# Full wwPDB EM Validation Report ⓘ

Jan 6, 2025 – 04:18 PM JST

| | | |
|---|---|---|
| PDB ID | : | 8YDX |
| EMDB ID | : | EMD-39184 |
| Title | : | Cryo-EM structure of SARS-CoV-2 spike ectodomain (HexaPro, Omicron BA.2 variant) in complex with CeSPIACE |
| Authors | : | Suzuki, H.; Nakamura, S.; Fujiyoshi, Y. |
| Deposited on | : | 2024-02-21 |
| Resolution | : | 4.90 Å(reported) |
| Based on initial model | : | 6XKL |

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

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

---

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

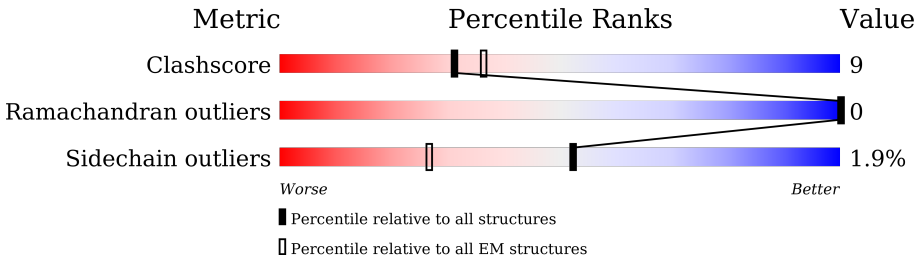
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev113 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.40 |

# 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 4.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.




| Metric | Whole archive (#Entries) | EM structures (#Entries) |
|---|---|---|
| Clashscore | 210492 | 15764 |
| Ramachandran outliers | 207382 | 16835 |
| Sidechain outliers | 206894 | 16415 |

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

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | D | 39 | 44% 92% 8% |
| 1 | E | 39 | 54% 92% 8% |
| 1 | F | 39 | 15% 92% 8% |
| 2 | A | 1307 | 12% 61% 17% 22% |
| 2 | B | 1307 | 11% 63% 16% • 21% |
| 2 | C | 1307 | 9% 62% 16% 22% |

## 2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 25471 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 CeSPIACE.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 1 | D | 39 | Total | C | N | O | S | 0 | 0 |
| | | | 330 | 212 | 52 | 63 | 3 | | |
| 1 | F | 39 | Total | C | N | O | S | 0 | 0 |
| | | | 330 | 212 | 52 | 63 | 3 | | |
| 1 | E | 39 | Total | C | N | O | S | 0 | 0 |
| | | | 330 | 212 | 52 | 63 | 3 | | |

- Molecule 2 is a protein called Spike glycoprotein.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | C | 1024 | Total | C | N | O | S | 0 | 0 |
| | | | 8008 | 5122 | 1333 | 1517 | 36 | | |
| 2 | B | 1035 | Total | C | N | O | S | 0 | 0 |
| | | | 8086 | 5165 | 1353 | 1532 | 36 | | |
| 2 | A | 1024 | Total | C | N | O | S | 0 | 0 |
| | | | 8009 | 5122 | 1335 | 1516 | 36 | | |

There are 405 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| C | -18 | MET | - | initiating methionine | UNP P0DTC2 |
| C | -17 | GLY | - | expression tag | UNP P0DTC2 |
| C | -16 | ILE | - | expression tag | UNP P0DTC2 |
| C | -15 | LEU | - | expression tag | UNP P0DTC2 |
| C | -14 | PRO | - | expression tag | UNP P0DTC2 |
| C | -13 | SER | - | expression tag | UNP P0DTC2 |
| C | -12 | PRO | - | expression tag | UNP P0DTC2 |
| C | -11 | GLY | - | expression tag | UNP P0DTC2 |
| C | -10 | MET | - | expression tag | UNP P0DTC2 |
| C | -9 | PRO | - | expression tag | UNP P0DTC2 |
| C | -8 | ALA | - | expression tag | UNP P0DTC2 |
| C | -7 | LEU | - | expression tag | UNP P0DTC2 |
| C | -6 | LEU | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| C | -5 | SER | - | expression tag | UNP P0DTC2 |
| C | -4 | LEU | - | expression tag | UNP P0DTC2 |
| C | -3 | VAL | - | expression tag | UNP P0DTC2 |
| C | -2 | SER | - | expression tag | UNP P0DTC2 |
| C | -1 | LEU | - | expression tag | UNP P0DTC2 |
| C | 0 | LEU | - | expression tag | UNP P0DTC2 |
| C | 1 | SER | - | expression tag | UNP P0DTC2 |
| C | 2 | VAL | - | expression tag | UNP P0DTC2 |
| C | 3 | LEU | - | expression tag | UNP P0DTC2 |
| C | 4 | LEU | - | expression tag | UNP P0DTC2 |
| C | 5 | MET | - | expression tag | UNP P0DTC2 |
| C | 6 | GLY | - | expression tag | UNP P0DTC2 |
| C | 7 | CYS | - | expression tag | UNP P0DTC2 |
| C | 8 | VAL | - | expression tag | UNP P0DTC2 |
| C | 9 | ALA | - | expression tag | UNP P0DTC2 |
| C | 10 | GLU | - | expression tag | UNP P0DTC2 |
| C | 11 | THR | - | expression tag | UNP P0DTC2 |
| C | 12 | GLY | - | expression tag | UNP P0DTC2 |
| C | 339 | ASP | GLY | variant | UNP P0DTC2 |
| C | 371 | PHE | SER | variant | UNP P0DTC2 |
| C | 373 | PRO | SER | variant | UNP P0DTC2 |
| C | 376 | ALA | THR | variant | UNP P0DTC2 |
| C | 405 | ASN | ASP | variant | UNP P0DTC2 |
| C | 408 | SER | ARG | variant | UNP P0DTC2 |
| C | 417 | ASN | LYS | variant | UNP P0DTC2 |
| C | 440 | LYS | ASN | variant | UNP P0DTC2 |
| C | 477 | ASN | SER | variant | UNP P0DTC2 |
| C | 478 | LYS | THR | variant | UNP P0DTC2 |
| C | 484 | ALA | GLU | variant | UNP P0DTC2 |
| C | 493 | ARG | GLN | variant | UNP P0DTC2 |
| C | 498 | ARG | GLN | variant | UNP P0DTC2 |
| C | 501 | TYR | ASN | variant | UNP P0DTC2 |
| C | 505 | HIS | TYR | variant | UNP P0DTC2 |
| C | 682 | GLY | ARG | conflict | UNP P0DTC2 |
| C | 683 | SER | ARG | conflict | UNP P0DTC2 |
| C | 685 | SER | ARG | conflict | UNP P0DTC2 |
| C | 817 | PRO | PHE | engineered mutation | UNP P0DTC2 |
| C | 892 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| C | 899 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| C | 942 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| C | 986 | PRO | LYS | engineered mutation | UNP P0DTC2 |
| C | 987 | PRO | VAL | engineered mutation | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| C | 1209 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1210 | SER | - | expression tag | UNP P0DTC2 |
| C | 1211 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1212 | TYR | - | expression tag | UNP P0DTC2 |
| C | 1213 | ILE | - | expression tag | UNP P0DTC2 |
| C | 1214 | PRO | - | expression tag | UNP P0DTC2 |
| C | 1215 | GLU | - | expression tag | UNP P0DTC2 |
| C | 1216 | ALA | - | expression tag | UNP P0DTC2 |
| C | 1217 | PRO | - | expression tag | UNP P0DTC2 |
| C | 1218 | ARG | - | expression tag | UNP P0DTC2 |
| C | 1219 | ASP | - | expression tag | UNP P0DTC2 |
| C | 1220 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1221 | GLN | - | expression tag | UNP P0DTC2 |
| C | 1222 | ALA | - | expression tag | UNP P0DTC2 |
| C | 1223 | TYR | - | expression tag | UNP P0DTC2 |
| C | 1224 | VAL | - | expression tag | UNP P0DTC2 |
| C | 1225 | ARG | - | expression tag | UNP P0DTC2 |
| C | 1226 | LYS | - | expression tag | UNP P0DTC2 |
| C | 1227 | ASP | - | expression tag | UNP P0DTC2 |
| C | 1228 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1229 | GLU | - | expression tag | UNP P0DTC2 |
| C | 1230 | TRP | - | expression tag | UNP P0DTC2 |
| C | 1231 | VAL | - | expression tag | UNP P0DTC2 |
| C | 1232 | LEU | - | expression tag | UNP P0DTC2 |
| C | 1233 | LEU | - | expression tag | UNP P0DTC2 |
| C | 1234 | SER | - | expression tag | UNP P0DTC2 |
| C | 1235 | THR | - | expression tag | UNP P0DTC2 |
| C | 1236 | PHE | - | expression tag | UNP P0DTC2 |
| C | 1237 | LEU | - | expression tag | UNP P0DTC2 |
| C | 1238 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1239 | ARG | - | expression tag | UNP P0DTC2 |
| C | 1240 | SER | - | expression tag | UNP P0DTC2 |
| C | 1241 | LEU | - | expression tag | UNP P0DTC2 |
| C | 1242 | GLU | - | expression tag | UNP P0DTC2 |
| C | 1243 | VAL | - | expression tag | UNP P0DTC2 |
| C | 1244 | LEU | - | expression tag | UNP P0DTC2 |
| C | 1245 | PHE | - | expression tag | UNP P0DTC2 |
| C | 1246 | GLN | - | expression tag | UNP P0DTC2 |
| C | 1247 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1248 | PRO | - | expression tag | UNP P0DTC2 |
| C | 1249 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1250 | HIS | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| C | 1251 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1252 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1253 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1254 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1255 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1256 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1257 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1258 | SER | - | expression tag | UNP P0DTC2 |
| C | 1259 | ALA | - | expression tag | UNP P0DTC2 |
| C | 1260 | TRP | - | expression tag | UNP P0DTC2 |
| C | 1261 | SER | - | expression tag | UNP P0DTC2 |
| C | 1262 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1263 | PRO | - | expression tag | UNP P0DTC2 |
| C | 1264 | GLN | - | expression tag | UNP P0DTC2 |
| C | 1265 | PHE | - | expression tag | UNP P0DTC2 |
| C | 1266 | GLU | - | expression tag | UNP P0DTC2 |
| C | 1267 | LYS | - | expression tag | UNP P0DTC2 |
| C | 1268 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1269 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1270 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1271 | SER | - | expression tag | UNP P0DTC2 |
| C | 1272 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1273 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1274 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1275 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1276 | SER | - | expression tag | UNP P0DTC2 |
| C | 1277 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1278 | GLY | - | expression tag | UNP P0DTC2 |
| C | 1279 | SER | - | expression tag | UNP P0DTC2 |
| C | 1280 | ALA | - | expression tag | UNP P0DTC2 |
| C | 1281 | TRP | - | expression tag | UNP P0DTC2 |
| C | 1282 | SER | - | expression tag | UNP P0DTC2 |
| C | 1283 | HIS | - | expression tag | UNP P0DTC2 |
| C | 1284 | PRO | - | expression tag | UNP P0DTC2 |
| C | 1285 | GLN | - | expression tag | UNP P0DTC2 |
| C | 1286 | PHE | - | expression tag | UNP P0DTC2 |
| C | 1287 | GLU | - | expression tag | UNP P0DTC2 |
| C | 1288 | LYS | - | expression tag | UNP P0DTC2 |
| B | -18 | MET | - | initiating methionine | UNP P0DTC2 |
| B | -17 | GLY | - | expression tag | UNP P0DTC2 |
| B | -16 | ILE | - | expression tag | UNP P0DTC2 |
| B | -15 | LEU | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | -14 | PRO | - | expression tag | UNP P0DTC2 |
| B | -13 | SER | - | expression tag | UNP P0DTC2 |
| B | -12 | PRO | - | expression tag | UNP P0DTC2 |
| B | -11 | GLY | - | expression tag | UNP P0DTC2 |
| B | -10 | MET | - | expression tag | UNP P0DTC2 |
| B | -9 | PRO | - | expression tag | UNP P0DTC2 |
| B | -8 | ALA | - | expression tag | UNP P0DTC2 |
| B | -7 | LEU | - | expression tag | UNP P0DTC2 |
| B | -6 | LEU | - | expression tag | UNP P0DTC2 |
| B | -5 | SER | - | expression tag | UNP P0DTC2 |
| B | -4 | LEU | - | expression tag | UNP P0DTC2 |
| B | -3 | VAL | - | expression tag | UNP P0DTC2 |
| B | -2 | SER | - | expression tag | UNP P0DTC2 |
| B | -1 | LEU | - | expression tag | UNP P0DTC2 |
| B | 0 | LEU | - | expression tag | UNP P0DTC2 |
| B | 1 | SER | - | expression tag | UNP P0DTC2 |
| B | 2 | VAL | - | expression tag | UNP P0DTC2 |
| B | 3 | LEU | - | expression tag | UNP P0DTC2 |
| B | 4 | LEU | - | expression tag | UNP P0DTC2 |
| B | 5 | MET | - | expression tag | UNP P0DTC2 |
| B | 6 | GLY | - | expression tag | UNP P0DTC2 |
| B | 7 | CYS | - | expression tag | UNP P0DTC2 |
| B | 8 | VAL | - | expression tag | UNP P0DTC2 |
| B | 9 | ALA | - | expression tag | UNP P0DTC2 |
| B | 10 | GLU | - | expression tag | UNP P0DTC2 |
| B | 11 | THR | - | expression tag | UNP P0DTC2 |
| B | 12 | GLY | - | expression tag | UNP P0DTC2 |
| B | 339 | ASP | GLY | variant | UNP P0DTC2 |
| B | 371 | PHE | SER | variant | UNP P0DTC2 |
| B | 373 | PRO | SER | variant | UNP P0DTC2 |
| B | 376 | ALA | THR | variant | UNP P0DTC2 |
| B | 405 | ASN | ASP | variant | UNP P0DTC2 |
| B | 408 | SER | ARG | variant | UNP P0DTC2 |
| B | 417 | ASN | LYS | variant | UNP P0DTC2 |
| B | 440 | LYS | ASN | variant | UNP P0DTC2 |
| B | 477 | ASN | SER | variant | UNP P0DTC2 |
| B | 478 | LYS | THR | variant | UNP P0DTC2 |
| B | 484 | ALA | GLU | variant | UNP P0DTC2 |
| B | 493 | ARG | GLN | variant | UNP P0DTC2 |
| B | 498 | ARG | GLN | variant | UNP P0DTC2 |
| B | 501 | TYR | ASN | variant | UNP P0DTC2 |
| B | 505 | HIS | TYR | variant | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | 682 | GLY | ARG | conflict | UNP P0DTC2 |
| B | 683 | SER | ARG | conflict | UNP P0DTC2 |
| B | 685 | SER | ARG | conflict | UNP P0DTC2 |
| B | 817 | PRO | PHE | engineered mutation | UNP P0DTC2 |
| B | 892 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| B | 899 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| B | 942 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| B | 986 | PRO | LYS | engineered mutation | UNP P0DTC2 |
| B | 987 | PRO | VAL | engineered mutation | UNP P0DTC2 |
| B | 1209 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1210 | SER | - | expression tag | UNP P0DTC2 |
| B | 1211 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1212 | TYR | - | expression tag | UNP P0DTC2 |
| B | 1213 | ILE | - | expression tag | UNP P0DTC2 |
| B | 1214 | PRO | - | expression tag | UNP P0DTC2 |
| B | 1215 | GLU | - | expression tag | UNP P0DTC2 |
| B | 1216 | ALA | - | expression tag | UNP P0DTC2 |
| B | 1217 | PRO | - | expression tag | UNP P0DTC2 |
| B | 1218 | ARG | - | expression tag | UNP P0DTC2 |
| B | 1219 | ASP | - | expression tag | UNP P0DTC2 |
| B | 1220 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1221 | GLN | - | expression tag | UNP P0DTC2 |
| B | 1222 | ALA | - | expression tag | UNP P0DTC2 |
| B | 1223 | TYR | - | expression tag | UNP P0DTC2 |
| B | 1224 | VAL | - | expression tag | UNP P0DTC2 |
| B | 1225 | ARG | - | expression tag | UNP P0DTC2 |
| B | 1226 | LYS | - | expression tag | UNP P0DTC2 |
| B | 1227 | ASP | - | expression tag | UNP P0DTC2 |
| B | 1228 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1229 | GLU | - | expression tag | UNP P0DTC2 |
| B | 1230 | TRP | - | expression tag | UNP P0DTC2 |
| B | 1231 | VAL | - | expression tag | UNP P0DTC2 |
| B | 1232 | LEU | - | expression tag | UNP P0DTC2 |
| B | 1233 | LEU | - | expression tag | UNP P0DTC2 |
| B | 1234 | SER | - | expression tag | UNP P0DTC2 |
| B | 1235 | THR | - | expression tag | UNP P0DTC2 |
| B | 1236 | PHE | - | expression tag | UNP P0DTC2 |
| B | 1237 | LEU | - | expression tag | UNP P0DTC2 |
| B | 1238 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1239 | ARG | - | expression tag | UNP P0DTC2 |
| B | 1240 | SER | - | expression tag | UNP P0DTC2 |
| B | 1241 | LEU | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | 1242 | GLU | - | expression tag | UNP P0DTC2 |
| B | 1243 | VAL | - | expression tag | UNP P0DTC2 |
| B | 1244 | LEU | - | expression tag | UNP P0DTC2 |
| B | 1245 | PHE | - | expression tag | UNP P0DTC2 |
| B | 1246 | GLN | - | expression tag | UNP P0DTC2 |
| B | 1247 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1248 | PRO | - | expression tag | UNP P0DTC2 |
| B | 1249 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1250 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1251 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1252 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1253 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1254 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1255 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1256 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1257 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1258 | SER | - | expression tag | UNP P0DTC2 |
| B | 1259 | ALA | - | expression tag | UNP P0DTC2 |
| B | 1260 | TRP | - | expression tag | UNP P0DTC2 |
| B | 1261 | SER | - | expression tag | UNP P0DTC2 |
| B | 1262 | HIS | - | expression tag | UNP P0DTC2 |
| B | 1263 | PRO | - | expression tag | UNP P0DTC2 |
| B | 1264 | GLN | - | expression tag | UNP P0DTC2 |
| B | 1265 | PHE | - | expression tag | UNP P0DTC2 |
| B | 1266 | GLU | - | expression tag | UNP P0DTC2 |
| B | 1267 | LYS | - | expression tag | UNP P0DTC2 |
| B | 1268 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1269 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1270 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1271 | SER | - | expression tag | UNP P0DTC2 |
| B | 1272 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1273 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1274 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1275 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1276 | SER | - | expression tag | UNP P0DTC2 |
| B | 1277 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1278 | GLY | - | expression tag | UNP P0DTC2 |
| B | 1279 | SER | - | expression tag | UNP P0DTC2 |
| B | 1280 | ALA | - | expression tag | UNP P0DTC2 |
| B | 1281 | TRP | - | expression tag | UNP P0DTC2 |
| B | 1282 | SER | - | expression tag | UNP P0DTC2 |
| B | 1283 | HIS | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | 1284 | PRO | - | expression tag | UNP P0DTC2 |
| B | 1285 | GLN | - | expression tag | UNP P0DTC2 |
| B | 1286 | PHE | - | expression tag | UNP P0DTC2 |
| B | 1287 | GLU | - | expression tag | UNP P0DTC2 |
| B | 1288 | LYS | - | expression tag | UNP P0DTC2 |
| A | -18 | MET | - | initiating methionine | UNP P0DTC2 |
| A | -17 | GLY | - | expression tag | UNP P0DTC2 |
| A | -16 | ILE | - | expression tag | UNP P0DTC2 |
| A | -15 | LEU | - | expression tag | UNP P0DTC2 |
| A | -14 | PRO | - | expression tag | UNP P0DTC2 |
| A | -13 | SER | - | expression tag | UNP P0DTC2 |
| A | -12 | PRO | - | expression tag | UNP P0DTC2 |
| A | -11 | GLY | - | expression tag | UNP P0DTC2 |
| A | -10 | MET | - | expression tag | UNP P0DTC2 |
| A | -9 | PRO | - | expression tag | UNP P0DTC2 |
| A | -8 | ALA | - | expression tag | UNP P0DTC2 |
| A | -7 | LEU | - | expression tag | UNP P0DTC2 |
| A | -6 | LEU | - | expression tag | UNP P0DTC2 |
| A | -5 | SER | - | expression tag | UNP P0DTC2 |
| A | -4 | LEU | - | expression tag | UNP P0DTC2 |
| A | -3 | VAL | - | expression tag | UNP P0DTC2 |
| A | -2 | SER | - | expression tag | UNP P0DTC2 |
| A | -1 | LEU | - | expression tag | UNP P0DTC2 |
| A | 0 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1 | SER | - | expression tag | UNP P0DTC2 |
| A | 2 | VAL | - | expression tag | UNP P0DTC2 |
| A | 3 | LEU | - | expression tag | UNP P0DTC2 |
| A | 4 | LEU | - | expression tag | UNP P0DTC2 |
| A | 5 | MET | - | expression tag | UNP P0DTC2 |
| A | 6 | GLY | - | expression tag | UNP P0DTC2 |
| A | 7 | CYS | - | expression tag | UNP P0DTC2 |
| A | 8 | VAL | - | expression tag | UNP P0DTC2 |
| A | 9 | ALA | - | expression tag | UNP P0DTC2 |
| A | 10 | GLU | - | expression tag | UNP P0DTC2 |
| A | 11 | THR | - | expression tag | UNP P0DTC2 |
| A | 12 | GLY | - | expression tag | UNP P0DTC2 |
| A | 339 | ASP | GLY | variant | UNP P0DTC2 |
| A | 371 | PHE | SER | variant | UNP P0DTC2 |
| A | 373 | PRO | SER | variant | UNP P0DTC2 |
| A | 376 | ALA | THR | variant | UNP P0DTC2 |
| A | 405 | ASN | ASP | variant | UNP P0DTC2 |
| A | 408 | SER | ARG | variant | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 417 | ASN | LYS | variant | UNP P0DTC2 |
| A | 440 | LYS | ASN | variant | UNP P0DTC2 |
| A | 477 | ASN | SER | variant | UNP P0DTC2 |
| A | 478 | LYS | THR | variant | UNP P0DTC2 |
| A | 484 | ALA | GLU | variant | UNP P0DTC2 |
| A | 493 | ARG | GLN | variant | UNP P0DTC2 |
| A | 498 | ARG | GLN | variant | UNP P0DTC2 |
| A | 501 | TYR | ASN | variant | UNP P0DTC2 |
| A | 505 | HIS | TYR | variant | UNP P0DTC2 |
| A | 682 | GLY | ARG | conflict | UNP P0DTC2 |
| A | 683 | SER | ARG | conflict | UNP P0DTC2 |
| A | 685 | SER | ARG | conflict | UNP P0DTC2 |
| A | 817 | PRO | PHE | engineered mutation | UNP P0DTC2 |
| A | 892 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| A | 899 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| A | 942 | PRO | ALA | engineered mutation | UNP P0DTC2 |
| A | 986 | PRO | LYS | engineered mutation | UNP P0DTC2 |
| A | 987 | PRO | VAL | engineered mutation | UNP P0DTC2 |
| A | 1209 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1210 | SER | - | expression tag | UNP P0DTC2 |
| A | 1211 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1212 | TYR | - | expression tag | UNP P0DTC2 |
| A | 1213 | ILE | - | expression tag | UNP P0DTC2 |
| A | 1214 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1215 | GLU | - | expression tag | UNP P0DTC2 |
| A | 1216 | ALA | - | expression tag | UNP P0DTC2 |
| A | 1217 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1218 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1219 | ASP | - | expression tag | UNP P0DTC2 |
| A | 1220 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1221 | GLN | - | expression tag | UNP P0DTC2 |
| A | 1222 | ALA | - | expression tag | UNP P0DTC2 |
| A | 1223 | TYR | - | expression tag | UNP P0DTC2 |
| A | 1224 | VAL | - | expression tag | UNP P0DTC2 |
| A | 1225 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1226 | LYS | - | expression tag | UNP P0DTC2 |
| A | 1227 | ASP | - | expression tag | UNP P0DTC2 |
| A | 1228 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1229 | GLU | - | expression tag | UNP P0DTC2 |
| A | 1230 | TRP | - | expression tag | UNP P0DTC2 |
| A | 1231 | VAL | - | expression tag | UNP P0DTC2 |
| A | 1232 | LEU | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

