# WORLDWIDE wwPDB PROTEIN DATA BANK

# Full wwPDB EM Validation Report ⓘ

Jun 17, 2024 – 12:23 AM JST

| | | |
|---|---|---|
| PDB ID | : | 8YRO |
| EMDB ID | : | EMD-39546 |
| Title | : | SARS-CoV-2 Delta Spike in complex with JL-8C |
| Authors | : | Nguyen, V.H.T.; Chen, X. |
| Deposited on | : | 2024-03-21 |
| Resolution | : | 3.27 Å(reported) |
| Based on initial model | : | 8HHY |

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

| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev92 |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.37.1 |

# 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 3.27 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 | Percentile Ranks | Value |
|---|---|---|
| Clashscore | | 12 |
| Ramachandran outliers | | 0.4% |
| Sidechain outliers | | 0.7% |

*Worse*         *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures
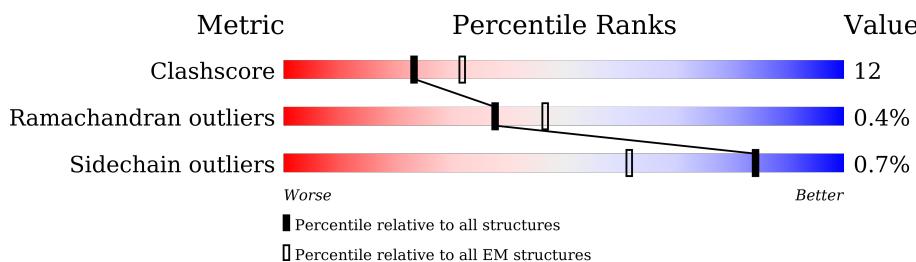
| Metric | Whole archive (#Entries) | EM structures (#Entries) |
|---|---|---|
| Clashscore | 158937 | 4297 |
| Ramachandran outliers | 154571 | 4023 |
| Sidechain outliers | 154315 | 3826 |

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

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 1259 | · 60% 17% · 23% |
| 1 | D | 1259 | · 60% 16% 23% |
| 1 | P | 1259 | · 59% 16% · 24% |
| 2 | B | 121 | 23% 79% 21% |
| 2 | E | 121 | 25% 77% 23% |
| 2 | H | 121 | 21% 73% 25% ·· |
| 3 | C | 110 | 28% 84% 16% |
| 3 | F | 110 | 28% 83% 17% |
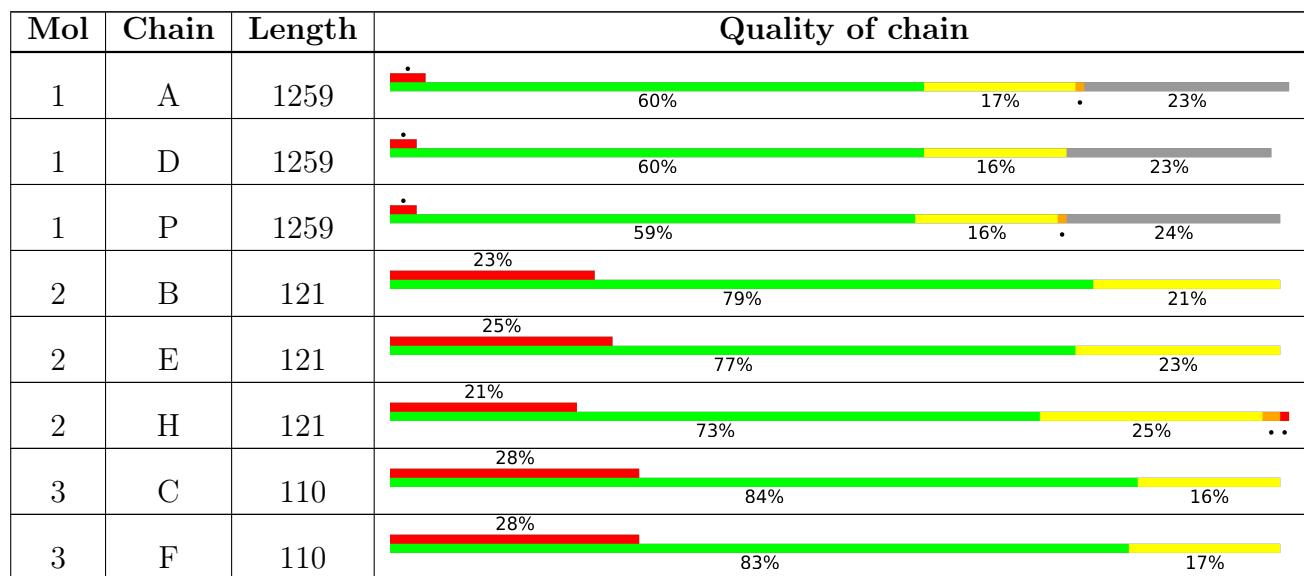
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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 3 | L | 110 | 27% ▬▬▬ 80% ▬▬▬ 20% |

# 2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 27775 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 Spike glycoprotein.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|:---:|:---:|:---:|:---|:---:|:---:|:---:|:---:|:---:|:---:|
| 1 | A | 970 | Total | C | N | O | S | 0 | 0 |
| | | | 7535 | 4808 | 1255 | 1437 | 35 | | |
| 1 | D | 967 | Total | C | N | O | S | 0 | 0 |
| | | | 7547 | 4828 | 1259 | 1426 | 34 | | |
| 1 | P | 959 | Total | C | N | O | S | 0 | 0 |
| | | | 7491 | 4784 | 1248 | 1425 | 34 | | |

