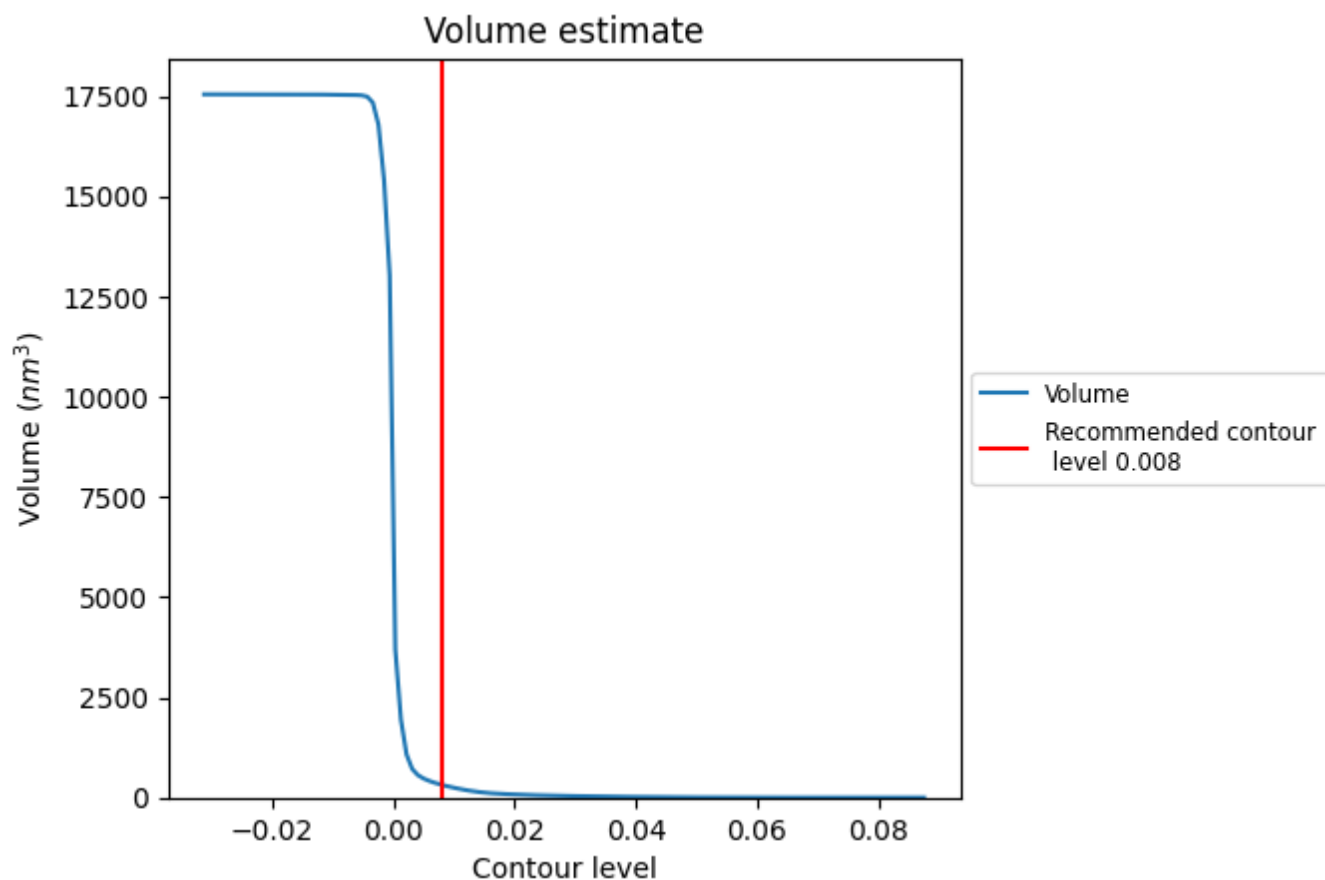
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