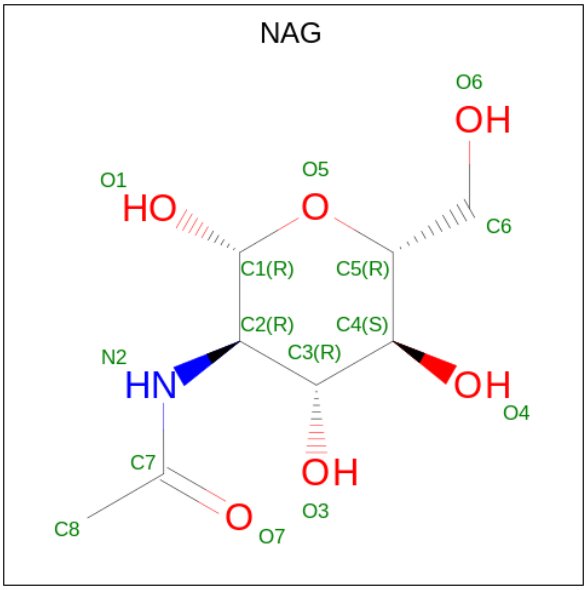
| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 1233 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1234 | SER | - | expression tag | UNP P0DTC2 |
| A | 1235 | THR | - | expression tag | UNP P0DTC2 |
| A | 1236 | PHE | - | expression tag | UNP P0DTC2 |
| A | 1237 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1238 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1239 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1240 | SER | - | expression tag | UNP P0DTC2 |
| A | 1241 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1242 | GLU | - | expression tag | UNP P0DTC2 |
| A | 1243 | VAL | - | expression tag | UNP P0DTC2 |
| A | 1244 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1245 | PHE | - | expression tag | UNP P0DTC2 |
| A | 1246 | GLN | - | expression tag | UNP P0DTC2 |
| A | 1247 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1248 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1249 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1250 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1251 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1252 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1253 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1254 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1255 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1256 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1257 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1258 | SER | - | expression tag | UNP P0DTC2 |
| A | 1259 | ALA | - | expression tag | UNP P0DTC2 |
| A | 1260 | TRP | - | expression tag | UNP P0DTC2 |
| A | 1261 | SER | - | expression tag | UNP P0DTC2 |
| A | 1262 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1263 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1264 | GLN | - | expression tag | UNP P0DTC2 |
| A | 1265 | PHE | - | expression tag | UNP P0DTC2 |
| A | 1266 | GLU | - | expression tag | UNP P0DTC2 |
| A | 1267 | LYS | - | expression tag | UNP P0DTC2 |
| A | 1268 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1269 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1270 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1271 | SER | - | expression tag | UNP P0DTC2 |
| A | 1272 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1273 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1274 | GLY | - | expression tag | UNP P0DTC2 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 1275 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1276 | SER | - | expression tag | UNP P0DTC2 |
| A | 1277 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1278 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1279 | SER | - | expression tag | UNP P0DTC2 |
| A | 1280 | ALA | - | expression tag | UNP P0DTC2 |
| A | 1281 | TRP | - | expression tag | UNP P0DTC2 |
| A | 1282 | SER | - | expression tag | UNP P0DTC2 |
| A | 1283 | HIS | - | expression tag | UNP P0DTC2 |
| A | 1284 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1285 | GLN | - | expression tag | UNP P0DTC2 |
| A | 1286 | PHE | - | expression tag | UNP P0DTC2 |
| A | 1287 | GLU | - | expression tag | UNP P0DTC2 |
| A | 1288 | LYS | - | expression tag | UNP P0DTC2 |

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




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

*Continued on next page...*

*Continued from previous page...*

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

*Continued on next page...*

*Continued from previous page...*

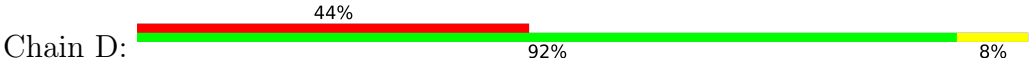
| Mol | Chain | Residues | Atoms | | | | AltConf |
|---|---|---|---|---|---|---|---|
| 3 | A | 1 | Total | C | N | O | 0 |
| | | | 14 | 8 | 1 | 5 | |
| 3 | A | 1 | Total | C | N | O | 0 |
| | | | 14 | 8 | 1 | 5 | |

# 3 Residue-property plots (i)

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

• Molecule 1: CeSPIACE

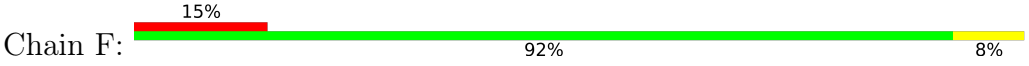
Chain D:

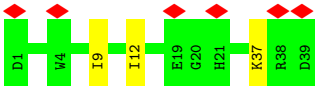




• Molecule 1: CeSPIACE

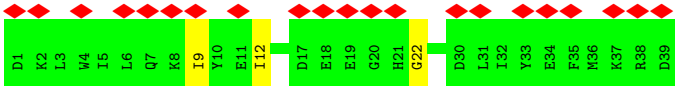
Chain F:



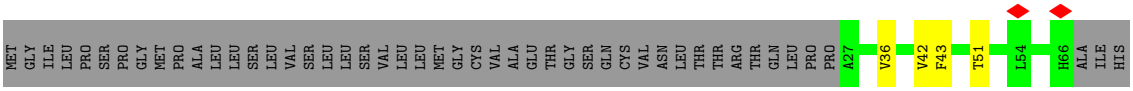

• Molecule 1: CeSPIACE

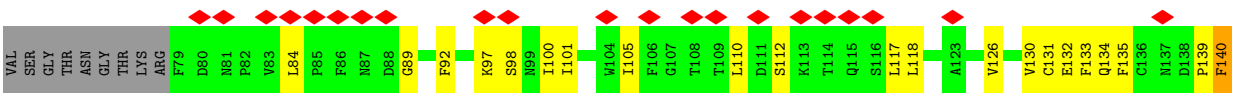
Chain E:

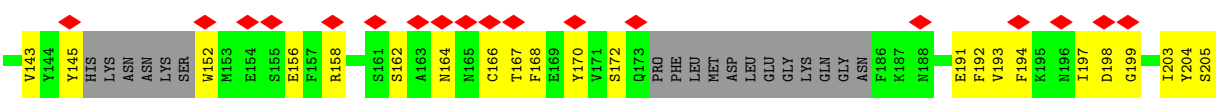



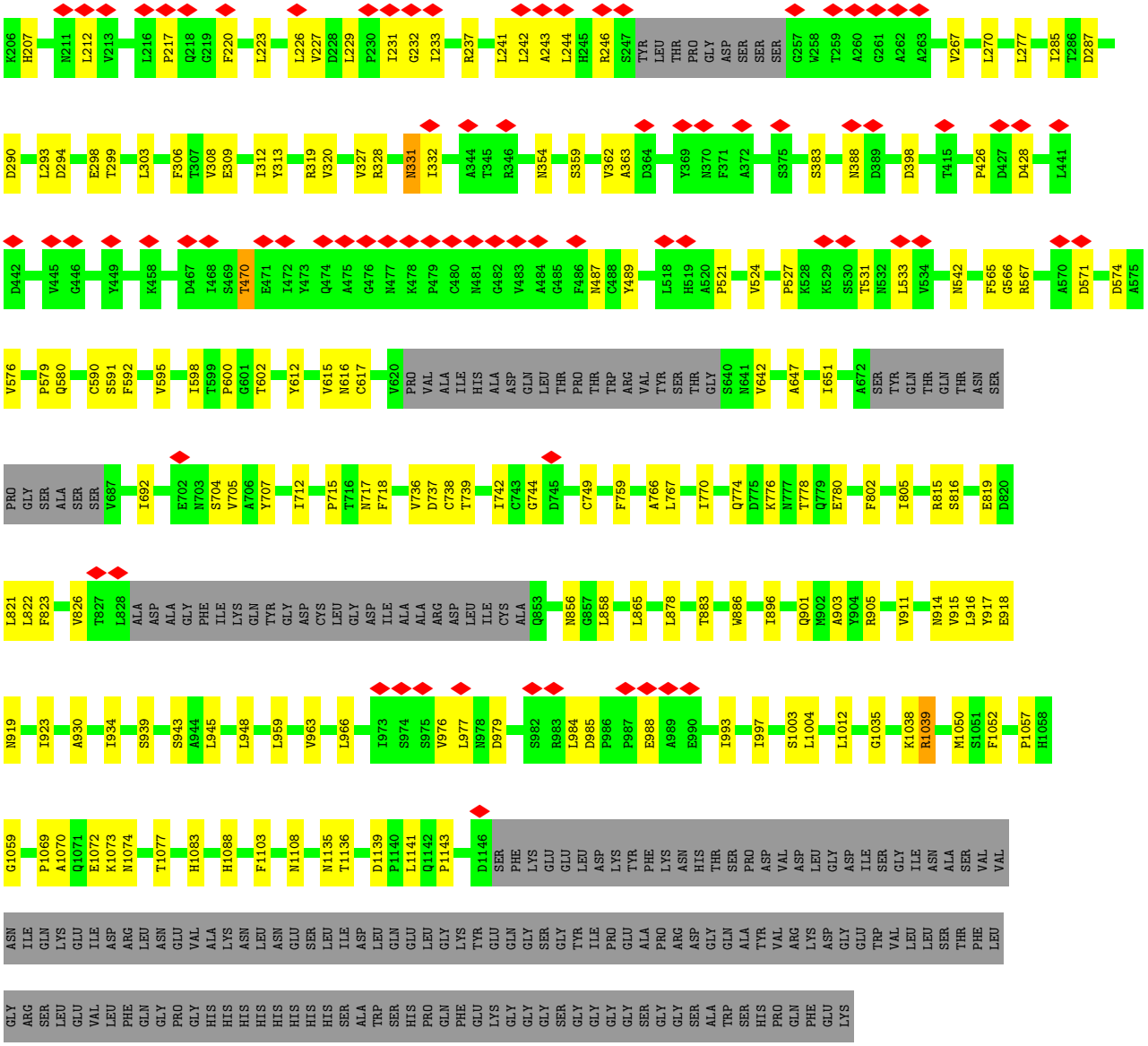

• Molecule 2: Spike glycoprotein

Chain C:

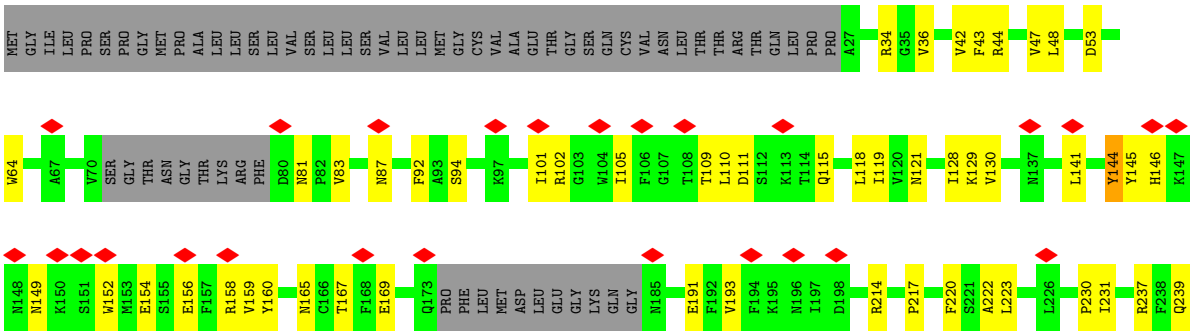



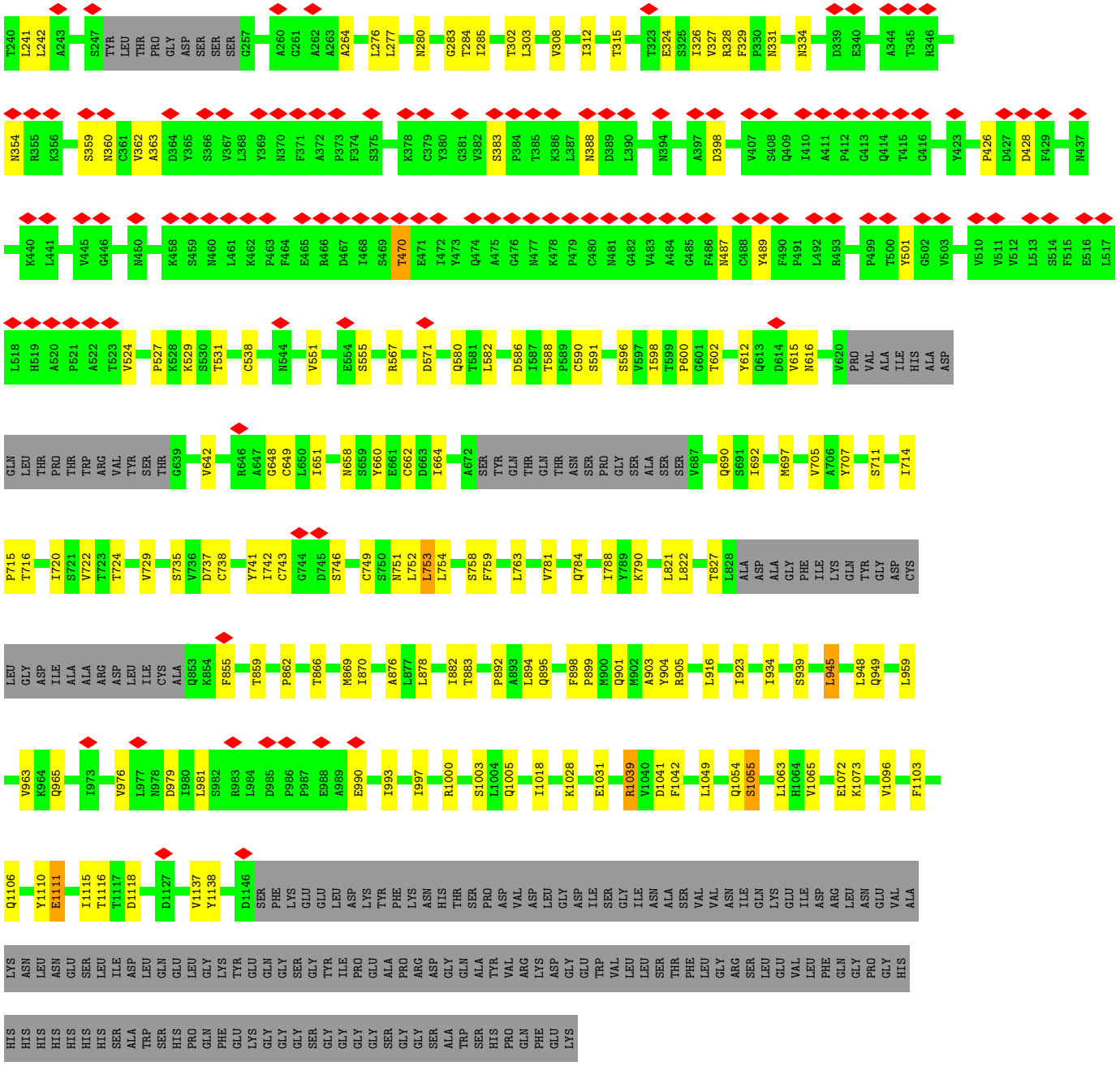





• Molecule 2: Spike glycoprotein

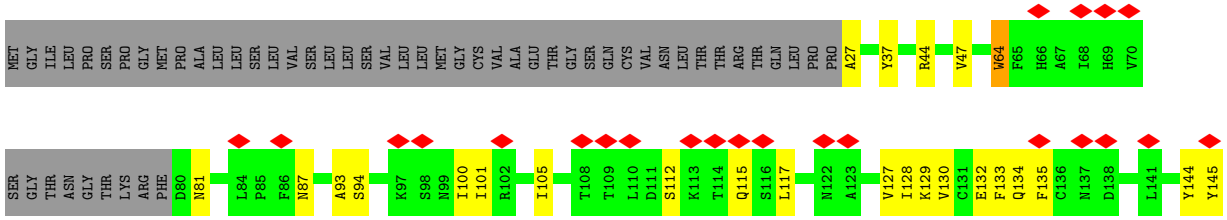
Chain B:

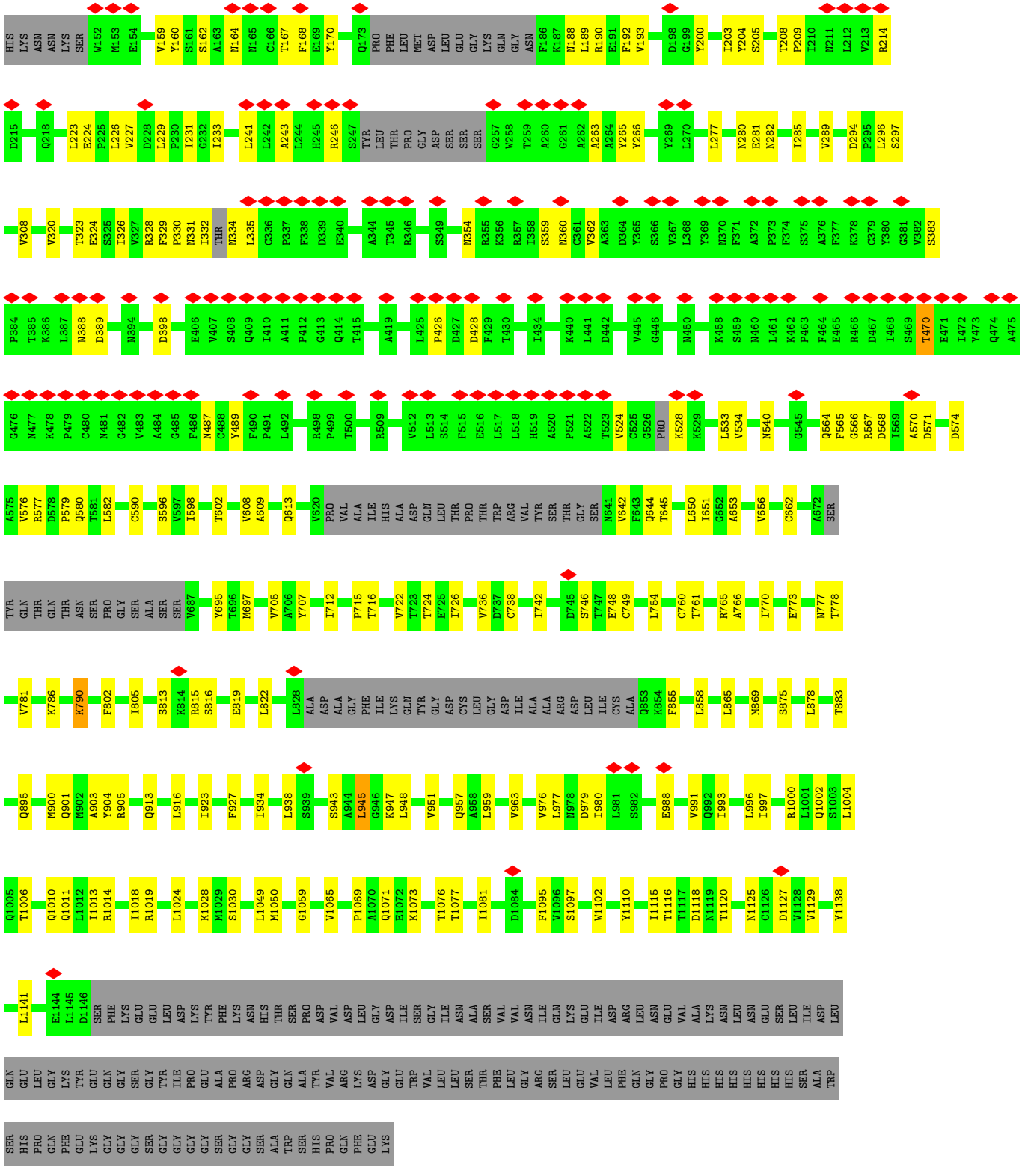





• Molecule 2: Spike glycoprotein

Chain A:


HIS LYS ASN ASN LYS SER W152 M153 E154 V159 Y160 S161 S162 A163 N164 N165 C166 T167 F168 E169 Y170 Q173 PRO PHE LEU MET ASP LEU GLU GLY LYS GLN GLY ASN F186 K187 N188 L189 R190 E191 F192 V193 D198 G199 Y200 I203 Y204 S205 T208 P209 I210 N211 L212 V213 R214
D215 Q218 L223 E224 P225 L226 V227 D228 L229 P230 I231 G232 I233 L241 L242 A243 L244 H245 R246 S247 TYR LEU THR PRO GLY ASP SER SER SER G257 W258 T259 A260 G261 A262 A263 A264 Y265 Y266 Y269 L270 L277 N280 E281 N282 I285 V289 D294 P295 L296 S297
V308 V320 T323 E324 S325 I326 V327 R328 F329 P330 N331 I332 THR N334 L335 C336 P337 F338 D339 E340 A344 T345 R346 S349 N354 R355 K356 R357 I358 S359 N360 C361 V362 A363 D364 Y365 S366 V367 L368 Y369 N370 F371 A372 P373 F374 S375 A376 F377 K378 C379 Y380 G381 V382 S383
P384 T385 K386 L387 N388 D389 N394 D398 E406 V407 S408 Q409 I410 A411 P412 G413 Q414 T415 A419 L425 P426 D427 D428 F429 T430 I434 K440 L441 D442 V445 G446 N450 K458 S459 N460 L461 K462 P463 F464 E465 R466 D467 I468 S469 T470 E471 I472 Y473 Q474 A475
G476 N477 K478 P479 C480 N481 G482 V483 A484 G485 F486 N487 C488 Y489 F490 P491 L492 R498 P499 T500 R509 V512 L513 S514 F515 E516 L517 L518 H519 A520 P521 A522 T523 V524 C525 G526 PRO K528 K529 L533 V534 N540 G545 Q564 F565 G566 R567 D568 I569 A570 D571 D574
A575 V576 R577 D578 P579 Q580 T581 L582 C590 S596 V597 I598 T602 V608 A609 Q613 V620 PRO VAL ALA ILE HIS ALA ASP GLN LEU THR PRO THR TRP ARG VAL TYR SER THR GLY SER N641 V642 F643 Q644 T645 L650 I651 G652 A653 V656 C662 A672 SER
TYR GLN THR GLN THR ASN SER PRO GLY SER ALA SER SER V687 Y695 T696 M697 V705 A706 Y707 I712 P715 T716 V722 T723 T724 E725 I726 V736 D737 C738 I742 D745 S746 T747 E748 C749 L754 C760 T761 R765 A766 I770 E773 N777 T778
V781 K786 K790 F802 I805 S813 K814 R815 S816 E819 L822 L828 ALA ASP ALA GLY PHE ILE LYS GLN TYR GLY ASP CYS LEU GLY ASP ILE ALA ALA ARG ASP LEU ILE CYS ALA Q853 K854 F855 L858 L865 M869 S875 L878 T883
Q895 M900 Q901 M902 A903 Y904 R905 Q913 L916 I923 F927 I934 L938 S939 S943 A944 L945 G946 K947 L948 V951 Q957 A958 L959 V963 V976 L977 N978 D979 I980 L981 S982 E988 V991 Q992 I993 L996 I997 R1000 L1001 Q1002 S1003 L1004
Q1005 T1006 Q1010 Q1011 L1012 I1013 R1014 I1018 R1019 L1024 K1028 M1029 S1030 L1049 M1050 G1059 V1065 P1069 A1070 Q1071 E1072 K1073 T1076 T1077 I1081 D1084 F1095 V1096 S1097 W1102 Y1110 I1115 T1116 T1117 D1118 N1119 T1120 N1125 C1126 D1127 V1128 V1129 Y1138
L1141 E1144 L1145 D1146 SER PHE LYS GLU GLU LEU ASP LYS TYR PHE LYS ASN HIS THR SER PRO ASP VAL ASP LEU GLY ASP ILE SER GLY ILE ASN ALA SER VAL VAL ASN ILE GLN LYS GLU ILE ASP ARG LEU ASN GLU VAL ALA LYS ASN LEU ASN GLU SER LEU ILE ASP LEU
GLN GLU LEU GLY LYS TYR GLU GLN GLY SER GLY TYR ILE PRO GLU ALA PRO ARG ASP GLY GLN ALA TYR VAL ARG LYS ASP GLY GLU TRP VAL LEU LEU SER THR PHE LEU GLY ARG SER LEU GLU VAL LEU PHE GLN GLY PRO GLY HIS HIS HIS HIS HIS HIS HIS HIS SER LEU ASP TRP
SER HIS PRO GLN PHE GLU LYS GLY GLY SER GLY GLY GLY GLY SER GLY GLY GLY SER ALA TRP SER HIS PRO GLN PHE GLU LYS

# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, C1 | Depositor |
| Number of particles used | 111423 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | JEOL CRYO ARM 300 | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 69.6 | Depositor |
| Minimum defocus (nm) | 1500 | Depositor |
| Maximum defocus (nm) | 2500 | Depositor |
| Magnification | Not provided | |
| Image detector | GATAN K2 SUMMIT (4k x 4k) | Depositor |
| Maximum map value | 0.060 | Depositor |
| Minimum map value | -0.025 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.002 | Depositor |
| Recommended contour level | 0.013 | Depositor |
| Map size (Å) | 489.6, 489.6, 489.6 | wwPDB |
| Map dimensions | 340, 340, 340 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.44, 1.44, 1.44 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | $\#\|Z\| > 5$ | RMSZ | $\#\|Z\| > 5$ |
| 1 | D | 0.47 | 0/335 | 0.71 | 0/446 |
| 1 | E | 0.47 | 0/335 | 0.71 | 0/446 |
| 1 | F | 0.47 | 0/335 | 0.71 | 0/446 |
| 2 | A | 0.57 | 0/8195 | 0.65 | 0/11154 |
| 2 | B | 0.57 | 0/8277 | 0.65 | 0/11269 |
| 2 | C | 0.57 | 0/8197 | 0.65 | 0/11160 |
| All | All | 0.57 | 0/25674 | 0.65 | 0/34921 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 1 | D | 330 | 0 | 330 | 2 | 0 |
| 1 | E | 330 | 0 | 330 | 2 | 0 |
| 1 | F | 330 | 0 | 330 | 2 | 0 |
| 2 | A | 8009 | 0 | 7795 | 160 | 0 |
| 2 | B | 8086 | 0 | 7862 | 140 | 0 |
| 2 | C | 8008 | 0 | 7788 | 156 | 0 |
| 3 | A | 126 | 0 | 117 | 0 | 0 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 3 | B | 126 | 0 | 117 | 3 | 0 |
| 3 | C | 126 | 0 | 117 | 3 | 0 |
| All | All | 25471 | 0 | 24786 | 432 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