There are 243 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|:---:|:---:|:---:|:---:|:---:|:---:|
| A | -5 | MET | - | expression tag | UNP P0DTC2 |
| A | -4 | LYS | - | expression tag | UNP P0DTC2 |
| A | -3 | VAL | - | expression tag | UNP P0DTC2 |
| A | -2 | LYS | - | expression tag | UNP P0DTC2 |
| A | -1 | LEU | - | expression tag | UNP P0DTC2 |
| A | 0 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1 | VAL | - | expression tag | UNP P0DTC2 |
| A | 2 | LEU | - | expression tag | UNP P0DTC2 |
| A | 3 | LEU | - | expression tag | UNP P0DTC2 |
| A | 4 | CYS | - | expression tag | UNP P0DTC2 |
| A | 5 | THR | - | expression tag | UNP P0DTC2 |
| A | 6 | PHE | - | expression tag | UNP P0DTC2 |
| A | 7 | THR | - | expression tag | UNP P0DTC2 |
| A | 8 | ALA | - | expression tag | UNP P0DTC2 |
| A | 9 | THR | - | expression tag | UNP P0DTC2 |
| A | 10 | TYR | - | expression tag | UNP P0DTC2 |
| A | 11 | ALA | - | expression tag | UNP P0DTC2 |
| A | 12 | GLY | - | expression tag | UNP P0DTC2 |
| A | 13 | THR | - | expression tag | UNP P0DTC2 |
| A | 19 | ARG | THR | variant | UNP P0DTC2 |
| A | 142 | ASP | GLY | variant | UNP P0DTC2 |
| A | ? | - | GLU | deletion | UNP P0DTC2 |
| A | ? | - | PHE | deletion | UNP P0DTC2 |
| A | 158 | GLY | ARG | variant | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|:---:|:---:|:---:|:---:|:---:|:---:|
| A | 452 | ARG | LEU | variant | UNP P0DTC2 |
| A | 478 | LYS | THR | variant | UNP P0DTC2 |
| A | 614 | GLY | ASP | variant | UNP P0DTC2 |
| A | 681 | ARG | PRO | variant | UNP P0DTC2 |
| A | 682 | GLY | ARG | variant | UNP P0DTC2 |
| A | 683 | SER | ARG | variant | UNP P0DTC2 |
| A | 685 | GLY | ARG | variant | UNP P0DTC2 |
| A | 950 | ASN | ASP | variant | UNP P0DTC2 |
| A | 986 | PRO | LYS | variant | UNP P0DTC2 |
| A | 987 | PRO | VAL | variant | UNP P0DTC2 |
| A | 1209 | ASP | - | expression tag | UNP P0DTC2 |
| A | 1210 | ILE | - | expression tag | UNP P0DTC2 |
| A | 1211 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1212 | SER | - | expression tag | UNP P0DTC2 |
| A | 1213 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1214 | VAL | - | expression tag | UNP P0DTC2 |
| A | 1215 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1216 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1217 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1218 | SER | - | expression tag | UNP P0DTC2 |
| A | 1219 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1220 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1221 | SER | - | expression tag | UNP P0DTC2 |
| A | 1222 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1223 | TYR | - | expression tag | UNP P0DTC2 |
| A | 1224 | ILE | - | expression tag | UNP P0DTC2 |
| A | 1225 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1226 | GLU | - | expression tag | UNP P0DTC2 |
| A | 1227 | ALA | - | expression tag | UNP P0DTC2 |
| A | 1228 | PRO | - | expression tag | UNP P0DTC2 |
| A | 1229 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1230 | ASP | - | expression tag | UNP P0DTC2 |
| A | 1231 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1232 | GLN | - | expression tag | UNP P0DTC2 |
| A | 1233 | ALA | - | expression tag | UNP P0DTC2 |
| A | 1234 | TYR | - | expression tag | UNP P0DTC2 |
| A | 1235 | VAL | - | expression tag | UNP P0DTC2 |
| A | 1236 | ARG | - | expression tag | UNP P0DTC2 |
| A | 1237 | LYS | - | expression tag | UNP P0DTC2 |
| A | 1238 | ASP | - | expression tag | UNP P0DTC2 |
| A | 1239 | GLY | - | expression tag | UNP P0DTC2 |
| A | 1240 | GLU | - | expression tag | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|:-----:|:-------:|:--------:|:------:|:-------:|:---------:|
| A | 1241 | TRP | - | expression tag | UNP P0DTC2 |
| A | 1242 | VAL | - | expression tag | UNP P0DTC2 |
| A | 1243 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1244 | LEU | - | expression tag | UNP P0DTC2 |
| A | 1245 | SER | - | expression tag | UNP P0DTC2 |
| A | 1246 | THR | - | expression tag | UNP P0DTC2 |
| A | 1247 | PHE | - | expression tag | UNP P0DTC2 |
| A | 1248 | LEU | - | 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 |
| D | -5 | MET | - | expression tag | UNP P0DTC2 |
| D | -4 | LYS | - | expression tag | UNP P0DTC2 |
| D | -3 | VAL | - | expression tag | UNP P0DTC2 |
| D | -2 | LYS | - | expression tag | UNP P0DTC2 |
| D | -1 | LEU | - | expression tag | UNP P0DTC2 |
| D | 0 | LEU | - | expression tag | UNP P0DTC2 |
| D | 1 | VAL | - | expression tag | UNP P0DTC2 |
| D | 2 | LEU | - | expression tag | UNP P0DTC2 |
| D | 3 | LEU | - | expression tag | UNP P0DTC2 |
| D | 4 | CYS | - | expression tag | UNP P0DTC2 |
| D | 5 | THR | - | expression tag | UNP P0DTC2 |
| D | 6 | PHE | - | expression tag | UNP P0DTC2 |
| D | 7 | THR | - | expression tag | UNP P0DTC2 |
| D | 8 | ALA | - | expression tag | UNP P0DTC2 |
| D | 9 | THR | - | expression tag | UNP P0DTC2 |
| D | 10 | TYR | - | expression tag | UNP P0DTC2 |
| D | 11 | ALA | - | expression tag | UNP P0DTC2 |
| D | 12 | GLY | - | expression tag | UNP P0DTC2 |
| D | 13 | THR | - | expression tag | UNP P0DTC2 |
| D | 19 | ARG | THR | variant | UNP P0DTC2 |
| D | 142 | ASP | GLY | variant | UNP P0DTC2 |
| D | ? | - | GLU | deletion | UNP P0DTC2 |
| D | ? | - | PHE | deletion | UNP P0DTC2 |
| D | 158 | GLY | ARG | variant | UNP P0DTC2 |
| D | 452 | ARG | LEU | variant | UNP P0DTC2 |
| D | 478 | LYS | THR | variant | UNP P0DTC2 |
| D | 614 | GLY | ASP | variant | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|:-----:|:-------:|:--------:|:------:|:-------:|:---------:|
| D | 681 | ARG | PRO | variant | UNP P0DTC2 |
| D | 682 | GLY | ARG | variant | UNP P0DTC2 |
| D | 683 | SER | ARG | variant | UNP P0DTC2 |
| D | 685 | GLY | ARG | variant | UNP P0DTC2 |
| D | 950 | ASN | ASP | variant | UNP P0DTC2 |
| D | 986 | PRO | LYS | variant | UNP P0DTC2 |
| D | 987 | PRO | VAL | variant | UNP P0DTC2 |
| D | 1209 | ASP | - | expression tag | UNP P0DTC2 |
| D | 1210 | ILE | - | expression tag | UNP P0DTC2 |
| D | 1211 | ARG | - | expression tag | UNP P0DTC2 |
| D | 1212 | SER | - | expression tag | UNP P0DTC2 |
| D | 1213 | LEU | - | expression tag | UNP P0DTC2 |
| D | 1214 | VAL | - | expression tag | UNP P0DTC2 |
| D | 1215 | PRO | - | expression tag | UNP P0DTC2 |
| D | 1216 | ARG | - | expression tag | UNP P0DTC2 |
| D | 1217 | GLY | - | expression tag | UNP P0DTC2 |