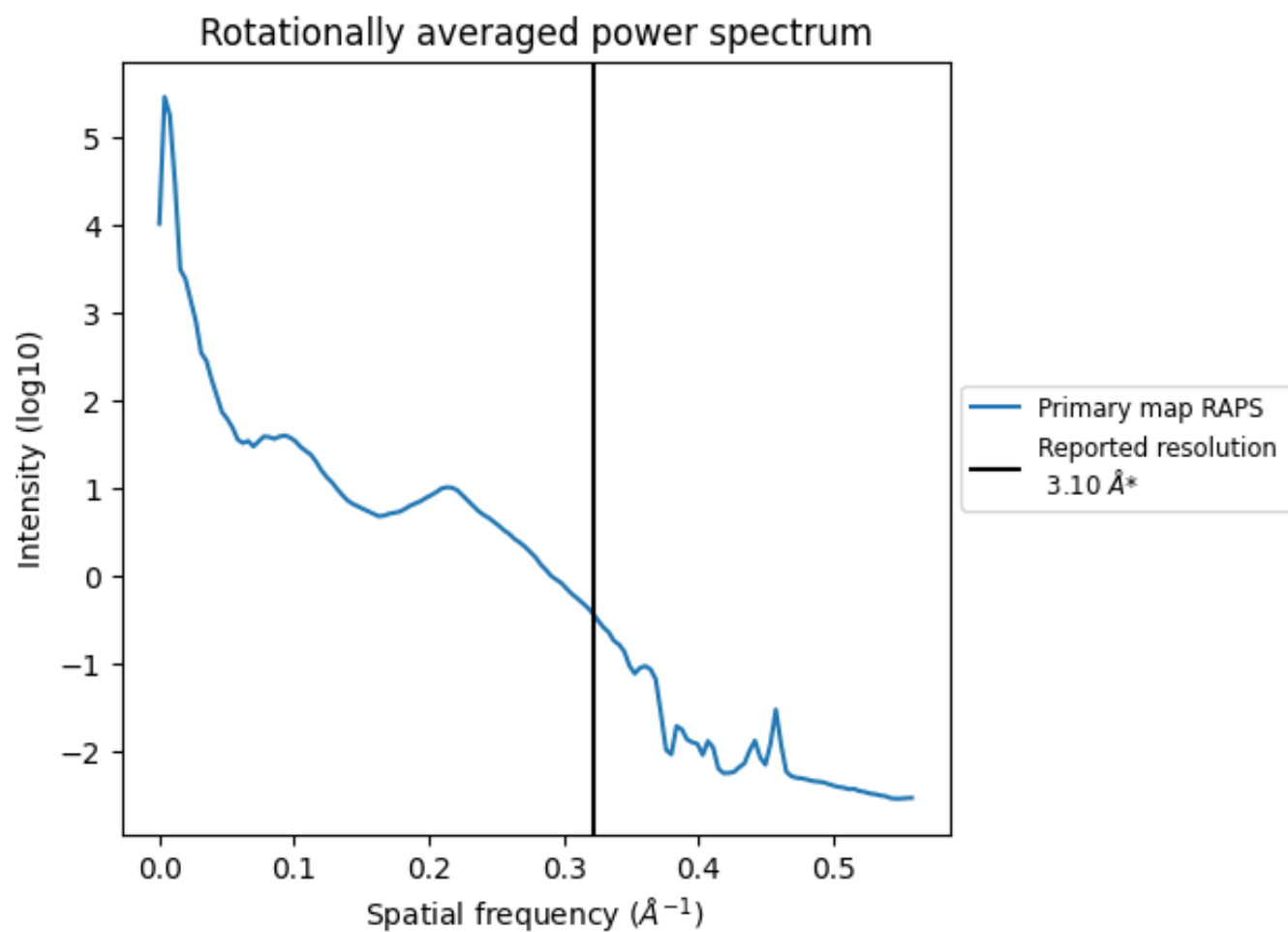
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 317  $\text{nm}^3$ ; this corresponds to an approximate mass of 286 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum ⓘ