All (432) 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:A:331:ASN:HA | 2:A:580:GLN:HG2 | 1.47 | 0.95 |
| 2:B:360:ASN:ND2 | 2:A:200:TYR:OH | 2.03 | 0.91 |
| 2:A:388:ASN:O | 2:A:528:LYS:N | 2.04 | 0.90 |
| 2:A:642:VAL:HG23 | 2:A:651:ILE:HG22 | 1.61 | 0.81 |
| 2:B:821:LEU:HD11 | 2:B:939:SER:HB2 | 1.62 | 0.80 |
| 2:C:226:LEU:HG | 2:C:227:VAL:HG23 | 1.63 | 0.80 |
| 2:C:117:LEU:HD12 | 2:C:130:VAL:HG22 | 1.63 | 0.80 |
| 2:A:226:LEU:HD23 | 2:A:227:VAL:HG23 | 1.64 | 0.78 |
| 2:C:168:PHE:CE1 | 2:A:360:ASN:ND2 | 2.54 | 0.76 |
| 2:C:363:ALA:O | 2:C:527:PRO:HD3 | 1.85 | 0.75 |
| 2:C:168:PHE:HE1 | 2:A:360:ASN:HD21 | 1.30 | 0.75 |
| 2:B:193:VAL:HG23 | 2:B:223:LEU:HD22 | 1.69 | 0.75 |
| 2:B:146:HIS:HD2 | 2:B:149:ASN:H | 1.35 | 0.74 |
| 2:B:363:ALA:O | 2:B:527:PRO:HD3 | 1.88 | 0.73 |
| 2:B:662:CYS:HB2 | 2:B:697:MET:HG3 | 1.71 | 0.73 |
| 2:C:168:PHE:HE1 | 2:A:360:ASN:ND2 | 1.86 | 0.72 |
| 2:B:64:TRP:HE1 | 2:B:264:ALA:HB1 | 1.55 | 0.72 |
| 2:C:193:VAL:HG23 | 2:C:223:LEU:HD13 | 1.72 | 0.72 |
| 2:A:331:ASN:CA | 2:A:580:GLN:HG2 | 2.20 | 0.71 |
| 2:B:129:LYS:HG2 | 2:B:169:GLU:HG2 | 1.73 | 0.70 |
| 2:B:555:SER:HB3 | 2:B:586:ASP:HB2 | 1.72 | 0.70 |
| 2:C:139:PRO:HA | 2:C:158:ARG:O | 1.91 | 0.69 |
| 2:C:707:TYR:HB2 | 2:B:883:THR:HG23 | 1.75 | 0.68 |
| 2:A:94:SER:HB3 | 2:A:190:ARG:HB2 | 1.75 | 0.68 |
| 2:C:616:ASN:OD1 | 2:C:617:CYS:N | 2.26 | 0.68 |
| 2:A:193:VAL:HG23 | 2:A:223:LEU:HD22 | 1.76 | 0.68 |
| 2:B:742:ILE:HG22 | 2:B:1000:ARG:HB3 | 1.75 | 0.68 |
| 2:B:48:LEU:HB3 | 2:B:276:LEU:HD11 | 1.75 | 0.68 |
| 2:C:332:ILE:HG21 | 2:C:362:VAL:HG11 | 1.76 | 0.68 |
| 2:C:715:PRO:HA | 2:C:1072:GLU:HA | 1.76 | 0.67 |
| 2:C:130:VAL:HG21 | 2:C:231:ILE:HD12 | 1.76 | 0.67 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:C:886:TRP:HB3 | 2:C:1035:GLY:HA2 | 1.77 | 0.67 |
| 2:B:715:PRO:HA | 2:B:1072:GLU:HA | 1.77 | 0.67 |
| 2:A:132:GLU:HB2 | 2:A:164:ASN:HB2 | 1.78 | 0.66 |
| 2:C:327:VAL:H | 2:C:531:THR:HB | 1.60 | 0.66 |
| 2:C:642:VAL:HG22 | 2:C:651:ILE:HG12 | 1.78 | 0.65 |
| 2:C:826:VAL:HG21 | 2:C:1057:PRO:HG2 | 1.77 | 0.65 |
| 2:A:308:VAL:HG22 | 2:A:602:THR:HG23 | 1.78 | 0.65 |
| 2:C:903:ALA:HB2 | 2:C:916:LEU:HD22 | 1.77 | 0.65 |
| 2:B:81:ASN:HB3 | 2:B:242:LEU:HD12 | 1.80 | 0.64 |
| 2:A:130:VAL:HB | 2:A:168:PHE:HB3 | 1.80 | 0.64 |
| 2:A:112:SER:HB3 | 2:A:134:GLN:HB2 | 1.79 | 0.64 |
| 2:B:277:LEU:HD22 | 2:B:285:ILE:HD13 | 1.79 | 0.64 |
| 2:C:858:LEU:HD13 | 2:C:959:LEU:HD12 | 1.80 | 0.63 |
| 2:C:567:ARG:HD3 | 2:C:571:ASP:HA | 1.80 | 0.62 |
| 2:A:117:LEU:HG | 2:A:130:VAL:HG22 | 1.80 | 0.62 |
| 2:A:722:VAL:HG22 | 2:A:1065:VAL:HG22 | 1.82 | 0.62 |
| 2:B:146:HIS:CD2 | 2:B:149:ASN:H | 2.17 | 0.62 |
| 2:C:948:LEU:HD21 | 2:C:1059:GLY:HA3 | 1.81 | 0.62 |
| 2:B:855:PHE:HD2 | 2:B:963:VAL:HG11 | 1.66 | 0.61 |
| 2:C:821:LEU:HD11 | 2:C:939:SER:HB2 | 1.81 | 0.61 |
| 2:A:332:ILE:HG23 | 2:A:362:VAL:HG21 | 1.81 | 0.61 |
| 2:B:331:ASN:HB2 | 3:B:1302:NAG:H2 | 1.83 | 0.61 |
| 2:B:707:TYR:HB2 | 2:A:883:THR:HG23 | 1.82 | 0.61 |
| 2:B:591:SER:HB2 | 2:B:615:VAL:HG23 | 1.81 | 0.61 |
| 2:C:140:PHE:CD2 | 2:C:244:LEU:HB2 | 2.35 | 0.61 |
| 2:C:917:TYR:HB3 | 2:A:1129:VAL:HG13 | 1.82 | 0.61 |
| 2:C:883:THR:HG23 | 2:A:707:TYR:HB2 | 1.82 | 0.61 |
| 2:B:359:SER:HA | 2:B:524:VAL:CG2 | 2.31 | 0.61 |
| 2:A:359:SER:HA | 2:A:524:VAL:CG2 | 2.31 | 0.60 |
| 2:C:131:CYS:HB3 | 2:C:166:CYS:HA | 1.83 | 0.60 |
| 2:C:105:ILE:HG23 | 2:C:241:LEU:HD11 | 1.83 | 0.60 |
| 2:C:359:SER:HA | 2:C:524:VAL:CG2 | 2.31 | 0.60 |
| 2:B:102:ARG:HG3 | 2:B:141:LEU:HD12 | 1.83 | 0.60 |
| 2:A:855:PHE:HB2 | 2:A:858:LEU:HB2 | 1.84 | 0.60 |
| 2:C:131:CYS:HB2 | 2:C:133:PHE:CE1 | 2.37 | 0.59 |
| 2:C:705:VAL:HB | 2:B:883:THR:HG21 | 1.83 | 0.59 |
| 2:A:565:PHE:HA | 2:A:576:VAL:HA | 1.84 | 0.59 |
| 2:A:598:ILE:HB | 2:A:609:ALA:HB3 | 1.83 | 0.59 |
| 2:A:736:VAL:HG11 | 2:A:1004:LEU:HD11 | 1.83 | 0.59 |
| 2:A:100:ILE:HD13 | 2:A:263:ALA:HB2 | 1.85 | 0.58 |
| 2:A:389:ASP:HA | 2:A:528:LYS:HA | 1.84 | 0.58 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:705:VAL:HB | 2:A:883:THR:HG21 | 1.84 | 0.58 |
| 2:C:883:THR:HG21 | 2:A:705:VAL:HB | 1.85 | 0.58 |
| 2:A:822:LEU:HD22 | 2:A:945:LEU:HD21 | 1.86 | 0.58 |
| 2:B:34:ARG:HH21 | 2:B:217:PRO:HB2 | 1.69 | 0.57 |
| 2:B:119:ILE:HG23 | 2:B:128:ILE:HG12 | 1.85 | 0.57 |
| 2:B:331:ASN:HB2 | 3:B:1302:NAG:C2 | 2.34 | 0.57 |
| 2:C:132:GLU:HB2 | 2:C:164:ASN:O | 2.04 | 0.57 |
| 2:B:115:GLN:HE21 | 2:B:165:ASN:HD22 | 1.50 | 0.57 |
| 2:B:191:GLU:HB3 | 2:B:223:LEU:HD21 | 1.86 | 0.57 |
| 2:B:312:ILE:HG12 | 2:B:596:SER:HB3 | 1.86 | 0.56 |
| 2:C:131:CYS:CB | 2:C:166:CYS:HA | 2.36 | 0.56 |
| 2:A:568:ASP:HB2 | 2:A:574:ASP:HB2 | 1.87 | 0.56 |
| 2:B:705:VAL:HG12 | 2:A:895:GLN:HB3 | 1.88 | 0.56 |
| 2:A:133:PHE:HB3 | 2:A:160:TYR:HB2 | 1.88 | 0.56 |
| 2:A:226:LEU:HD23 | 2:A:227:VAL:CG2 | 2.36 | 0.56 |
| 2:A:976:VAL:HG13 | 2:A:979:ASP:HB3 | 1.88 | 0.56 |
| 2:B:105:ILE:HG23 | 2:B:241:LEU:HD11 | 1.86 | 0.55 |
| 2:C:212:LEU:HD12 | 2:C:217:PRO:HA | 1.88 | 0.55 |
| 2:B:722:VAL:HG22 | 2:B:1065:VAL:HG22 | 1.88 | 0.55 |
| 2:C:566:GLY:HA2 | 2:B:43:PHE:H | 1.72 | 0.55 |
| 2:B:976:VAL:HB | 2:B:979:ASP:HB2 | 1.88 | 0.55 |
| 2:A:802:PHE:HD1 | 2:A:805:ILE:HD11 | 1.72 | 0.55 |
| 2:A:100:ILE:O | 2:A:243:ALA:N | 2.40 | 0.55 |
| 2:A:115:GLN:HE22 | 2:A:167:THR:H | 1.55 | 0.54 |
| 2:C:388:ASN:ND2 | 2:C:527:PRO:HD2 | 2.22 | 0.54 |
| 2:C:984:LEU:HD13 | 2:C:988:GLU:HG3 | 1.88 | 0.54 |
| 2:C:802:PHE:HD1 | 2:C:805:ILE:HD11 | 1.72 | 0.54 |
| 2:B:102:ARG:NH2 | 2:B:121:ASN:OD1 | 2.40 | 0.54 |
| 2:C:156:GLU:OE2 | 2:C:246:ARG:NH1 | 2.41 | 0.54 |
| 2:B:716:THR:HG21 | 2:B:1073:LYS:HD3 | 1.89 | 0.54 |
| 2:A:778:THR:HG22 | 2:A:865:LEU:HD12 | 1.89 | 0.54 |
| 2:A:1076:THR:HB | 2:A:1097:SER:HB3 | 1.90 | 0.54 |
| 2:B:751:ASN:HA | 2:B:754:LEU:HD12 | 1.90 | 0.54 |
| 2:A:977:LEU:HD11 | 2:A:993:ILE:HG13 | 1.90 | 0.54 |
| 2:C:131:CYS:HB2 | 2:C:133:PHE:CZ | 2.42 | 0.54 |
| 2:A:277:LEU:HD22 | 2:A:285:ILE:HD13 | 1.90 | 0.54 |
| 2:B:746:SER:HB2 | 2:B:749:CYS:SG | 2.47 | 0.54 |
| 2:C:1103:PHE:HZ | 3:C:1306:NAG:H62 | 1.73 | 0.53 |
| 2:C:704:SER:HB3 | 2:B:790:LYS:HB3 | 1.91 | 0.53 |
| 2:B:94:SER:HB2 | 2:B:101:ILE:HD13 | 1.89 | 0.53 |
| 2:C:192:PHE:HA | 2:C:204:TYR:O | 2.09 | 0.53 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:551:VAL:HG22 | 2:B:588:THR:HB | 1.89 | 0.53 |
| 2:A:27:ALA:HB3 | 2:A:64:TRP:HE1 | 1.73 | 0.53 |
| 2:C:766:ALA:O | 2:C:770:ILE:HG23 | 2.09 | 0.53 |
| 2:C:105:ILE:HG22 | 2:C:118:LEU:HG | 1.91 | 0.53 |
| 2:A:117:LEU:HD11 | 2:A:231:ILE:HG13 | 1.91 | 0.53 |
| 2:C:647:ALA:HA | 2:B:862:PRO:HG3 | 1.91 | 0.53 |
| 2:C:911:VAL:HG22 | 2:C:1108:ASN:HB2 | 1.91 | 0.53 |
| 2:A:715:PRO:HB3 | 2:A:1069:PRO:HB3 | 1.91 | 0.52 |
| 2:C:736:VAL:HG21 | 2:C:1004:LEU:HD11 | 1.92 | 0.52 |
| 2:C:914:ASN:O | 2:C:918:GLU:HG2 | 2.08 | 0.52 |
| 2:C:739:THR:O | 2:C:744:GLY:N | 2.31 | 0.52 |
| 2:C:388:ASN:CG | 2:C:527:PRO:HD2 | 2.30 | 0.52 |
| 2:A:168:PHE:HZ | 2:A:229:LEU:HD22 | 1.74 | 0.52 |
| 2:A:330:PRO:HA | 2:A:579:PRO:HB3 | 1.91 | 0.52 |
| 2:A:749:CYS:HB2 | 2:A:997:ILE:HD11 | 1.90 | 0.52 |
| 2:A:1011:GLN:OE1 | 2:A:1014:ARG:NH1 | 2.43 | 0.52 |
| 2:C:133:PHE:HA | 2:C:162:SER:O | 2.09 | 0.52 |
| 2:C:145:TYR:HB2 | 2:C:152:TRP:CE2 | 2.44 | 0.52 |
| 3:C:1304:NAG:H83 | 3:C:1304:NAG:H3 | 1.92 | 0.51 |
| 2:B:334:ASN:O | 2:B:362:VAL:HG12 | 2.11 | 0.51 |
| 2:B:567:ARG:HD3 | 2:B:571:ASP:HA | 1.91 | 0.51 |
| 2:A:130:VAL:HG21 | 2:A:231:ILE:HG23 | 1.91 | 0.51 |
| 2:A:716:THR:HA | 2:A:1110:TYR:HB3 | 1.91 | 0.51 |
| 2:C:110:LEU:HA | 2:C:135:PHE:HE2 | 1.75 | 0.51 |
| 2:C:308:VAL:HG22 | 2:C:602:THR:HG23 | 1.91 | 0.51 |
| 2:A:819:GLU:HA | 2:A:822:LEU:HD12 | 1.92 | 0.51 |
| 2:A:133:PHE:HD2 | 2:A:160:TYR:CG | 2.29 | 0.51 |
| 2:A:323:THR:OG1 | 2:A:324:GLU:OE1 | 2.28 | 0.51 |
| 2:A:951:VAL:HG11 | 2:A:1018:ILE:HD11 | 1.91 | 0.51 |
| 2:B:324:GLU:HG2 | 2:B:326:ILE:HG13 | 1.92 | 0.51 |
| 2:A:1006:THR:O | 2:A:1010:GLN:HG2 | 2.11 | 0.51 |
| 2:C:231:ILE:HG22 | 2:C:233:ILE:HG22 | 1.92 | 0.51 |
| 2:A:822:LEU:HD21 | 2:A:938:LEU:HD13 | 1.92 | 0.51 |
| 2:A:726:ILE:HG22 | 2:A:948:LEU:HD13 | 1.92 | 0.51 |
| 2:C:328:ARG:HD3 | 2:C:533:LEU:HB3 | 1.92 | 0.51 |
| 2:B:720:ILE:HD12 | 2:B:923:ILE:HG23 | 1.93 | 0.51 |
| 2:A:650:LEU:HD21 | 2:A:653:ALA:HB3 | 1.92 | 0.50 |
| 2:C:319:ARG:HG2 | 2:C:592:PHE:HB2 | 1.93 | 0.50 |
| 2:B:658:ASN:ND2 | 2:B:660:TYR:OH | 2.44 | 0.50 |
| 2:B:612:TYR:O | 2:B:648:GLY:HA3 | 2.10 | 0.50 |
| 2:B:878:LEU:HD11 | 2:B:1054:GLN:HE22 | 1.76 | 0.50 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:C:101:ILE:HD13 | 2:C:242:LEU:HD23 | 1.93 | 0.50 |
| 2:C:118:LEU:HD13 | 2:C:133:PHE:CD2 | 2.46 | 0.50 |
| 2:A:189:LEU:HB3 | 2:A:208:THR:O | 2.11 | 0.50 |
| 2:A:203:ILE:HD13 | 2:A:227:VAL:HB | 1.93 | 0.50 |
| 2:A:1050:MET:HG2 | 2:A:1065:VAL:HB | 1.94 | 0.50 |
| 2:A:1115:ILE:HD12 | 2:A:1115:ILE:H | 1.76 | 0.49 |
| 2:B:130:VAL:HG21 | 2:B:231:ILE:HD12 | 1.93 | 0.49 |
| 2:B:866:THR:H | 2:B:869:MET:HE2 | 1.77 | 0.49 |
| 2:A:145:TYR:HB3 | 2:A:246:ARG:HH21 | 1.77 | 0.49 |
| 2:C:1135:ASN:OD1 | 2:C:1136:THR:N | 2.46 | 0.49 |
| 2:A:813:SER:O | 2:A:815:ARG:N | 2.46 | 0.49 |
| 2:B:159:VAL:HG23 | 2:B:160:TYR:HD1 | 1.78 | 0.49 |
| 2:A:927:PHE:HE1 | 2:A:1065:VAL:HG21 | 1.77 | 0.49 |
| 2:C:470:THR:O | 2:C:470:THR:CG2 | 2.61 | 0.49 |
| 2:B:470:THR:CG2 | 2:B:470:THR:O | 2.61 | 0.49 |
| 2:C:168:PHE:CD1 | 2:A:360:ASN:ND2 | 2.81 | 0.49 |
| 2:C:100:ILE:O | 2:C:243:ALA:N | 2.45 | 0.49 |
| 2:C:320:VAL:HG23 | 2:C:590:CYS:HB3 | 1.95 | 0.49 |
| 2:A:331:ASN:O | 2:A:332:ILE:HB | 2.12 | 0.49 |
| 2:A:742:ILE:HG22 | 2:A:997:ILE:HD13 | 1.95 | 0.49 |
| 2:C:36:VAL:HG21 | 2:C:220:PHE:CZ | 2.48 | 0.49 |
| 2:B:328:ARG:NH1 | 2:B:580:GLN:OE1 | 2.46 | 0.49 |
| 2:B:878:LEU:O | 2:B:882:ILE:HG13 | 2.13 | 0.49 |
| 2:A:470:THR:O | 2:A:470:THR:CG2 | 2.61 | 0.49 |
| 2:C:359:SER:HA | 2:C:524:VAL:HG22 | 1.95 | 0.48 |
| 2:C:567:ARG:HA | 2:C:574:ASP:H | 1.79 | 0.48 |
| 2:B:737:ASP:OD1 | 2:B:737:ASP:N | 2.43 | 0.48 |
| 2:B:763:LEU:HD21 | 2:B:1005:GLN:HG3 | 1.94 | 0.48 |
| 2:C:42:VAL:HG22 | 2:A:565:PHE:CZ | 2.47 | 0.48 |
| 2:B:312:ILE:HG13 | 2:B:598:ILE:HD13 | 1.94 | 0.48 |
| 2:C:715:PRO:HD3 | 2:B:894:LEU:HD13 | 1.94 | 0.48 |
| 2:A:231:ILE:HG22 | 2:A:233:ILE:HG22 | 1.96 | 0.48 |
| 2:A:359:SER:HA | 2:A:524:VAL:HG22 | 1.95 | 0.48 |
| 2:C:579:PRO:O | 2:C:580:GLN:HB2 | 2.13 | 0.48 |
| 2:B:359:SER:HA | 2:B:524:VAL:HG22 | 1.95 | 0.48 |
| 2:B:1031:GLU:OE1 | 2:B:1039:ARG:NH1 | 2.45 | 0.48 |
| 2:A:916:LEU:HD12 | 2:A:923:ILE:HD12 | 1.95 | 0.48 |
| 2:C:533:LEU:HD23 | 2:C:533:LEU:H | 1.79 | 0.48 |
| 2:C:1083:HIS:HB3 | 2:C:1088:HIS:CE1 | 2.49 | 0.48 |
| 2:A:44:ARG:HB3 | 2:A:47:VAL:HG22 | 1.96 | 0.48 |
| 2:A:101:ILE:H | 2:A:101:ILE:HD12 | 1.78 | 0.48 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:540:ASN:OD1 | 2:A:540:ASN:N | 2.45 | 0.48 |
| 2:A:389:ASP:HA | 2:A:528:LYS:CA | 2.44 | 0.48 |
| 2:B:1115:ILE:HG22 | 2:B:1137:VAL:HA | 1.95 | 0.47 |
| 2:A:726:ILE:HB | 2:A:947:LYS:HE2 | 1.95 | 0.47 |
| 2:A:1116:THR:OG1 | 2:A:1118:ASP:OD1 | 2.31 | 0.47 |
| 2:C:309:GLU:H | 2:C:309:GLU:CD | 2.18 | 0.47 |
| 2:B:642:VAL:HG12 | 2:B:651:ILE:HG12 | 1.96 | 0.47 |
| 2:A:724:THR:HG23 | 2:A:934:ILE:HD11 | 1.96 | 0.47 |
| 2:A:742:ILE:HG23 | 2:A:1000:ARG:HB2 | 1.96 | 0.47 |
| 2:A:289:VAL:HG13 | 2:A:297:SER:HB3 | 1.97 | 0.47 |
| 2:C:718:PHE:HE1 | 2:C:923:ILE:HG12 | 1.78 | 0.47 |
| 2:A:564:GLN:HA | 2:A:577:ARG:HG2 | 1.96 | 0.47 |
| 2:C:911:VAL:HG12 | 2:C:915:VAL:HG11 | 1.97 | 0.47 |
| 2:B:83:VAL:HG21 | 2:B:237:ARG:HE | 1.79 | 0.47 |
| 2:C:896:ILE:HD12 | 2:A:712:ILE:HG13 | 1.96 | 0.47 |
| 2:B:742:ILE:HD11 | 2:B:753:LEU:HD11 | 1.96 | 0.47 |
| 2:C:118:LEU:HD11 | 2:C:135:PHE:CE1 | 2.49 | 0.47 |
| 2:C:199:GLY:O | 2:C:232:GLY:N | 2.48 | 0.47 |
| 2:C:567:ARG:HG2 | 2:B:42:VAL:HG11 | 1.95 | 0.47 |
| 2:B:388:ASN:CG | 2:B:527:PRO:HD2 | 2.35 | 0.47 |
| 2:B:1103:PHE:HZ | 3:B:1308:NAG:H61 | 1.80 | 0.47 |