| D | 1218 | SER | - | expression tag | UNP P0DTC2 |
| D | 1219 | PRO | - | expression tag | UNP P0DTC2 |
| D | 1220 | GLY | - | expression tag | UNP P0DTC2 |
| D | 1221 | SER | - | expression tag | UNP P0DTC2 |
| D | 1222 | GLY | - | expression tag | UNP P0DTC2 |
| D | 1223 | TYR | - | expression tag | UNP P0DTC2 |
| D | 1224 | ILE | - | expression tag | UNP P0DTC2 |
| D | 1225 | PRO | - | expression tag | UNP P0DTC2 |
| D | 1226 | GLU | - | expression tag | UNP P0DTC2 |
| D | 1227 | ALA | - | expression tag | UNP P0DTC2 |
| D | 1228 | PRO | - | expression tag | UNP P0DTC2 |
| D | 1229 | ARG | - | expression tag | UNP P0DTC2 |
| D | 1230 | ASP | - | expression tag | UNP P0DTC2 |
| D | 1231 | GLY | - | expression tag | UNP P0DTC2 |
| D | 1232 | GLN | - | expression tag | UNP P0DTC2 |
| D | 1233 | ALA | - | expression tag | UNP P0DTC2 |
| D | 1234 | TYR | - | expression tag | UNP P0DTC2 |
| D | 1235 | VAL | - | expression tag | UNP P0DTC2 |
| D | 1236 | ARG | - | expression tag | UNP P0DTC2 |
| D | 1237 | LYS | - | expression tag | UNP P0DTC2 |
| D | 1238 | ASP | - | expression tag | UNP P0DTC2 |
| D | 1239 | GLY | - | expression tag | UNP P0DTC2 |
| D | 1240 | GLU | - | expression tag | UNP P0DTC2 |
| D | 1241 | TRP | - | expression tag | UNP P0DTC2 |
| D | 1242 | VAL | - | expression tag | UNP P0DTC2 |
| D | 1243 | LEU | - | expression tag | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|:-----:|:-------:|:--------:|:------:|:-------:|:---------:|
| D | 1244 | LEU | - | expression tag | UNP P0DTC2 |
| D | 1245 | SER | - | expression tag | UNP P0DTC2 |
| D | 1246 | THR | - | expression tag | UNP P0DTC2 |
| D | 1247 | PHE | - | expression tag | UNP P0DTC2 |
| D | 1248 | LEU | - | expression tag | UNP P0DTC2 |
| D | 1249 | GLY | - | expression tag | UNP P0DTC2 |
| D | 1250 | HIS | - | expression tag | UNP P0DTC2 |
| D | 1251 | HIS | - | expression tag | UNP P0DTC2 |
| D | 1252 | HIS | - | expression tag | UNP P0DTC2 |
| D | 1253 | HIS | - | expression tag | UNP P0DTC2 |
| D | 1254 | HIS | - | expression tag | UNP P0DTC2 |
| D | 1255 | HIS | - | expression tag | UNP P0DTC2 |
| P | -5 | MET | - | expression tag | UNP P0DTC2 |
| P | -4 | LYS | - | expression tag | UNP P0DTC2 |
| P | -3 | VAL | - | expression tag | UNP P0DTC2 |
| P | -2 | LYS | - | expression tag | UNP P0DTC2 |
| P | -1 | LEU | - | expression tag | UNP P0DTC2 |
| P | 0 | LEU | - | expression tag | UNP P0DTC2 |
| P | 1 | VAL | - | expression tag | UNP P0DTC2 |
| P | 2 | LEU | - | expression tag | UNP P0DTC2 |
| P | 3 | LEU | - | expression tag | UNP P0DTC2 |
| P | 4 | CYS | - | expression tag | UNP P0DTC2 |
| P | 5 | THR | - | expression tag | UNP P0DTC2 |
| P | 6 | PHE | - | expression tag | UNP P0DTC2 |
| P | 7 | THR | - | expression tag | UNP P0DTC2 |
| P | 8 | ALA | - | expression tag | UNP P0DTC2 |
| P | 9 | THR | - | expression tag | UNP P0DTC2 |
| P | 10 | TYR | - | expression tag | UNP P0DTC2 |
| P | 11 | ALA | - | expression tag | UNP P0DTC2 |
| P | 12 | GLY | - | expression tag | UNP P0DTC2 |
| P | 13 | THR | - | expression tag | UNP P0DTC2 |
| P | 19 | ARG | THR | variant | UNP P0DTC2 |
| P | 142 | ASP | GLY | variant | UNP P0DTC2 |
| P | ? | - | GLU | deletion | UNP P0DTC2 |
| P | ? | - | PHE | deletion | UNP P0DTC2 |
| P | 158 | GLY | ARG | variant | UNP P0DTC2 |
| P | 452 | ARG | LEU | variant | UNP P0DTC2 |
| P | 478 | LYS | THR | variant | UNP P0DTC2 |
| P | 614 | GLY | ASP | variant | UNP P0DTC2 |
| P | 681 | ARG | PRO | variant | UNP P0DTC2 |
| P | 682 | GLY | ARG | variant | UNP P0DTC2 |
| P | 683 | SER | ARG | variant | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|:---:|:---:|:---:|:---:|:---:|:---:|
| P | 685 | GLY | ARG | variant | UNP P0DTC2 |
| P | 950 | ASN | ASP | variant | UNP P0DTC2 |
| P | 986 | PRO | LYS | variant | UNP P0DTC2 |
| P | 987 | PRO | VAL | variant | UNP P0DTC2 |
| P | 1209 | ASP | - | expression tag | UNP P0DTC2 |
| P | 1210 | ILE | - | expression tag | UNP P0DTC2 |
| P | 1211 | ARG | - | expression tag | UNP P0DTC2 |
| P | 1212 | SER | - | expression tag | UNP P0DTC2 |
| P | 1213 | LEU | - | expression tag | UNP P0DTC2 |
| P | 1214 | VAL | - | expression tag | UNP P0DTC2 |
| P | 1215 | PRO | - | expression tag | UNP P0DTC2 |
| P | 1216 | ARG | - | expression tag | UNP P0DTC2 |
| P | 1217 | GLY | - | expression tag | UNP P0DTC2 |
| P | 1218 | SER | - | expression tag | UNP P0DTC2 |
| P | 1219 | PRO | - | expression tag | UNP P0DTC2 |
| P | 1220 | GLY | - | expression tag | UNP P0DTC2 |
| P | 1221 | SER | - | expression tag | UNP P0DTC2 |
| P | 1222 | GLY | - | expression tag | UNP P0DTC2 |
| P | 1223 | TYR | - | expression tag | UNP P0DTC2 |
| P | 1224 | ILE | - | expression tag | UNP P0DTC2 |
| P | 1225 | PRO | - | expression tag | UNP P0DTC2 |
| P | 1226 | GLU | - | expression tag | UNP P0DTC2 |
| P | 1227 | ALA | - | expression tag | UNP P0DTC2 |
| P | 1228 | PRO | - | expression tag | UNP P0DTC2 |
| P | 1229 | ARG | - | expression tag | UNP P0DTC2 |
| P | 1230 | ASP | - | expression tag | UNP P0DTC2 |
| P | 1231 | GLY | - | expression tag | UNP P0DTC2 |
| P | 1232 | GLN | - | expression tag | UNP P0DTC2 |
| P | 1233 | ALA | - | expression tag | UNP P0DTC2 |
| P | 1234 | TYR | - | expression tag | UNP P0DTC2 |
| P | 1235 | VAL | - | expression tag | UNP P0DTC2 |
| P | 1236 | ARG | - | expression tag | UNP P0DTC2 |
| P | 1237 | LYS | - | expression tag | UNP P0DTC2 |
| P | 1238 | ASP | - | expression tag | UNP P0DTC2 |
| P | 1239 | GLY | - | expression tag | UNP P0DTC2 |
| P | 1240 | GLU | - | expression tag | UNP P0DTC2 |
| P | 1241 | TRP | - | expression tag | UNP P0DTC2 |
| P | 1242 | VAL | - | expression tag | UNP P0DTC2 |
| P | 1243 | LEU | - | expression tag | UNP P0DTC2 |
| P | 1244 | LEU | - | expression tag | UNP P0DTC2 |
| P | 1245 | SER | - | expression tag | UNP P0DTC2 |
| P | 1246 | THR | - | expression tag | UNP P0DTC2 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| P | 1247 | PHE | - | expression tag | UNP P0DTC2 |
| P | 1248 | LEU | - | expression tag | UNP P0DTC2 |
| P | 1249 | GLY | - | expression tag | UNP P0DTC2 |
| P | 1250 | HIS | - | expression tag | UNP P0DTC2 |
| P | 1251 | HIS | - | expression tag | UNP P0DTC2 |
| P | 1252 | HIS | - | expression tag | UNP P0DTC2 |
| P | 1253 | HIS | - | expression tag | UNP P0DTC2 |
| P | 1254 | HIS | - | expression tag | UNP P0DTC2 |
| P | 1255 | HIS | - | expression tag | UNP P0DTC2 |