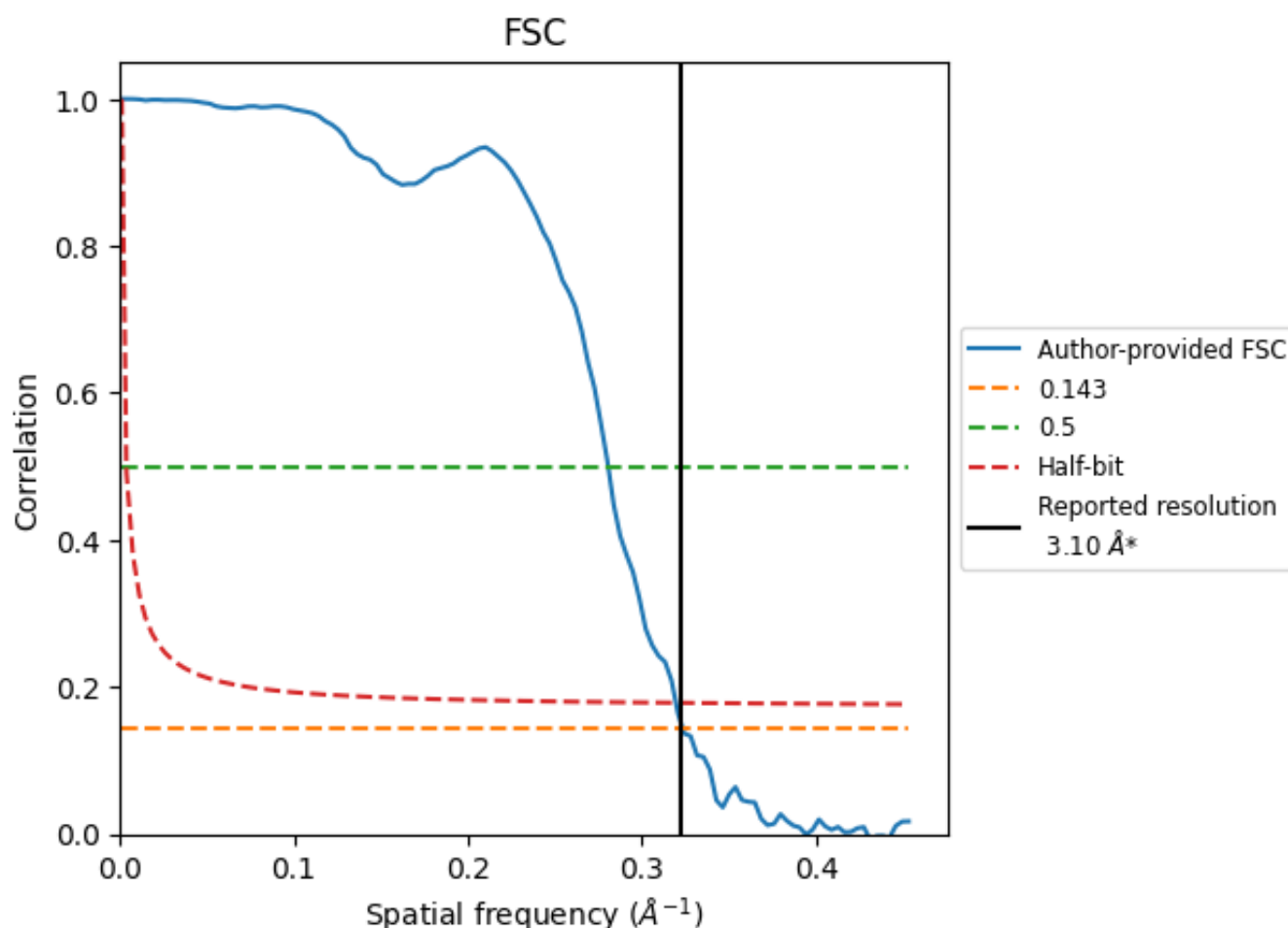


\*Reported resolution corresponds to spatial frequency of 0.323 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.323 \text{ \AA}^{-1}$

## 8.2 Resolution estimates [i](#)

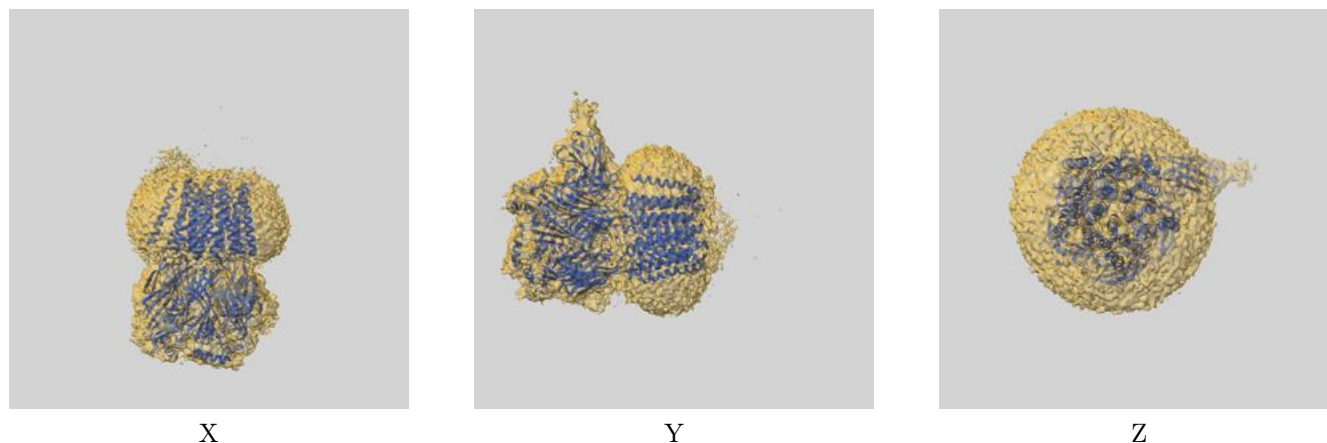
| Resolution estimate (Å)   | Estimation criterion (FSC cut-off) |      |          |
|---------------------------|------------------------------------|------|----------|
|                           | 0.143                              | 0.5  | Half-bit |
| Reported by author        | 3.10                               | -    | -        |
| Author-provided FSC curve | 3.09                               | 3.56 | 3.13     |
| Unmasked-calculated*      | -                                  | -    | -        |

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

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

This section contains information regarding the fit between EMDB map EMD-14073 and PDB model 7QNB. Per-residue inclusion information can be found in section [3](#) on page [10](#).