| 2:A:1024:LEU:HD11 | 2:A:1028:LYS:HE3 | 1.97 | 0.47 |
| 2:C:736:VAL:HG22 | 2:C:767:LEU:HD12 | 1.97 | 0.46 |
| 2:C:1012:LEU:HB3 | 2:A:1013:ILE:HD13 | 1.97 | 0.46 |
| 2:A:816:SER:OG | 2:A:819:GLU:HG2 | 2.15 | 0.46 |
| 2:C:43:PHE:HB3 | 2:A:566:GLY:HA2 | 1.97 | 0.46 |
| 2:C:140:PHE:HD2 | 2:C:244:LEU:HB2 | 1.77 | 0.46 |
| 2:C:737:ASP:OD1 | 2:C:738:CYS:N | 2.47 | 0.46 |
| 2:B:600:PRO:HD3 | 2:B:692:ILE:HD11 | 1.97 | 0.46 |
| 2:C:312:ILE:HG13 | 2:C:598:ILE:HD13 | 1.96 | 0.46 |
| 2:B:308:VAL:HG22 | 2:B:602:THR:HG23 | 1.98 | 0.46 |
| 2:A:320:VAL:HG13 | 2:A:590:CYS:HB3 | 1.97 | 0.46 |
| 2:A:354:ASN:O | 2:A:398:ASP:HA | 2.15 | 0.46 |
| 2:A:1116:THR:HG22 | 2:A:1138:TYR:HD2 | 1.80 | 0.46 |
| 2:C:354:ASN:O | 2:C:398:ASP:HA | 2.15 | 0.46 |
| 2:C:778:THR:HG22 | 2:C:865:LEU:HD12 | 1.98 | 0.46 |
| 2:C:901:GLN:O | 2:C:905:ARG:HG3 | 2.14 | 0.46 |
| 2:B:354:ASN:O | 2:B:398:ASP:HA | 2.15 | 0.46 |
| 2:A:738:CYS:HB3 | 2:A:760:CYS:HB3 | 1.78 | 0.46 |
| 2:A:1077:THR:HG23 | 2:A:1095:PHE:O | 2.15 | 0.46 |
| 2:B:105:ILE:HD12 | 2:B:110:LEU:HD11 | 1.98 | 0.46 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:109:THR:OG1 | 2:B:111:ASP:OD1 | 2.28 | 0.46 |
| 2:B:870:ILE:HG22 | 2:B:1055:SER:HB2 | 1.97 | 0.46 |
| 2:A:159:VAL:HG22 | 2:A:241:LEU:HD22 | 1.96 | 0.46 |
| 2:C:327:VAL:HG22 | 2:C:542:ASN:HB3 | 1.98 | 0.46 |
| 2:B:903:ALA:HB2 | 2:B:916:LEU:HD23 | 1.97 | 0.46 |
| 2:A:128:ILE:HD13 | 2:A:170:TYR:HD2 | 1.81 | 0.46 |
| 2:A:192:PHE:HA | 2:A:204:TYR:O | 2.15 | 0.46 |
| 2:A:188:ASN:HA | 2:A:209:PRO:HA | 1.97 | 0.46 |
| 2:A:802:PHE:CD1 | 2:A:805:ILE:HD11 | 2.51 | 0.46 |
| 2:C:332:ILE:HG22 | 2:C:362:VAL:HG21 | 1.97 | 0.46 |
| 2:C:993:ILE:O | 2:C:997:ILE:HG12 | 2.15 | 0.46 |
| 2:B:714:ILE:HD12 | 2:B:1096:VAL:HG11 | 1.98 | 0.46 |
| 2:A:777:ASN:O | 2:A:781:VAL:HG23 | 2.15 | 0.46 |
| 2:C:105:ILE:CG2 | 2:C:241:LEU:HD11 | 2.46 | 0.45 |
| 2:B:724:THR:HG22 | 2:B:1063:LEU:HD22 | 1.98 | 0.45 |
| 2:A:329:PHE:O | 2:A:580:GLN:NE2 | 2.50 | 0.45 |
| 2:A:805:ILE:HG13 | 2:A:878:LEU:HD21 | 1.98 | 0.45 |
| 2:C:487:ASN:HA | 2:C:489:TYR:CZ | 2.52 | 0.45 |
| 2:B:105:ILE:HD11 | 2:B:239:GLN:HB3 | 1.98 | 0.45 |
| 2:A:901:GLN:O | 2:A:905:ARG:HG3 | 2.16 | 0.45 |
| 2:C:84:LEU:HD13 | 2:C:267:VAL:HG11 | 1.98 | 0.45 |
| 2:C:976:VAL:HG12 | 2:C:979:ASP:H | 1.81 | 0.45 |
| 2:B:735:SER:HB3 | 2:B:859:THR:HG23 | 1.99 | 0.45 |
| 2:B:487:ASN:HA | 2:B:489:TYR:CZ | 2.52 | 0.45 |
| 2:C:126:VAL:HG23 | 2:C:172:SER:HB3 | 1.97 | 0.45 |
| 2:C:565:PHE:HA | 2:C:576:VAL:HA | 1.99 | 0.45 |
| 2:B:144:TYR:CE2 | 2:B:146:HIS:HB2 | 2.52 | 0.45 |
| 2:A:326:ILE:HG21 | 2:A:534:VAL:HG22 | 1.99 | 0.45 |
| 2:C:140:PHE:CE1 | 2:C:158:ARG:HB2 | 2.52 | 0.45 |
| 2:C:963:VAL:HG23 | 2:A:570:ALA:HB1 | 1.99 | 0.45 |
| 2:C:749:CYS:SG | 2:C:997:ILE:HD11 | 2.57 | 0.45 |
| 2:A:596:SER:OG | 2:A:613:GLN:NE2 | 2.48 | 0.45 |
| 2:A:959:LEU:O | 2:A:963:VAL:HG23 | 2.17 | 0.45 |
| 2:C:193:VAL:HG13 | 2:C:270:LEU:HD11 | 1.99 | 0.45 |
| 2:C:170:TYR:CZ | 2:C:172:SER:HB2 | 2.51 | 0.45 |
| 2:C:565:PHE:O | 2:B:42:VAL:HA | 2.17 | 0.45 |
| 2:C:919:ASN:O | 2:C:923:ILE:HG13 | 2.17 | 0.45 |
| 2:A:100:ILE:HD12 | 2:A:100:ILE:H | 1.82 | 0.45 |
| 2:C:770:ILE:O | 2:C:774:GLN:HG2 | 2.17 | 0.44 |
| 2:B:822:LEU:HD22 | 2:B:945:LEU:HD21 | 1.98 | 0.44 |
| 2:A:190:ARG:HB3 | 2:A:192:PHE:CE2 | 2.52 | 0.44 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:C:1141:LEU:HD22 | 2:A:1141:LEU:HD13 | 1.98 | 0.44 |
| 2:B:598:ILE:HG23 | 2:B:664:ILE:HG21 | 1.99 | 0.44 |
| 2:B:724:THR:HG23 | 2:B:934:ILE:HD12 | 1.99 | 0.44 |
| 2:A:487:ASN:HA | 2:A:489:TYR:CZ | 2.52 | 0.44 |
| 2:B:329:PHE:HB2 | 2:B:529:LYS:CB | 2.47 | 0.44 |
| 2:B:959:LEU:O | 2:B:963:VAL:HG22 | 2.17 | 0.44 |
| 2:C:229:LEU:HB2 | 2:C:231:ILE:HD11 | 2.00 | 0.44 |
| 2:C:705:VAL:HG12 | 2:B:895:GLN:HB3 | 1.99 | 0.44 |
| 2:B:64:TRP:CH2 | 2:B:214:ARG:HG3 | 2.52 | 0.44 |
| 2:A:948:LEU:HD21 | 2:A:1059:GLY:HA3 | 1.98 | 0.44 |
| 2:A:227:VAL:HG12 | 2:A:229:LEU:HG | 1.99 | 0.44 |
| 2:A:644:GLN:NE2 | 2:A:645:THR:O | 2.51 | 0.44 |
| 2:C:168:PHE:CZ | 2:C:170:TYR:HB2 | 2.52 | 0.44 |
| 2:B:115:GLN:NE2 | 2:B:165:ASN:HD22 | 2.15 | 0.44 |
| 2:B:326:ILE:HA | 2:B:531:THR:HG21 | 1.99 | 0.44 |
| 2:A:105:ILE:HD11 | 2:A:241:LEU:HD21 | 1.99 | 0.44 |
| 2:A:567:ARG:HD3 | 2:A:571:ASP:HA | 1.98 | 0.44 |
| 2:C:776:LYS:NZ | 2:C:780:GLU:HB2 | 2.33 | 0.44 |
| 2:C:930:ALA:O | 2:C:934:ILE:HG12 | 2.18 | 0.44 |
| 2:B:729:VAL:HG11 | 2:B:781:VAL:HG11 | 2.00 | 0.44 |
| 2:C:42:VAL:HG22 | 2:A:565:PHE:CE2 | 2.53 | 0.43 |
| 2:C:112:SER:HB3 | 2:C:134:GLN:HB2 | 1.99 | 0.43 |
| 2:C:856:ASN:ND2 | 2:C:966:LEU:HD12 | 2.33 | 0.43 |
| 2:A:330:PRO:O | 2:A:332:ILE:HG13 | 2.18 | 0.43 |
| 2:A:656:VAL:HG13 | 2:A:695:TYR:HB3 | 1.99 | 0.43 |
| 2:B:302:THR:HG21 | 2:B:315:THR:HG22 | 2.00 | 0.43 |
| 2:A:100:ILE:HA | 2:A:243:ALA:HB3 | 2.01 | 0.43 |
| 2:C:191:GLU:O | 2:C:205:SER:HA | 2.18 | 0.43 |
| 2:C:815:ARG:HD3 | 2:C:823:PHE:CE2 | 2.54 | 0.43 |
| 2:B:752:LEU:HD11 | 2:B:990:GLU:HG2 | 2.00 | 0.43 |
| 2:C:1139:ASP:O | 2:C:1143:PRO:HD2 | 2.18 | 0.43 |
| 2:B:303:LEU:HD12 | 2:B:308:VAL:HG12 | 1.99 | 0.43 |
| 2:B:878:LEU:HD11 | 2:B:1054:GLN:NE2 | 2.33 | 0.43 |
| 2:A:715:PRO:HA | 2:A:1071:GLN:O | 2.18 | 0.43 |
| 2:A:905:ARG:HD3 | 2:A:1049:LEU:O | 2.17 | 0.43 |
| 2:C:197:ILE:HG23 | 2:C:198:ASP:OD2 | 2.17 | 0.43 |
| 2:B:44:ARG:O | 2:B:283:GLY:HA2 | 2.18 | 0.43 |
| 2:B:388:ASN:ND2 | 2:B:527:PRO:HD2 | 2.33 | 0.43 |
| 2:A:980:ILE:HD13 | 2:A:996:LEU:HD12 | 2.00 | 0.43 |
| 2:C:100:ILE:HD13 | 2:C:100:ILE:HA | 1.88 | 0.43 |
| 2:A:716:THR:HG21 | 2:A:1073:LYS:HD3 | 2.00 | 0.43 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:C:600:PRO:HG3 | 2:C:692:ILE:HD11 | 2.01 | 0.43 |
| 2:B:102:ARG:NH1 | 2:B:154:GLU:OE1 | 2.52 | 0.43 |
| 2:B:538:CYS:HB2 | 2:B:590:CYS:HB2 | 1.83 | 0.43 |
| 2:C:294:ASP:O | 2:C:298:GLU:HG3 | 2.19 | 0.43 |
| 2:B:145:TYR:HB2 | 2:B:152:TRP:CD2 | 2.54 | 0.43 |
| 2:B:280:ASN:OD1 | 2:B:284:THR:N | 2.52 | 0.43 |
| 2:A:144:TYR:HA | 2:A:246:ARG:HG2 | 2.01 | 0.43 |
| 2:A:766:ALA:O | 2:A:770:ILE:HG23 | 2.19 | 0.43 |
| 2:C:595:VAL:HG22 | 2:C:612:TYR:CD1 | 2.54 | 0.42 |
| 2:B:115:GLN:HE22 | 2:B:167:THR:HG23 | 1.84 | 0.42 |
| 2:B:827:THR:O | 2:B:949:GLN:NE2 | 2.52 | 0.42 |
| 2:B:905:ARG:HD3 | 2:B:1049:LEU:O | 2.19 | 0.42 |
| 2:B:1018:ILE:HD13 | 2:B:1018:ILE:HA | 1.87 | 0.42 |
| 2:C:287:ASP:HB3 | 2:C:306:PHE:CE2 | 2.53 | 0.42 |
| 2:B:741:TYR:HD2 | 2:B:742:ILE:HG23 | 1.83 | 0.42 |
| 2:A:93:ALA:HB3 | 2:A:266:TYR:HB2 | 1.99 | 0.42 |
| 2:C:212:LEU:HD23 | 2:C:212:LEU:HA | 1.80 | 0.42 |
| 2:B:945:LEU:HD23 | 2:B:948:LEU:HD12 | 2.00 | 0.42 |
| 2:B:1028:LYS:NZ | 2:B:1042:PHE:O | 2.40 | 0.42 |
| 2:A:1097:SER:HB2 | 2:A:1102:TRP:CD2 | 2.54 | 0.42 |
| 2:C:320:VAL:HG22 | 2:C:591:SER:O | 2.19 | 0.42 |
| 2:B:64:TRP:HH2 | 2:B:214:ARG:HG3 | 1.84 | 0.42 |
| 2:B:916:LEU:HD12 | 2:B:923:ILE:HD12 | 2.02 | 0.42 |
| 2:A:81:ASN:OD1 | 2:A:81:ASN:N | 2.52 | 0.42 |
| 2:C:277:LEU:HD13 | 2:C:285:ILE:HD13 | 2.01 | 0.42 |
| 2:B:1106:GLN:NE2 | 2:B:1111:GLU:OE2 | 2.52 | 0.42 |
| 2:C:89:GLY:HA3 | 2:C:270:LEU:HD12 | 2.02 | 0.42 |
| 2:C:591:SER:HB2 | 2:C:615:VAL:HG12 | 2.01 | 0.42 |
| 2:A:865:LEU:HD23 | 2:A:869:MET:HE2 | 2.01 | 0.42 |
| 1:D:37:LYS:HD2 | 1:D:37:LYS:HA | 1.82 | 0.42 |
| 2:C:712:ILE:HB | 2:C:1077:THR:HG21 | 2.01 | 0.42 |
| 2:C:738:CYS:O | 2:C:742:ILE:HB | 2.19 | 0.42 |
| 2:B:426:PRO:HB2 | 2:B:428:ASP:OD1 | 2.20 | 0.42 |
| 2:A:773:GLU:OE1 | 2:A:1019:ARG:NH1 | 2.53 | 0.42 |
| 2:A:903:ALA:HB1 | 2:A:913:GLN:HB2 | 2.01 | 0.42 |
| 2:A:1073:LYS:HE2 | 2:A:1073:LYS:HB3 | 1.84 | 0.42 |
| 2:C:331:ASN:HB3 | 2:C:580:GLN:HG2 | 2.02 | 0.42 |
| 2:B:327:VAL:O | 2:B:531:THR:HB | 2.20 | 0.42 |
| 2:B:1116:THR:OG1 | 2:B:1118:ASP:OD1 | 2.26 | 0.42 |
| 2:A:426:PRO:HB2 | 2:A:428:ASP:OD1 | 2.20 | 0.42 |
| 2:B:36:VAL:HG11 | 2:B:220:PHE:CZ | 2.55 | 0.42 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:901:GLN:O | 2:B:905:ARG:HG3 | 2.19 | 0.42 |
| 2:A:334:ASN:C | 2:A:362:VAL:HG12 | 2.41 | 0.42 |
| 2:B:714:ILE:HG22 | 2:B:1110:TYR:HB2 | 2.02 | 0.41 |
| 2:B:1041:ASP:HB2 | 2:A:1030:SER:HB3 | 2.02 | 0.41 |
| 2:A:133:PHE:HB2 | 2:A:135:PHE:CE1 | 2.55 | 0.41 |
| 2:A:328:ARG:NH1 | 2:A:533:LEU:HB2 | 2.35 | 0.41 |
| 2:A:786:LYS:HE2 | 2:A:786:LYS:HB2 | 1.83 | 0.41 |
| 2:A:1081:ILE:HD13 | 2:A:1081:ILE:HA | 1.93 | 0.41 |
| 1:D:9:ILE:O | 1:D:12:ILE:HG22 | 2.20 | 0.41 |
| 2:B:827:THR:H | 2:B:949:GLN:HE22 | 1.68 | 0.41 |
| 2:B:959:LEU:HD12 | 2:B:959:LEU:HA | 1.84 | 0.41 |
| 2:A:296:LEU:HB2 | 2:A:608:VAL:HG21 | 2.02 | 0.41 |
| 2:C:717:ASN:HB3 | 2:C:1070:ALA:HB3 | 2.03 | 0.41 |
| 3:C:1306:NAG:H83 | 3:C:1306:NAG:H3 | 2.02 | 0.41 |
| 2:C:822:LEU:HD23 | 2:C:945:LEU:HD21 | 2.02 | 0.41 |
| 2:B:222:ALA:HB2 | 2:B:285:ILE:HB | 2.03 | 0.41 |
| 2:B:788:ILE:HG23 | 2:B:876:ALA:HB2 | 2.03 | 0.41 |
| 2:C:878:LEU:HD21 | 2:C:1052:PHE:HB3 | 2.03 | 0.41 |
| 2:B:1116:THR:HG22 | 2:B:1138:TYR:HD2 | 1.85 | 0.41 |
| 2:A:565:PHE:HE2 | 2:A:567:ARG:HH21 | 1.68 | 0.41 |
| 2:A:959:LEU:HD23 | 2:A:959:LEU:HA | 1.93 | 0.41 |
| 1:F:9:ILE:O | 1:F:12:ILE:HG22 | 2.20 | 0.41 |
| 2:C:290:ASP:HB3 | 2:C:293:LEU:HB2 | 2.02 | 0.41 |
| 2:C:299:THR:HG22 | 2:C:308:VAL:HG11 | 2.01 | 0.41 |
| 2:C:776:LYS:HZ2 | 2:C:780:GLU:HB2 | 1.84 | 0.41 |
| 2:A:280:ASN:ND2 | 2:A:282:ASN:OD1 | 2.53 | 0.41 |
| 2:A:746:SER:OG | 2:A:748:GLU:OE1 | 2.33 | 0.41 |
| 2:C:303:LEU:HD21 | 2:C:313:TYR:CD1 | 2.55 | 0.41 |
| 2:C:712:ILE:O | 2:C:1074:ASN:HA | 2.21 | 0.41 |
| 2:C:1004:LEU:HD12 | 2:C:1004:LEU:HA | 1.93 | 0.41 |
| 2:C:1038:LYS:HD2 | 2:C:1038:LYS:HA | 1.90 | 0.41 |
| 2:B:92:PHE:CZ | 2:B:101:ILE:HG21 | 2.55 | 0.41 |
| 2:B:101:ILE:H | 2:B:101:ILE:HD12 | 1.85 | 0.41 |
| 2:B:993:ILE:O | 2:B:997:ILE:HG12 | 2.21 | 0.41 |
| 2:A:37:TYR:HA | 2:A:223:LEU:H | 1.85 | 0.41 |
| 2:A:335:LEU:HA | 2:A:362:VAL:O | 2.21 | 0.41 |
| 2:A:754:LEU:HD23 | 2:A:754:LEU:HA | 1.87 | 0.41 |
| 2:A:790:LYS:HE3 | 2:A:790:LYS:HB3 | 1.92 | 0.41 |
| 1:E:9:ILE:O | 1:E:12:ILE:HG22 | 2.20 | 0.41 |
| 2:B:156:GLU:HG2 | 2:B:158:ARG:HG3 | 2.02 | 0.41 |
| 2:B:965:GLN:HG2 | 2:B:1003:SER:OG | 2.20 | 0.41 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:662:CYS:HB2 | 2:A:697:MET:SD | 2.60 | 0.41 |
| 2:C:426:PRO:HB2 | 2:C:428:ASP:OD1 | 2.20 | 0.41 |
| 2:C:1039:ARG:H | 2:C:1039:ARG:HG2 | 1.66 | 0.41 |
| 2:B:615:VAL:HG22 | 2:B:616:ASN:O | 2.21 | 0.41 |
| 2:B:898:PHE:N | 2:B:899:PRO:HD2 | 2.36 | 0.41 |
| 2:A:133:PHE:HA | 2:A:162:SER:O | 2.21 | 0.41 |
| 2:A:205:SER:OG | 2:A:226:LEU:HD13 | 2.21 | 0.41 |
| 2:A:988:GLU:O | 2:A:991:VAL:HG12 | 2.20 | 0.41 |
| 2:A:1125:ASN:ND2 | 2:A:1127:ASP:OD2 | 2.54 | 0.41 |
| 2:C:1003:SER:HB2 | 2:B:759:PHE:HE1 | 1.85 | 0.41 |
| 2:B:722:VAL:O | 2:B:934:ILE:HD11 | 2.21 | 0.41 |
| 2:C:117:LEU:HD13 | 2:C:231:ILE:HG13 | 2.04 | 0.40 |
| 2:B:92:PHE:HZ | 2:B:101:ILE:HG21 | 1.87 | 0.40 |
| 2:B:1039:ARG:H | 2:B:1039:ARG:HG2 | 1.67 | 0.40 |
| 2:C:92:PHE:HZ | 2:C:101:ILE:HD12 | 1.86 | 0.40 |
| 2:C:1073:LYS:HE2 | 2:C:1073:LYS:HB3 | 1.86 | 0.40 |
| 2:A:389:ASP:HA | 2:A:528:LYS:N | 2.36 | 0.40 |
| 2:C:816:SER:OG | 2:C:819:GLU:HB2 | 2.22 | 0.40 |
| 2:B:44:ARG:HB3 | 2:B:47:VAL:CG1 | 2.52 | 0.40 |
| 2:A:294:ASP:OD1 | 2:A:294:ASP:N | 2.53 | 0.40 |
| 2:A:761:THR:HG22 | 2:A:765:ARG:NH2 | 2.36 | 0.40 |
| 1:F:37:LYS:HA | 1:F:37:LYS:HD2 | 1.82 | 0.40 |
| 2:C:130:VAL:O | 2:C:167:THR:OG1 | 2.25 | 0.40 |
| 2:A:1115:ILE:HG23 | 2:A:1120:THR:HG21 | 2.03 | 0.40 |
| 1:E:22:GLY:HA3 | 2:B:501:TYR:OH | 2.22 | 0.40 |
| 2:C:143:VAL:HG12 | 2:C:152:TRP:HE3 | 1.87 | 0.40 |
| 2:C:170:TYR:CE1 | 2:C:172:SER:HB2 | 2.57 | 0.40 |
| 2:C:194:PHE:HD1 | 2:C:203:ILE:HG12 | 1.86 | 0.40 |
| 2:C:470:THR:O | 2:C:470:THR:HG23 | 2.22 | 0.40 |
| 2:C:521:PRO:HB2 | 2:B:230:PRO:HB2 | 2.03 | 0.40 |
| 2:C:1069:PRO:HG2 | 2:B:892:PRO:HD2 | 2.02 | 0.40 |
| 2:A:127:VAL:HG12 | 2:A:129:LYS:HG3 | 2.03 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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