- Molecule 2 is a protein called JL-8C Heavy Chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | H | 121 | Total 939 | C 592 | N 160 | O 184 | S 3 | 0 | 0 |
| 2 | B | 121 | Total 939 | C 592 | N 160 | O 184 | S 3 | 0 | 0 |
| 2 | E | 121 | Total 939 | C 592 | N 160 | O 184 | S 3 | 0 | 0 |

- Molecule 3 is a protein called JL-8C Light Chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 3 | L | 110 | Total 795 | C 491 | N 138 | O 164 | S 2 | 0 | 0 |
| 3 | C | 110 | Total 795 | C 491 | N 138 | O 164 | S 2 | 0 | 0 |
| 3 | F | 110 | Total 795 | C 491 | N 138 | O 164 | S 2 | 0 | 0 |

# 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: Spike glycoprotein



Chain A:

• Molecule 1: Spike glycoprotein

Chain D:

60%      16%      23%

• Molecule 1: Spike glycoprotein

Chain P:

59%      16%    •    24%

V1128 V1129 I1130 G1131 I1132 V1133 N1134 N1135 T1136 P1140 LEU GLN PRO GLU LEU ASP SER PHE LYS GLU GLU LEU ASP LYS TYR PHE LYS ASN HIS THR SER PRO ASP VAL ASP LEU GLY 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 ASP ILE ARG SER LEU VAL PRO ARG GLY SER PRO 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

HIS HIS HIS HIS HIS

• Molecule 2: JL-8C Heavy Chain

Chain H:

21%

73%

25%

Q1 V2 Q3 L4 V5 Q6 A9 K13 K14 P15 G16 E17 S18 G27 Y28 S29 H33 W34 I35 G36 W37 V38 G43 K44 I51 I52 Y55 T61 R62 Y63 S64 P65 S66 F67 Q68 G70 L71 S79 S80 L85 S88 S89 L90 Q91 A92 S93 D94 T95 A96