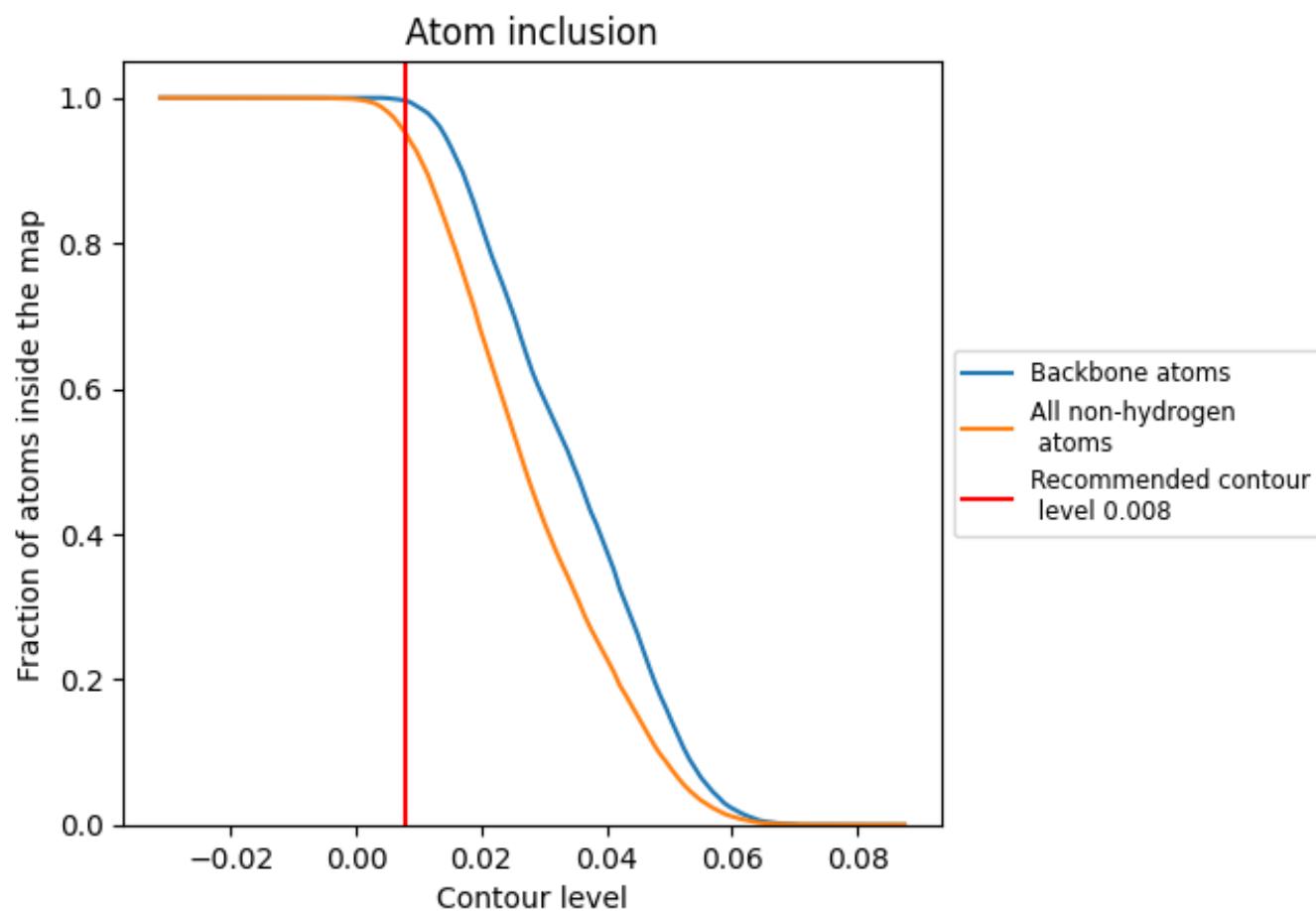
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.008 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 Atom inclusion [i](#)



At the recommended contour level, 100% of all backbone atoms, 95% of all non-hydrogen atoms, are inside the map.