entries.

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | D | 37/39 (95%) | 36 (97%) | 1 (3%) | 0 | 100 | 100 |
| 1 | E | 37/39 (95%) | 36 (97%) | 1 (3%) | 0 | 100 | 100 |
| 1 | F | 37/39 (95%) | 36 (97%) | 1 (3%) | 0 | 100 | 100 |
| 2 | A | 1004/1307 (77%) | 987 (98%) | 17 (2%) | 0 | 100 | 100 |
| 2 | B | 1021/1307 (78%) | 1003 (98%) | 18 (2%) | 0 | 100 | 100 |
| 2 | C | 1008/1307 (77%) | 982 (97%) | 26 (3%) | 0 | 100 | 100 |
| All | All | 3144/4038 (78%) | 3080 (98%) | 64 (2%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains (i)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 1 | D | 36/36 (100%) | 36 (100%) | 0 | 100 | 100 |
| 1 | E | 36/36 (100%) | 36 (100%) | 0 | 100 | 100 |
| 1 | F | 36/36 (100%) | 36 (100%) | 0 | 100 | 100 |
| 2 | A | 892/1128 (79%) | 875 (98%) | 17 (2%) | 52 | 70 |
| 2 | B | 900/1128 (80%) | 879 (98%) | 21 (2%) | 45 | 64 |
| 2 | C | 892/1128 (79%) | 877 (98%) | 15 (2%) | 56 | 72 |
| All | All | 2792/3492 (80%) | 2739 (98%) | 53 (2%) | 52 | 70 |

All (53) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | C | 51 | THR |
| 2 | C | 97 | LYS |
| 2 | C | 98 | SER |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | C | 140 | PHE |
| 2 | C | 207 | HIS |
| 2 | C | 237 | ARG |
| 2 | C | 331 | ASN |
| 2 | C | 383 | SER |
| 2 | C | 470 | THR |
| 2 | C | 759 | PHE |
| 2 | C | 943 | SER |
| 2 | C | 977 | LEU |
| 2 | C | 985 | ASP |
| 2 | C | 1039 | ARG |
| 2 | C | 1050 | MET |
| 2 | B | 53 | ASP |
| 2 | B | 87 | ASN |
| 2 | B | 118 | LEU |
| 2 | B | 144 | TYR |
| 2 | B | 383 | SER |
| 2 | B | 470 | THR |
| 2 | B | 582 | LEU |
| 2 | B | 649 | CYS |
| 2 | B | 690 | GLN |
| 2 | B | 711 | SER |
| 2 | B | 738 | CYS |
| 2 | B | 743 | CYS |
| 2 | B | 753 | LEU |
| 2 | B | 758 | SER |
| 2 | B | 784 | GLN |
| 2 | B | 904 | TYR |
| 2 | B | 945 | LEU |
| 2 | B | 981 | LEU |
| 2 | B | 1039 | ARG |
| 2 | B | 1055 | SER |
| 2 | B | 1111 | GLU |
| 2 | A | 64 | TRP |
| 2 | A | 87 | ASN |
| 2 | A | 214 | ARG |
| 2 | A | 224 | GLU |
| 2 | A | 265 | TYR |
| 2 | A | 281 | GLU |
| 2 | A | 383 | SER |
| 2 | A | 470 | THR |
| 2 | A | 582 | LEU |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | A | 790 | LYS |
| 2 | A | 875 | SER |
| 2 | A | 900 | MET |
| 2 | A | 904 | TYR |
| 2 | A | 943 | SER |
| 2 | A | 945 | LEU |
| 2 | A | 957 | GLN |
| 2 | A | 1002 | GLN |

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

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | C | 580 | GLN |
| 2 | C | 957 | GLN |
| 2 | C | 1002 | GLN |
| 2 | C | 1088 | HIS |
| 2 | B | 146 | HIS |
| 2 | B | 165 | ASN |
| 2 | B | 360 | ASN |
| 2 | A | 115 | GLN |
| 2 | A | 613 | GLN |

### 5.3.3 RNA

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry

27 ligands are modelled in this entry.

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

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\| > 2$ | Counts | RMSZ | $\#\|Z\| > 2$ |
| 3 | NAG | B | 1306 | 2 | 14,14,15 | 0.27 | 0 | 17,19,21 | 0.37 | 0 |
| 3 | NAG | A | 1309 | 2 | 14,14,15 | 0.24 | 0 | 17,19,21 | 0.50 | 0 |
| 3 | NAG | B | 1307 | 2 | 14,14,15 | 0.30 | 0 | 17,19,21 | 0.53 | 0 |
| 3 | NAG | B | 1301 | 2 | 14,14,15 | 0.29 | 0 | 17,19,21 | 0.47 | 0 |
| 3 | NAG | B | 1308 | 2 | 14,14,15 | 0.26 | 0 | 17,19,21 | 0.67 | 0 |
| 3 | NAG | C | 1305 | 2 | 14,14,15 | 0.31 | 0 | 17,19,21 | 0.54 | 0 |
| 3 | NAG | A | 1307 | 2 | 14,14,15 | 0.25 | 0 | 17,19,21 | 0.49 | 0 |
| 3 | NAG | C | 1307 | 2 | 14,14,15 | 0.42 | 0 | 17,19,21 | 1.65 | 1 (5%) |
| 3 | NAG | C | 1301 | 2 | 14,14,15 | 0.28 | 0 | 17,19,21 | 0.49 | 0 |
| 3 | NAG | A | 1304 | 2 | 14,14,15 | 0.24 | 0 | 17,19,21 | 0.43 | 0 |
| 3 | NAG | A | 1302 | 2 | 14,14,15 | 0.19 | 0 | 17,19,21 | 0.65 | 0 |
| 3 | NAG | C | 1304 | 2 | 14,14,15 | 0.31 | 0 | 17,19,21 | 1.35 | 2 (11%) |
| 3 | NAG | C | 1302 | 2 | 14,14,15 | 0.39 | 0 | 17,19,21 | 0.45 | 0 |
| 3 | NAG | A | 1301 | 2 | 14,14,15 | 0.26 | 0 | 17,19,21 | 0.46 | 0 |
| 3 | NAG | B | 1305 | 2 | 14,14,15 | 0.27 | 0 | 17,19,21 | 0.50 | 0 |
| 3 | NAG | A | 1308 | 2 | 14,14,15 | 0.33 | 0 | 17,19,21 | 0.74 | 0 |
| 3 | NAG | B | 1302 | 2 | 14,14,15 | 0.48 | 0 | 17,19,21 | 0.63 | 0 |
| 3 | NAG | C | 1308 | 2 | 14,14,15 | 0.27 | 0 | 17,19,21 | 0.59 | 0 |
| 3 | NAG | B | 1303 | 2 | 14,14,15 | 0.25 | 0 | 17,19,21 | 0.53 | 0 |
| 3 | NAG | B | 1309 | 2 | 14,14,15 | 0.31 | 0 | 17,19,21 | 0.64 | 0 |
| 3 | NAG | A | 1306 | 2 | 14,14,15 | 0.27 | 0 | 17,19,21 | 0.51 | 0 |
| 3 | NAG | C | 1303 | 2 | 14,14,15 | 0.42 | 0 | 17,19,21 | 0.45 | 0 |
| 3 | NAG | A | 1303 | 2 | 14,14,15 | 0.35 | 0 | 17,19,21 | 0.68 | 0 |
| 3 | NAG | C | 1306 | 2 | 14,14,15 | 0.28 | 0 | 17,19,21 | 1.65 | 3 (17%) |
| 3 | NAG | A | 1305 | 2 | 14,14,15 | 0.31 | 0 | 17,19,21 | 0.42 | 0 |
| 3 | NAG | B | 1304 | 2 | 14,14,15 | 0.24 | 0 | 17,19,21 | 0.43 | 0 |
| 3 | NAG | C | 1309 | 2 | 14,14,15 | 0.40 | 0 | 17,19,21 | 0.45 | 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 |
|---|---|---|---|---|---|---|---|
| 3 | NAG | B | 1306 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1309 | 2 | - | 1/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1307 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1301 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1308 | 2 | - | 1/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1305 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1307 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1307 | 2 | - | 1/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1301 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1304 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1302 | 2 | - | 3/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1304 | 2 | - | 3/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1302 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1301 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1305 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1308 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1302 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1308 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1303 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1309 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1306 | 2 | - | 1/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1303 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1303 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1306 | 2 | - | 5/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 1305 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 1304 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 1309 | 2 | - | 1/6/23/26 | 0/1/1/1 |

There are no bond length outliers.

All (6) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 3 | C | 1307 | NAG | C1-C2-N2 | -6.34 | 99.66 | 110.49 |
| 3 | C | 1306 | NAG | C2-N2-C7 | 5.01 | 130.03 | 122.90 |
| 3 | C | 1304 | NAG | C2-N2-C7 | 4.43 | 129.22 | 122.90 |
| 3 | C | 1306 | NAG | C1-C2-N2 | 2.81 | 115.29 | 110.49 |
| 3 | C | 1304 | NAG | C1-C2-N2 | 2.15 | 114.16 | 110.49 |
| 3 | C | 1306 | NAG | C8-C7-N2 | 2.05 | 119.58 | 116.10 |

There are no chirality outliers.

All (32) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 3 | C | 1306 | NAG | C4-C5-C6-O6 |
| 3 | B | 1306 | NAG | O5-C5-C6-O6 |
| 3 | B | 1307 | NAG | O5-C5-C6-O6 |
| 3 | C | 1301 | NAG | O5-C5-C6-O6 |
| 3 | B | 1301 | NAG | O5-C5-C6-O6 |
| 3 | B | 1301 | NAG | C4-C5-C6-O6 |
| 3 | C | 1303 | NAG | C8-C7-N2-C2 |
| 3 | C | 1303 | NAG | O7-C7-N2-C2 |
| 3 | C | 1304 | NAG | C8-C7-N2-C2 |
| 3 | C | 1304 | NAG | O7-C7-N2-C2 |
| 3 | C | 1306 | NAG | C8-C7-N2-C2 |
| 3 | C | 1306 | NAG | O7-C7-N2-C2 |
| 3 | A | 1302 | NAG | C8-C7-N2-C2 |
| 3 | A | 1302 | NAG | O7-C7-N2-C2 |
| 3 | C | 1306 | NAG | O5-C5-C6-O6 |
| 3 | B | 1306 | NAG | C4-C5-C6-O6 |
| 3 | B | 1307 | NAG | C4-C5-C6-O6 |
| 3 | C | 1301 | NAG | C4-C5-C6-O6 |
| 3 | A | 1305 | NAG | C4-C5-C6-O6 |
| 3 | A | 1305 | NAG | O5-C5-C6-O6 |
| 3 | B | 1309 | NAG | O5-C5-C6-O6 |
| 3 | C | 1307 | NAG | C1-C2-N2-C7 |
| 3 | A | 1306 | NAG | O5-C5-C6-O6 |
| 3 | B | 1308 | NAG | O5-C5-C6-O6 |
| 3 | C | 1302 | NAG | C1-C2-N2-C7 |
| 3 | A | 1302 | NAG | O5-C5-C6-O6 |
| 3 | C | 1309 | NAG | C1-C2-N2-C7 |
| 3 | C | 1304 | NAG | C3-C2-N2-C7 |
| 3 | C | 1306 | NAG | C3-C2-N2-C7 |
| 3 | B | 1309 | NAG | C4-C5-C6-O6 |
| 3 | A | 1309 | NAG | O5-C5-C6-O6 |
| 3 | C | 1302 | NAG | C3-C2-N2-C7 |

There are no ring outliers.

4 monomers are involved in 6 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 3 | B | 1308 | NAG | 1 | 0 |
| 3 | C | 1304 | NAG | 1 | 0 |
| 3 | B | 1302 | NAG | 2 | 0 |
| 3 | C | 1306 | NAG | 2 | 0 |

## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

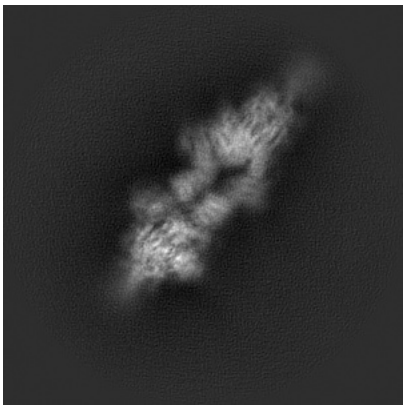
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-39184. These allow visual inspection of the internal detail of the map and identification of artifacts.