I97 Y98 Y99 C100 A101 R102 R103 Q106 Y107 G108 S109 H110 G111 M112 D113 V114 W115 G116 Q117 T120 V123 S124 S125

• Molecule 2: JL-8C Heavy Chain

Chain B:

23%

79%

21%

Q1 L4 V5 Q6 A9 K14 P15 G16 E17 S18 L19 K20 G27 Y28 S29 H33 G36 P42 G43 K44 I51 I52 Y55 D58 S59 D60 T61 R62 P65 S66 F67 Q68 G70 L71 F74 S79 S80 L85 Q86 W87 S88 S89 L90 Q91 A92 S93 D94

T95 A96 I97 C100 A101 R102 R103 S109 H110 V114 W115 G116 Q117 T120 S124 S125

• Molecule 2: JL-8C Heavy Chain

Chain E:

25%

77%

23%

Q1 V2 Q3 L4 V5 Q6 A9 K13 K14 P15 G16 E17 S18 L19 K20 G27 Y28 S29 H33 W34 I35 K41 P42 G43 K44 V49 Y55 D58 R62 Y63 S64 P65 S66 F67 Q68 G70 L71 S79 S80 L85 Q86 W87 S88 S89 L90 Q91 A92 S93 D94 T95

A96 I97 R102 R103 Y107 G108 S109 H110 D113 Q117 T120 V123 S124 S125

• Molecule 3: JL-8C Light Chain

Chain L:

27%

80%

20%

Q1 S2 P7 P8 S9 A11 S12 G13 T14 P15 G16 Q17 R18 S22 S27 N40 W41 Y42 A47 K51 L52 L53 I54 Y55 R60 S65 D67 R68 F69 S76 G77 T78 I84 S85 G86 L87 Q88 S89 Y95 F96 W100 D101 D102 S103 L104 N105 G106 V107

L108 G111 G112 T113 K114 L115 T116 V117 L118

• Molecule 3: JL-8C Light Chain

Chain C:

28%

84%　　　　　　16%

Q1 S2 P7 P8 S9 A11 S12 G13 T14 P15 G16 Q17 R18 S22 S27 I30 G35 G36 N37 P38 V39 N40 W41 Y42 A47 I54 Y55 N56 F69 S76 I84 S85 G86 L87 Q88 S89 V90 D91 Y95 F96 W100 D101 D102 S103 L104 N105 G106 V107 L108

T113 K114 L115 T116 V117 L118

• Molecule 3: JL-8C Light Chain

Chain F:

28%

83%　　　　　　17%

Q1 S2 P7 P8 S9 A11 S12 G13 T14 P15 G16 Q17 R18 S22 S27 N37 P38 A47 K51 L52 Y55 N56 Q59 G63 F69 S76 I84 S85 G86 L87 Q88 S89 V90 D91 E92 Y95 W100 S103 L104 N105 G106 V107 G111 G112

T113 K114 L115 T116 V117 L118

# 4 Experimental information ⓘ

| Property | Value | Source |
| --- | --- | --- |
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, C3 | Depositor |
| Number of particles used | 125930 | 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 $(e^-/Å^2)$ | 52.434 | Depositor |
| Minimum defocus (nm) | 1500 | Depositor |
| Maximum defocus (nm) | 2000 | Depositor |
| Magnification | 105000 | Depositor |
| Image detector | GATAN K3 BIOQUANTUM (6k x 4k) | Depositor |
| Maximum map value | 4.366 | Depositor |
| Minimum map value | -2.442 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.064 | Depositor |
| Recommended contour level | 0.22 | Depositor |
| Map size (Å) | 424.97278, 424.97278, 424.97278 | wwPDB |
| Map dimensions | 384, 384, 384 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.1067, 1.1067, 1.1067 | Depositor |

# 5 Model quality ⓘ

## 5.1 Standard geometry ⓘ

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

| Mol | Chain | Bond lengths | | Bond angles | |
|-----|-------|------|----------|------|----------|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 1 | A | 0.35 | 0/7696 | 0.62 | 8/10464 (0.1%) |
| 1 | D | 0.36 | 1/7709 (0.0%) | 0.58 | 2/10478 (0.0%) |
| 1 | P | 0.38 | 2/7646 (0.0%) | 0.61 | 6/10388 (0.1%) |
| 2 | B | 0.26 | 0/965 | 0.53 | 0/1308 |
| 2 | E | 0.28 | 0/965 | 0.53 | 0/1308 |
| 2 | H | 0.31 | 0/965 | 0.50 | 0/1308 |
| 3 | C | 0.27 | 0/811 | 0.60 | 0/1104 |
| 3 | F | 0.29 | 0/811 | 0.59 | 0/1104 |
| 3 | L | 0.28 | 0/811 | 0.59 | 0/1104 |
| All | All | 0.35 | 3/28379 (0.0%) | 0.59 | 16/38566 (0.0%) |

All (3) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|-----|-------------|----------|
| 1 | P | 1126 | CYS | CB-SG | -5.62 | 1.72 | 1.81 |
| 1 | P | 590 | CYS | CB-SG | -5.40 | 1.73 | 1.81 |
| 1 | D | 590 | CYS | CB-SG | -5.18 | 1.73 | 1.81 |

All (16) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|-----|----------------|-------------|
| 1 | P | 802 | PHE | N-CA-CB | 7.55 | 124.20 | 110.60 |
| 1 | P | 1082 | CYS | CA-CB-SG | -6.65 | 102.04 | 114.00 |
| 1 | A | 166 | CYS | CA-CB-SG | 6.06 | 124.90 | 114.00 |
| 1 | P | 805 | ILE | CA-C-O | -6.01 | 107.48 | 120.10 |
| 1 | D | 712 | ILE | CG1-CB-CG2 | -5.99 | 98.21 | 111.40 |
| 1 | P | 800 | PHE | C-N-CA | -5.95 | 106.84 | 121.70 |
| 1 | D | 1114 | ILE | CG1-CB-CG2 | -5.76 | 98.72 | 111.40 |
| 1 | A | 1126 | CYS | CA-CB-SG | 5.75 | 124.35 | 114.00 |
| 1 | A | 712 | ILE | CG1-CB-CG2 | -5.70 | 98.86 | 111.40 |
| 1 | A | 1082 | CYS | CA-CB-SG | 5.67 | 124.20 | 114.00 |
| 1 | A | 54 | LEU | CA-CB-CG | 5.51 | 127.97 | 115.30 |
| 1 | P | 805 | ILE | CA-C-N | 5.33 | 128.92 | 117.20 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | A | 617 | CYS | CA-CB-SG | 5.16 | 123.28 | 114.00 |
| 1 | A | 402 | ILE | CG1-CB-CG2 | -5.12 | 100.14 | 111.40 |
| 1 | P | 699 | LEU | CA-CB-CG | 5.12 | 127.07 | 115.30 |
| 1 | A | 131 | CYS | CA-CB-SG | 5.03 | 123.06 | 114.00 |

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 | A | 7535 | 0 | 7335 | 239 | 0 |
| 1 | D | 7547 | 0 | 7386 | 183 | 0 |
| 1 | P | 7491 | 0 | 7318 | 191 | 0 |
| 2 | B | 939 | 0 | 894 | 23 | 0 |
| 2 | E | 939 | 0 | 894 | 21 | 0 |
| 2 | H | 939 | 0 | 894 | 35 | 0 |
| 3 | C | 795 | 0 | 768 | 11 | 0 |
| 3 | F | 795 | 0 | 768 | 15 | 0 |
| 3 | L | 795 | 0 | 768 | 19 | 0 |
| All | All | 27775 | 0 | 27025 | 675 | 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 12.