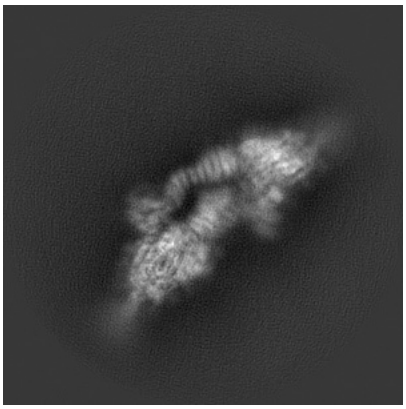
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

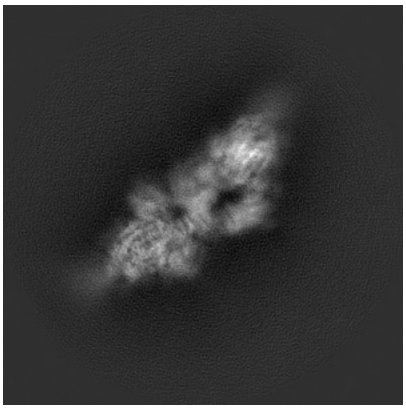
### 6.1.1 Primary map



X

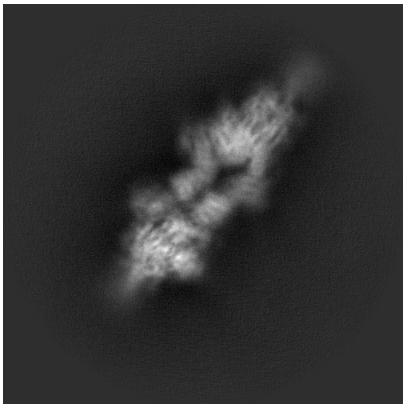


Y

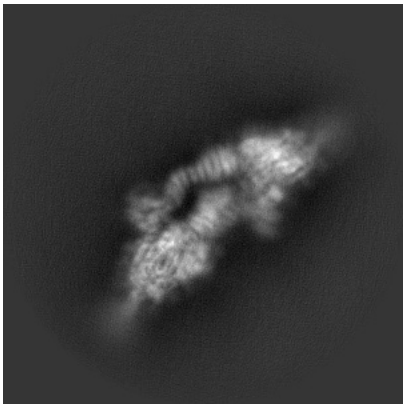


Z

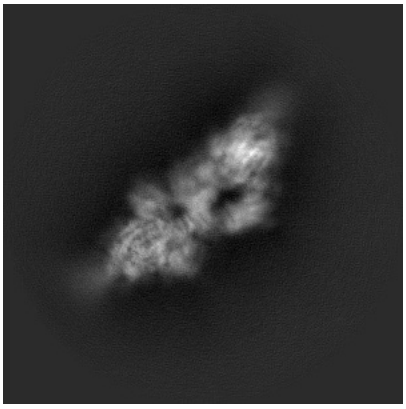
### 6.1.2 Raw map



X



Y

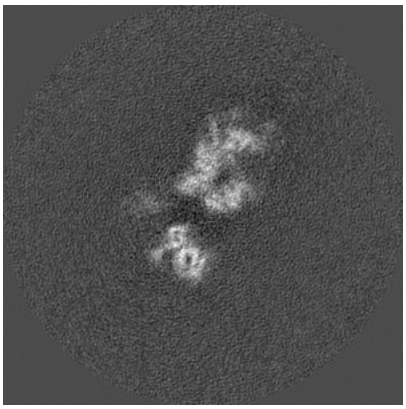


Z

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

## 6.2 Central slices (i)

### 6.2.1 Primary map

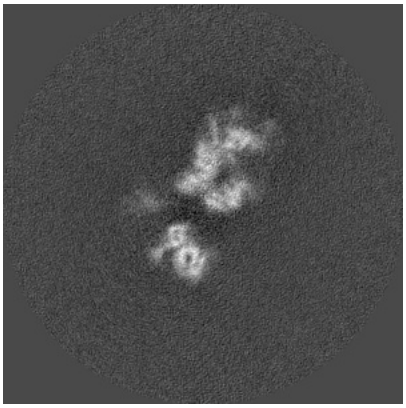


X Index: 170

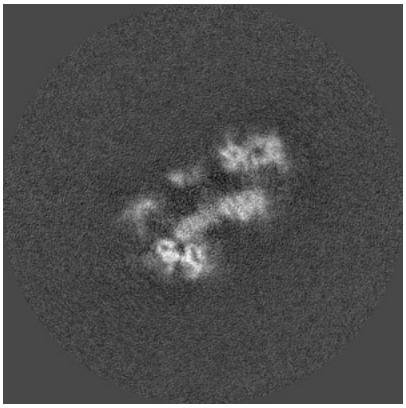
Y Index: 170

Z Index: 170

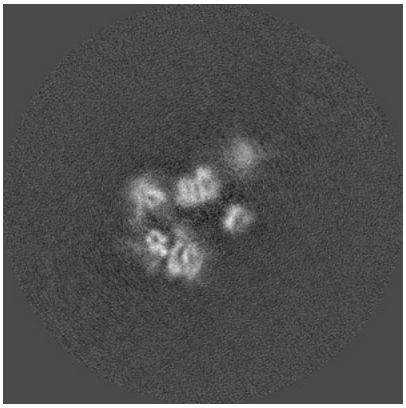
### 6.2.2 Raw map



X Index: 170



Y Index: 170

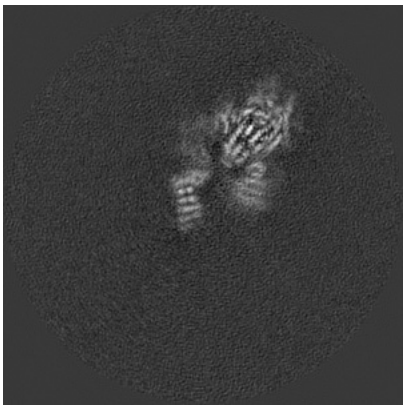


Z Index: 170

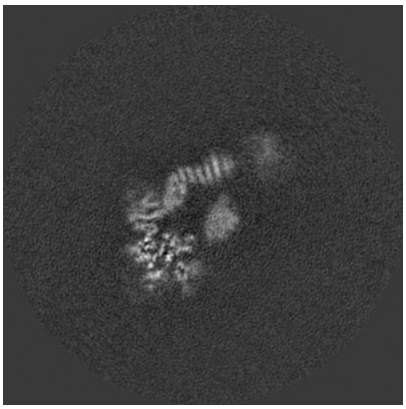
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

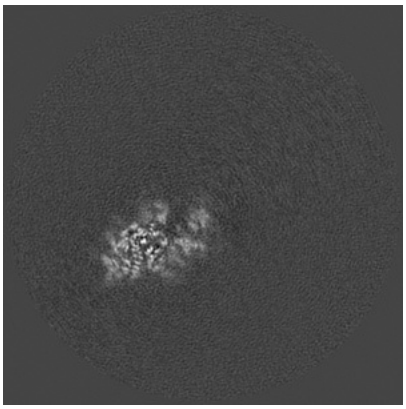
### 6.3.1 Primary map



X Index: 201

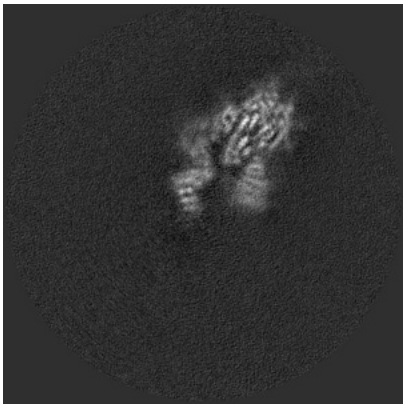


Y Index: 151



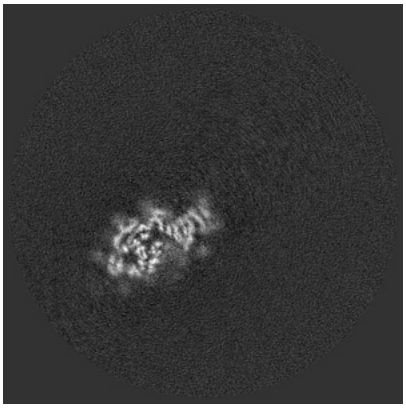
Z Index: 131

### 6.3.2 Raw map



X Index: 204

Y Index: 152

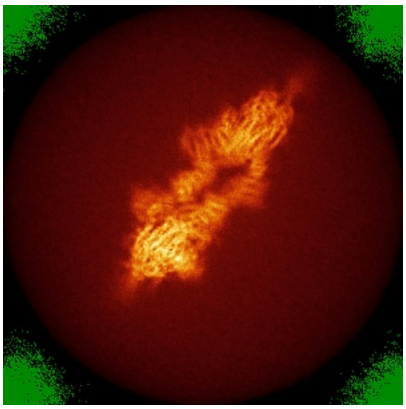


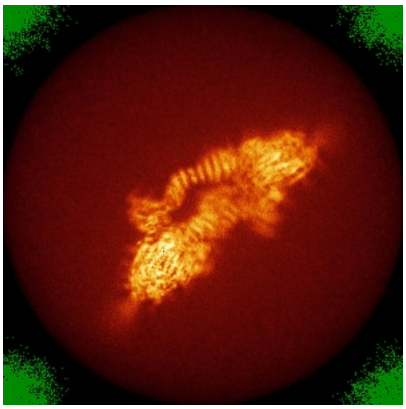
Z Index: 125

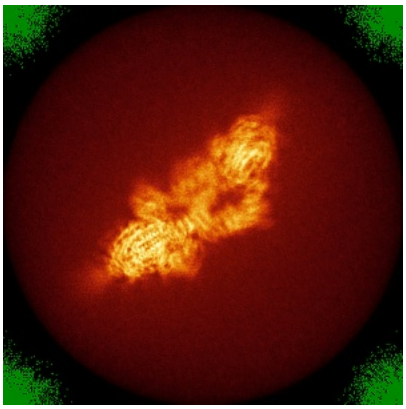
The images above show the largest variance slices of the map in three orthogonal directions.

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

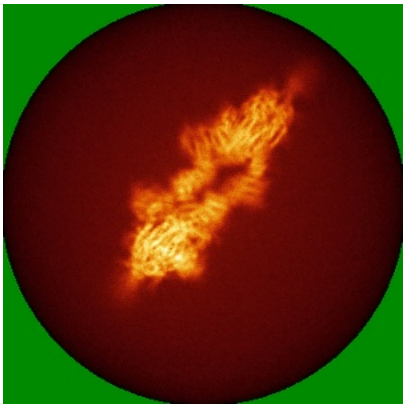
### 6.4.1 Primary map

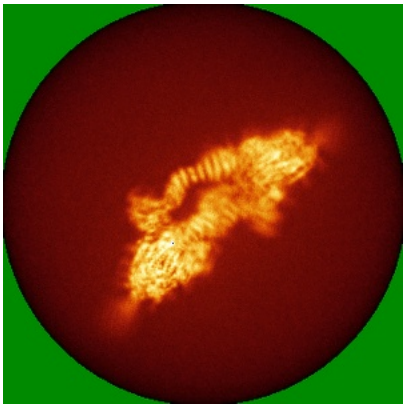

X

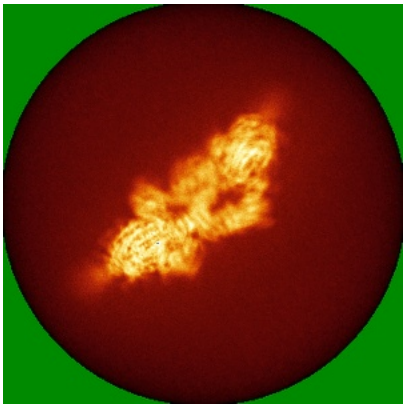

Y


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.

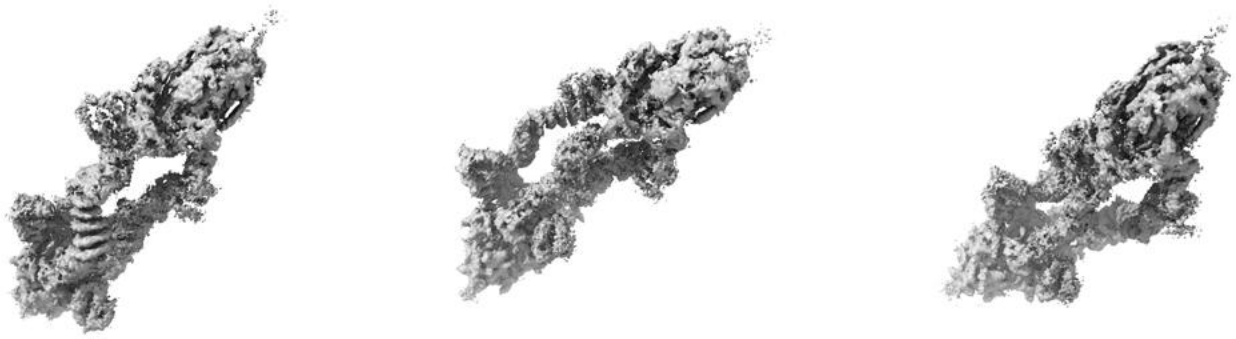
## 6.5 Orthogonal surface views (i)

### 6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.013. 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.

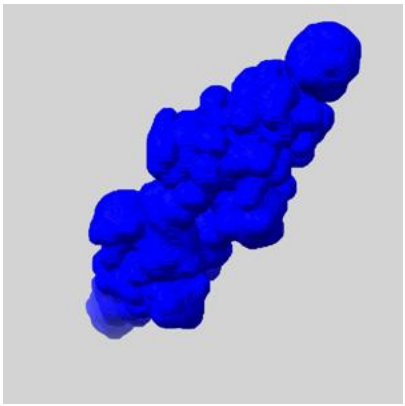
## 6.6 Mask visualisation (i)

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

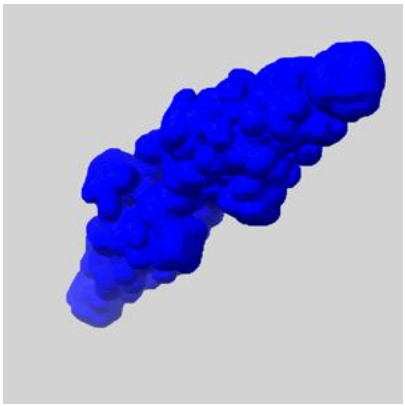
A mask typically either:

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

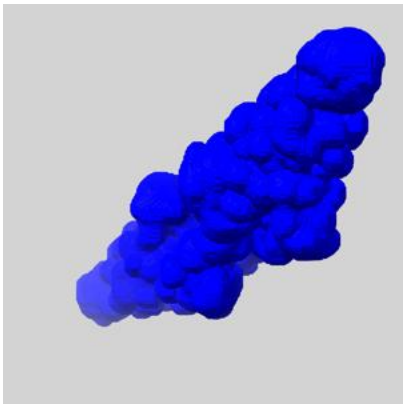
### 6.6.1 emd_39184_msk_1.map (i)



X



Y

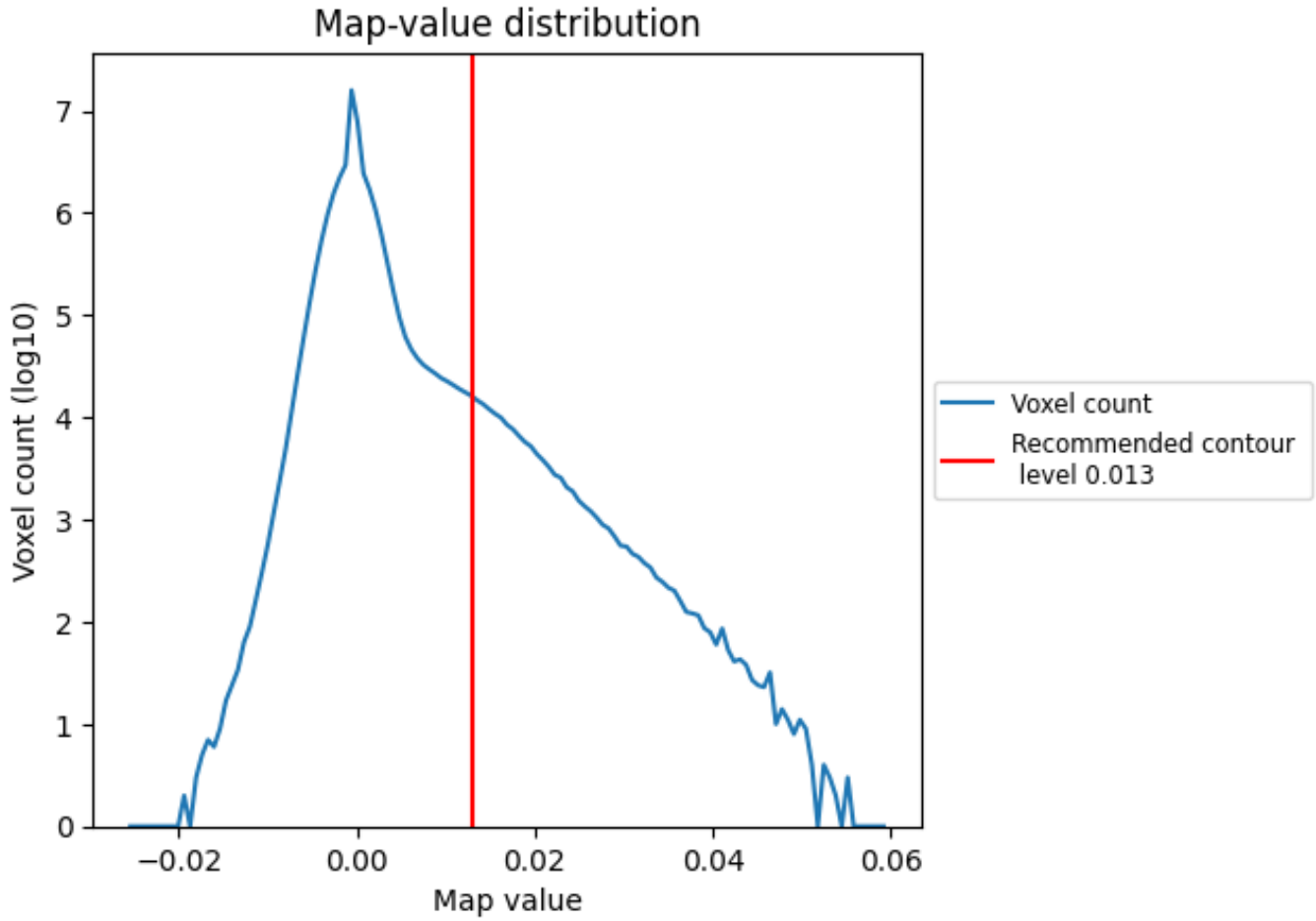


Z

# 7 Map analysis

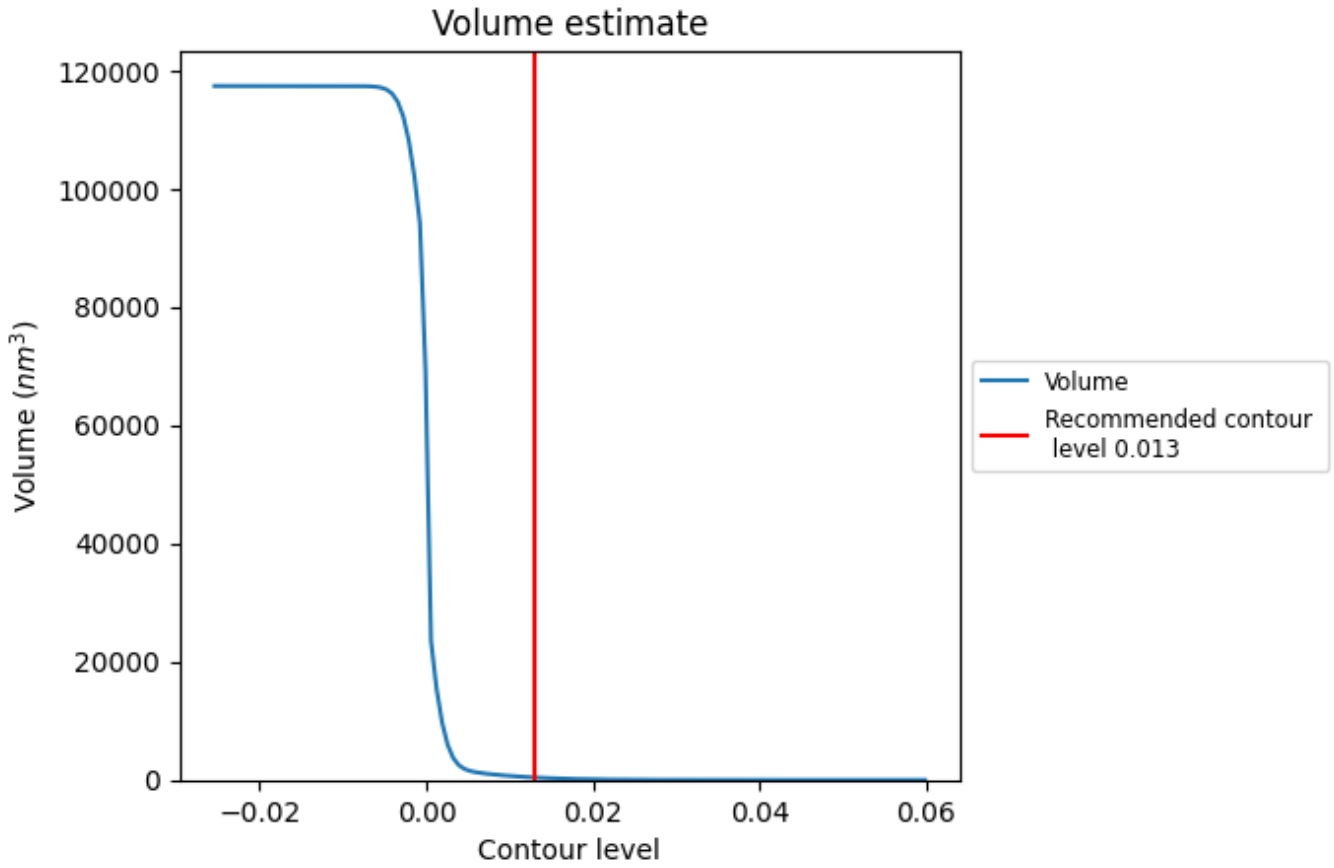
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution




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

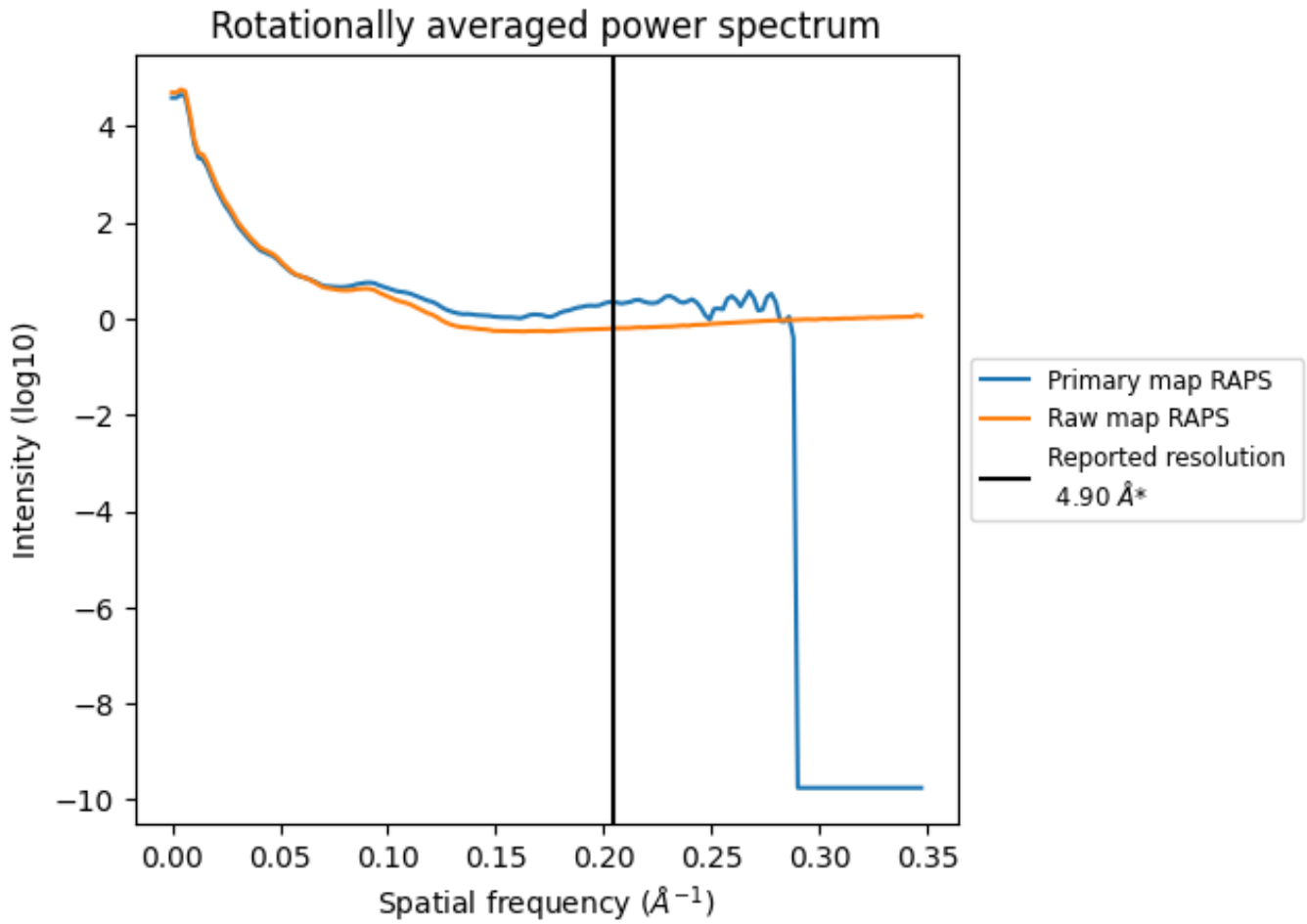
## 7.2 Volume estimate




The volume at the recommended contour level is 421 $nm^3$; this corresponds to an approximate mass of 380 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)

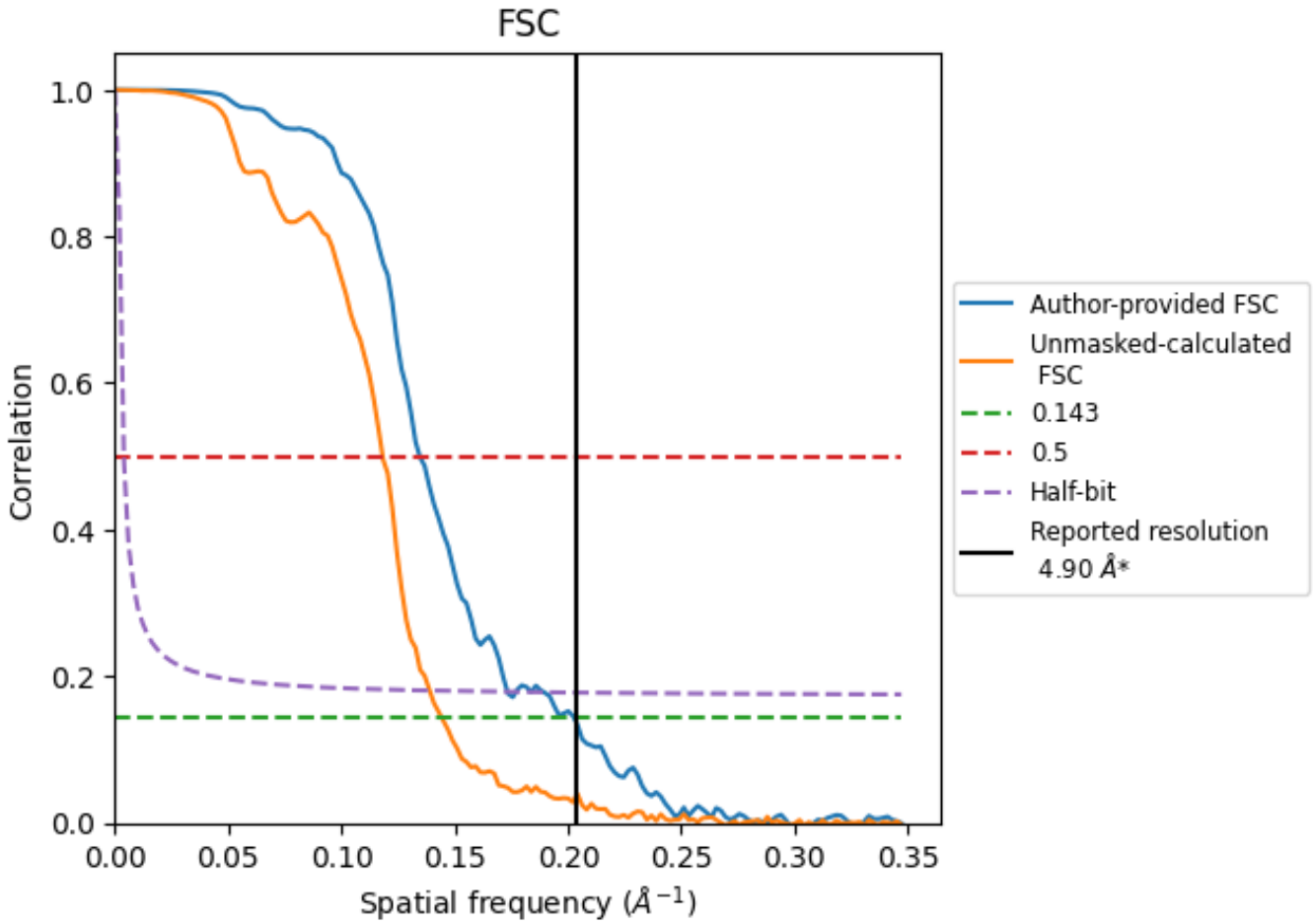



*Reported resolution corresponds to spatial frequency of 0.204 Å$^{-1}$

# 8 Fourier-Shell correlation

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

## 8.1 FSC




*Reported resolution corresponds to spatial frequency of 0.204 Å$^{-1}$

## 8.2 Resolution estimates (i)

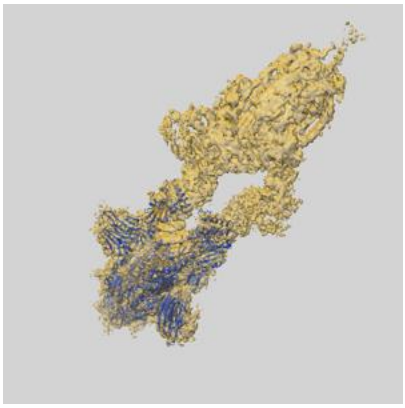
| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 4.90 | - | - |
| Author-provided FSC curve | 4.93 | 7.43 | 5.77 |
| Unmasked-calculated* | 6.93 | 8.46 | 7.19 |

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.93 differs from the reported value 4.9 by more than 10 %

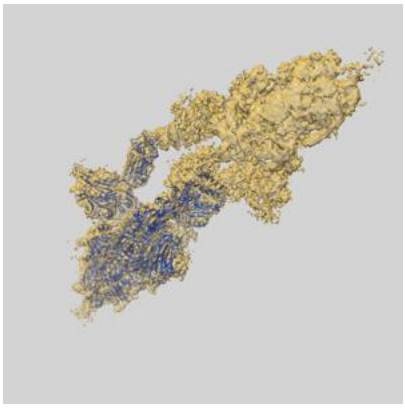
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-39184 and PDB model 8YDX. Per-residue inclusion information can be found in section 3 on page 16.

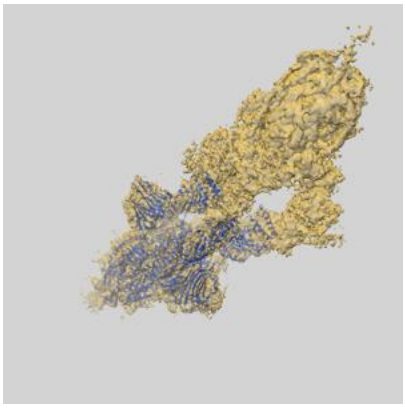
## 9.1 Map-model overlay



X



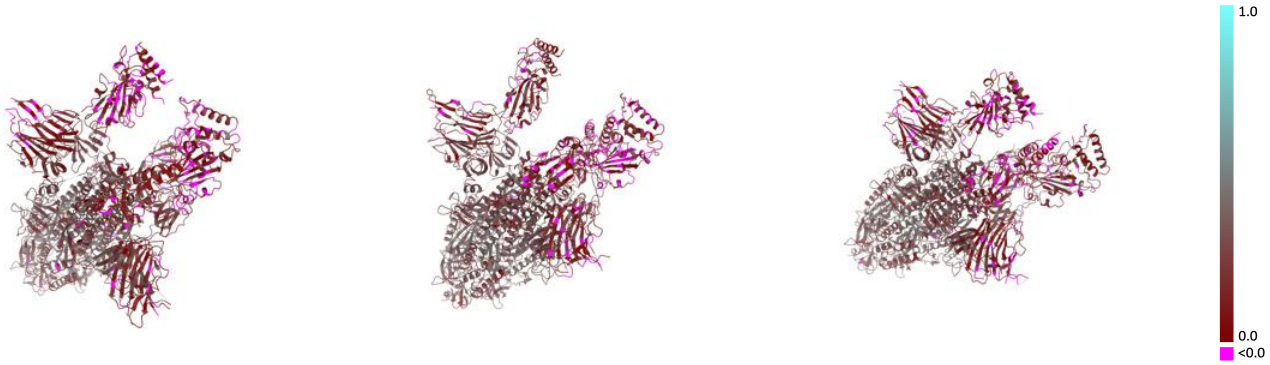
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.013 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

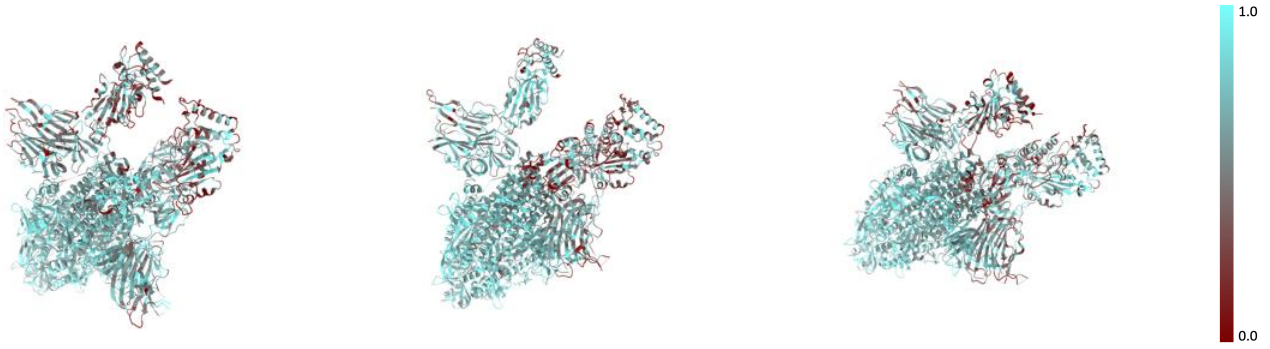
## 9.2 Q-score mapped to coordinate model (i)




X Y Z

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

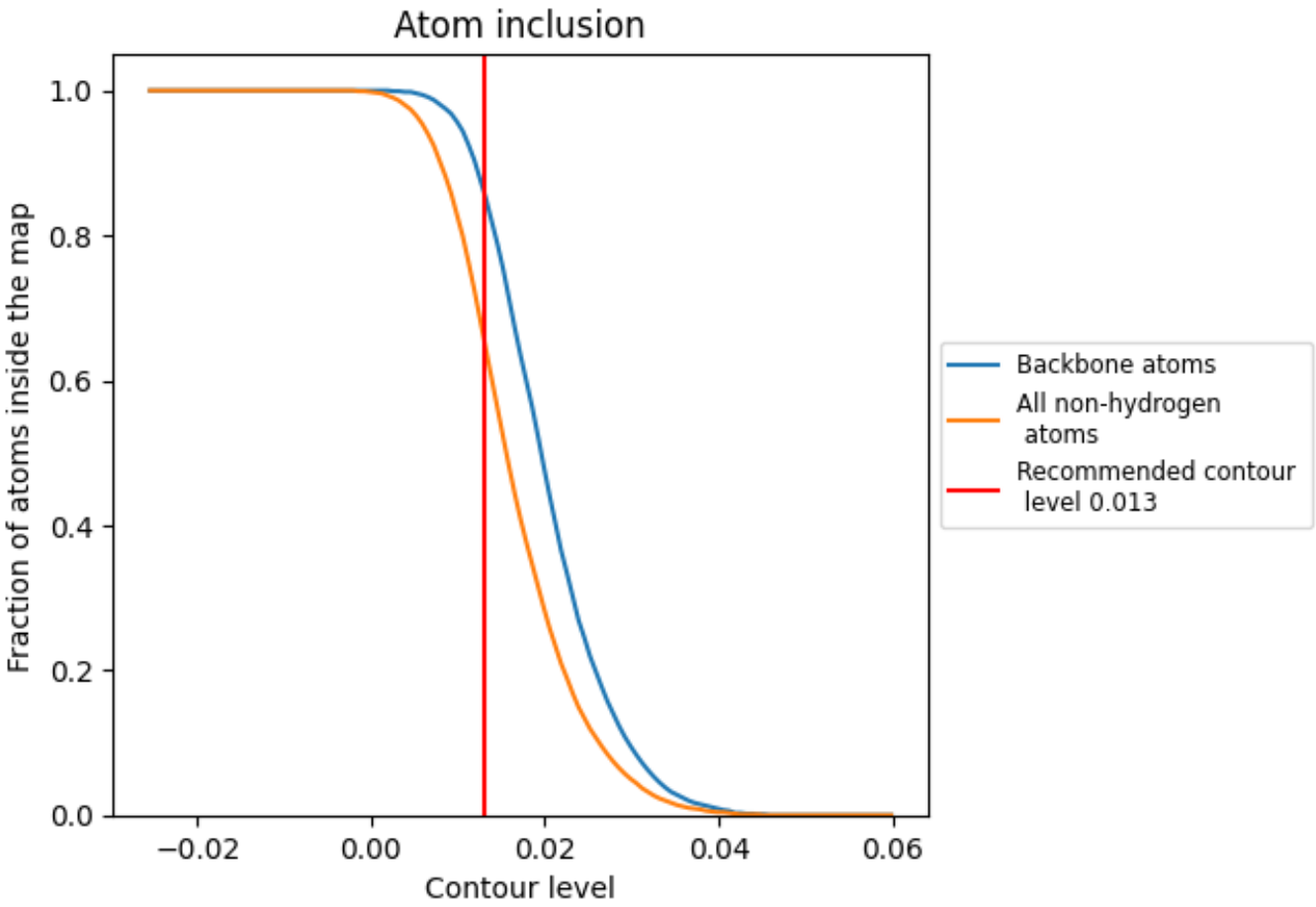
## 9.3 Atom inclusion mapped to coordinate model (i)




X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.013).

## 9.4 Atom inclusion (i)




At the recommended contour level, 86% of all backbone atoms, 66% 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 (0.013) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.6580 | 0.2370 |
| A | 0.6520 | 0.2350 |
| B | 0.6670 | 0.2450 |
| C | 0.6760 | 0.2450 |
| D | 0.4460 | 0.0880 |
| E | 0.4060 | 0.0890 |
| F | 0.5820 | 0.1510 |