All (675) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:526:GLY:HA2 | 1:D:529:LYS:CE | 1.32 | 1.55 |
| 1:D:526:GLY:CA | 1:D:529:LYS:HE3 | 1.41 | 1.45 |
| 1:A:878:LEU:HD12 | 1:A:879:ALA:N | 1.13 | 1.45 |
| 1:A:878:LEU:CD1 | 1:A:879:ALA:H | 1.34 | 1.40 |
| 1:A:327:VAL:HB | 1:A:529:LYS:CE | 1.51 | 1.40 |
| 1:A:327:VAL:CB | 1:A:529:LYS:HE2 | 1.50 | 1.38 |
| 1:A:1104:VAL:CG2 | 1:A:1115:ILE:HD13 | 1.54 | 1.38 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:363:ALA:O | 1:A:527:PRO:CG | 1.72 | 1.37 |
| 1:D:212:LEU:HD22 | 1:D:215:ASP:O | 1.31 | 1.30 |
| 1:A:805:ILE:HG12 | 1:A:818:ILE:CD1 | 1.67 | 1.23 |
| 1:D:363:ALA:N | 1:D:527:PRO:HG3 | 1.53 | 1.21 |
| 1:A:363:ALA:O | 1:A:527:PRO:HG3 | 1.21 | 1.21 |
| 2:H:110:HIS:O | 2:H:111:GLY:O | 1.54 | 1.20 |
| 1:A:363:ALA:O | 1:A:527:PRO:CD | 1.93 | 1.16 |
| 1:P:805:ILE:HG21 | 1:P:1054:GLN:NE2 | 1.62 | 1.14 |
| 1:P:391:CYS:SG | 1:P:524:VAL:O | 2.06 | 1.12 |
| 1:P:800:PHE:C | 1:P:802:PHE:H | 1.46 | 1.11 |
| 2:H:109:SER:OG | 3:L:55:TYR:HD1 | 1.35 | 1.10 |
| 2:B:97:ILE:HB | 2:B:120:THR:HG22 | 1.32 | 1.10 |
| 1:A:1073:LYS:HG2 | 1:A:1074:ASN:H | 1.10 | 1.10 |
| 1:A:805:ILE:HG12 | 1:A:818:ILE:HD12 | 1.19 | 1.09 |
| 1:A:363:ALA:HB3 | 1:A:527:PRO:HD2 | 1.11 | 1.08 |
| 1:D:363:ALA:H | 1:D:527:PRO:HG3 | 1.02 | 1.08 |
| 1:A:363:ALA:HB3 | 1:A:527:PRO:CD | 1.84 | 1.06 |
| 2:B:97:ILE:HD13 | 2:B:120:THR:HG23 | 1.37 | 1.06 |
| 1:P:803:SER:OG | 1:P:935:GLN:NE2 | 1.89 | 1.06 |
| 1:D:363:ALA:H | 1:D:527:PRO:CG | 1.69 | 1.05 |
| 1:P:805:ILE:O | 1:P:816:SER:OG | 1.72 | 1.05 |
| 1:D:212:LEU:CD2 | 1:D:215:ASP:O | 2.04 | 1.05 |
| 1:P:662:CYS:HB2 | 1:P:697:MET:SD | 1.97 | 1.05 |
| 2:H:109:SER:OG | 3:L:55:TYR:CD1 | 2.09 | 1.04 |
| 1:A:712:ILE:CG2 | 1:A:1077:THR:CG2 | 2.36 | 1.02 |
| 1:A:712:ILE:HG13 | 1:A:1075:PHE:HB2 | 1.41 | 1.02 |
| 1:A:1104:VAL:HG23 | 1:A:1115:ILE:CD1 | 1.89 | 1.02 |
| 1:A:363:ALA:O | 1:A:527:PRO:HD3 | 1.57 | 1.01 |
| 1:P:799:GLY:HA2 | 1:P:928:ASN:OD1 | 1.59 | 1.01 |
| 1:A:712:ILE:CG2 | 1:A:1077:THR:HG21 | 1.92 | 1.00 |
| 1:A:878:LEU:CD1 | 1:A:879:ALA:N | 2.03 | 1.00 |
| 1:P:1115:ILE:HG21 | 1:P:1136:THR:OG1 | 1.62 | 0.99 |
| 1:P:803:SER:CB | 1:P:935:GLN:HE21 | 1.76 | 0.99 |
| 2:H:110:HIS:CD2 | 3:L:40:ASN:HD21 | 1.80 | 0.98 |
| 1:P:800:PHE:C | 1:P:802:PHE:N | 2.09 | 0.98 |
| 1:A:712:ILE:HG23 | 1:A:1077:THR:HG22 | 1.44 | 0.98 |
| 1:A:710:ASN:HA | 1:A:1077:THR:O | 1.64 | 0.96 |
| 1:D:985:ASP:C | 1:D:987:PRO:HD2 | 1.83 | 0.96 |
| 1:P:800:PHE:HZ | 1:P:898:PHE:CD1 | 1.83 | 0.95 |
| 1:A:712:ILE:HG23 | 1:A:1077:THR:CG2 | 1.94 | 0.94 |
| 1:A:712:ILE:HD11 | 1:A:1096:VAL:HB | 1.48 | 0.94 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:1104:VAL:HG23 | 1:A:1115:ILE:HD13 | 0.95 | 0.94 |
| 3:F:92:GLU:OE2 | 3:F:116:THR:HA | 1.67 | 0.93 |
| 1:D:526:GLY:HA2 | 1:D:529:LYS:NZ | 1.82 | 0.93 |
| 1:A:327:VAL:HG11 | 1:A:529:LYS:HG3 | 1.52 | 0.91 |
| 1:A:885:GLY:O | 1:A:888:PHE:CD1 | 2.23 | 0.91 |
| 1:P:800:PHE:O | 1:P:802:PHE:N | 2.04 | 0.91 |
| 1:A:878:LEU:HD12 | 1:A:879:ALA:CA | 2.00 | 0.90 |
| 1:A:363:ALA:CB | 1:A:527:PRO:HD2 | 2.00 | 0.90 |
| 1:D:526:GLY:H | 1:D:527:PRO:HD2 | 1.34 | 0.90 |
| 2:H:106:GLN:O | 2:H:108:GLY:N | 2.04 | 0.90 |
| 1:A:1104:VAL:CG2 | 1:A:1115:ILE:CD1 | 2.47 | 0.90 |
| 1:A:1073:LYS:HG2 | 1:A:1074:ASN:N | 1.86 | 0.89 |
| 1:P:799:GLY:O | 1:P:801:ASN:N | 2.04 | 0.89 |
| 1:D:591:SER:HB3 | 1:D:615:VAL:HG12 | 1.54 | 0.89 |
| 1:P:318:PHE:CD1 | 1:P:595:VAL:HG23 | 2.07 | 0.88 |
| 1:A:917:TYR:CB | 1:P:1129:VAL:CG2 | 2.51 | 0.88 |
| 1:A:331:ASN:O | 1:A:333:THR:HG23 | 1.73 | 0.88 |
| 1:A:805:ILE:CG1 | 1:A:818:ILE:CD1 | 2.52 | 0.87 |
| 1:P:805:ILE:O | 1:P:806:LEU:C | 2.12 | 0.86 |
| 1:D:986:PRO:N | 1:D:987:PRO:HD2 | 1.91 | 0.86 |
| 2:B:97:ILE:HB | 2:B:120:THR:CG2 | 2.05 | 0.85 |
| 1:A:331:ASN:O | 1:A:333:THR:N | 2.09 | 0.85 |
| 1:D:712:ILE:HD11 | 1:P:900:MET:SD | 2.17 | 0.85 |
| 1:P:804:GLN:O | 1:P:818:ILE:HG12 | 1.77 | 0.85 |
| 1:P:803:SER:CB | 1:P:935:GLN:NE2 | 2.38 | 0.85 |
| 2:B:97:ILE:CD1 | 2:B:120:THR:HG23 | 2.06 | 0.84 |
| 1:P:805:ILE:O | 1:P:806:LEU:O | 1.95 | 0.83 |
| 1:P:805:ILE:HG21 | 1:P:1054:GLN:HE22 | 1.41 | 0.83 |
| 1:A:712:ILE:CG2 | 1:A:1077:THR:HG22 | 2.07 | 0.83 |
| 1:A:64:TRP:CD1 | 1:A:266:TYR:HE1 | 1.97 | 0.83 |
| 1:A:917:TYR:CB | 1:P:1129:VAL:HG23 | 2.08 | 0.83 |
| 1:A:805:ILE:CG1 | 1:A:818:ILE:HD12 | 2.07 | 0.82 |
| 1:P:363:ALA:H | 1:P:526:GLY:HA2 | 1.42 | 0.82 |
| 1:D:712:ILE:HG12 | 1:P:897:PRO:HD3 | 1.60 | 0.82 |
| 1:P:803:SER:HG | 1:P:935:GLN:HE21 | 1.27 | 0.82 |
| 1:P:318:PHE:HD1 | 1:P:595:VAL:HG23 | 1.43 | 0.82 |
| 1:P:1120:THR:HG22 | 1:P:1122:VAL:HG23 | 1.62 | 0.82 |
| 1:A:885:GLY:O | 1:A:888:PHE:HD1 | 1.61 | 0.81 |
| 1:A:1104:VAL:HG11 | 1:A:1119:ASN:HD21 | 1.44 | 0.81 |
| 1:D:712:ILE:HG12 | 1:P:896:ILE:HD12 | 1.62 | 0.81 |
| 1:D:391:CYS:SG | 1:D:525:CYS:HB3 | 2.21 | 0.80 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:526:GLY:H | 1:D:527:PRO:CD | 1.92 | 0.80 |
| 1:A:985:ASP:C | 1:A:987:PRO:HD2 | 2.00 | 0.80 |
| 1:D:712:ILE:HG22 | 1:D:713:ALA:N | 1.94 | 0.80 |
| 2:B:97:ILE:CB | 2:B:120:THR:HG22 | 2.09 | 0.80 |
| 1:D:526:GLY:C | 1:D:529:LYS:HE3 | 2.03 | 0.79 |
| 1:D:591:SER:HB3 | 1:D:615:VAL:CG1 | 2.11 | 0.79 |
| 1:A:1073:LYS:CG | 1:A:1074:ASN:H | 1.94 | 0.79 |
| 1:A:1104:VAL:HG22 | 1:A:1115:ILE:HD13 | 1.62 | 0.79 |
| 1:P:805:ILE:CG2 | 1:P:1054:GLN:HE22 | 1.95 | 0.79 |
| 1:A:805:ILE:HG12 | 1:A:818:ILE:HD11 | 1.63 | 0.79 |
| 1:D:526:GLY:N | 1:D:527:PRO:CD | 2.45 | 0.79 |
| 1:P:805:ILE:CG2 | 1:P:1054:GLN:NE2 | 2.45 | 0.79 |
| 1:D:212:LEU:HD21 | 1:D:215:ASP:H | 1.48 | 0.78 |
| 1:P:800:PHE:O | 1:P:801:ASN:C | 2.21 | 0.78 |
| 1:A:985:ASP:HB2 | 1:A:987:PRO:HD2 | 1.66 | 0.77 |
| 1:D:212:LEU:CD2 | 1:D:215:ASP:H | 1.97 | 0.77 |
| 1:A:231:ILE:HG22 | 1:A:233:ILE:HG23 | 1.66 | 0.77 |
| 1:A:901:GLN:HE21 | 1:A:905:ARG:HE | 1.32 | 0.77 |
| 1:D:712:ILE:CD1 | 1:P:896:ILE:HD12 | 2.16 | 0.76 |
| 1:A:878:LEU:CG | 1:A:879:ALA:H | 1.98 | 0.76 |
| 1:P:799:GLY:CA | 1:P:928:ASN:OD1 | 2.33 | 0.76 |
| 1:A:363:ALA:CB | 1:A:527:PRO:CD | 2.62 | 0.75 |
| 1:A:363:ALA:C | 1:A:527:PRO:HD3 | 2.06 | 0.74 |
| 1:P:799:GLY:O | 1:P:801:ASN:ND2 | 2.18 | 0.74 |
| 1:A:805:ILE:CD1 | 1:A:818:ILE:HD11 | 2.17 | 0.74 |
| 1:P:804:GLN:O | 1:P:805:ILE:HG13 | 1.87 | 0.74 |
| 1:A:986:PRO:N | 1:A:987:PRO:CD | 2.51 | 0.74 |
| 1:A:710:ASN:O | 1:A:710:ASN:OD1 | 2.06 | 0.73 |
| 1:A:388:ASN:O | 1:A:527:PRO:HG2 | 1.87 | 0.73 |
| 1:A:918:GLU:CG | 1:P:1128:VAL:HG11 | 2.19 | 0.72 |
| 1:A:712:ILE:HG21 | 1:A:1077:THR:HG21 | 1.71 | 0.72 |
| 1:A:64:TRP:CD1 | 1:A:266:TYR:CE1 | 2.77 | 0.72 |
| 1:P:363:ALA:N | 1:P:526:GLY:HA2 | 2.04 | 0.72 |
| 1:A:887:THR:OG1 | 1:A:896:ILE:HD11 | 1.90 | 0.72 |
| 1:A:985:ASP:CB | 1:A:987:PRO:HD2 | 2.18 | 0.72 |
| 1:A:327:VAL:CG2 | 1:A:529:LYS:HE2 | 2.19 | 0.71 |
| 1:A:805:ILE:CG1 | 1:A:818:ILE:HD11 | 2.18 | 0.71 |
| 2:B:97:ILE:HD13 | 2:B:120:THR:CG2 | 2.18 | 0.71 |
| 1:A:361:CYS:HB2 | 1:A:524:VAL:HG13 | 1.72 | 0.71 |
| 1:D:526:GLY:CA | 1:D:529:LYS:CE | 2.24 | 0.71 |
| 1:A:327:VAL:CG1 | 1:A:529:LYS:HG3 | 2.20 | 0.70 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:712:ILE:CG1 | 1:P:896:ILE:HD12 | 2.20 | 0.70 |
| 1:D:985:ASP:OD1 | 1:D:987:PRO:HG2 | 1.91 | 0.70 |
| 1:D:1128:VAL:HG12 | 1:P:918:GLU:O | 1.91 | 0.70 |
| 1:A:985:ASP:HB2 | 1:A:987:PRO:CD | 2.21 | 0.70 |
| 1:D:362:VAL:HB | 1:D:527:PRO:HB3 | 1.74 | 0.70 |
| 1:P:803:SER:HB3 | 1:P:935:GLN:NE2 | 2.06 | 0.70 |
| 1:A:878:LEU:HD12 | 1:A:879:ALA:CB | 2.21 | 0.70 |
| 1:A:885:GLY:O | 1:A:888:PHE:CE1 | 2.45 | 0.69 |
| 1:A:986:PRO:HD2 | 1:A:987:PRO:HD3 | 1.73 | 0.69 |
| 1:D:712:ILE:HD13 | 1:P:896:ILE:CD1 | 2.22 | 0.69 |
| 1:A:712:ILE:HD13 | 1:A:1096:VAL:HG12 | 1.75 | 0.69 |
| 1:A:1073:LYS:HD3 | 1:A:1075:PHE:CZ | 2.28 | 0.69 |
| 1:P:363:ALA:H | 1:P:526:GLY:CA | 2.05 | 0.69 |
| 1:P:1115:ILE:HG21 | 1:P:1136:THR:HG1 | 1.56 | 0.69 |
| 2:H:109:SER:CB | 3:L:55:TYR:CD1 | 2.76 | 0.69 |
| 1:D:712:ILE:HD13 | 1:D:1094:VAL:HG11 | 1.74 | 0.68 |
| 1:A:918:GLU:HG3 | 1:P:1128:VAL:CG1 | 2.22 | 0.68 |
| 1:A:327:VAL:HG11 | 1:A:529:LYS:CG | 2.23 | 0.68 |
| 1:P:391:CYS:HG | 1:P:524:VAL:C | 1.92 | 0.68 |
| 1:P:318:PHE:CD1 | 1:P:595:VAL:CG2 | 2.76 | 0.68 |
| 1:A:360:ASN:H | 1:A:523:THR:HB | 1.58 | 0.67 |
| 1:P:1120:THR:CG2 | 1:P:1122:VAL:HG23 | 2.24 | 0.67 |
| 1:P:524:VAL:O | 1:P:524:VAL:HG23 | 1.93 | 0.67 |
| 1:D:712:ILE:HG22 | 1:D:713:ALA:H | 1.56 | 0.67 |
| 1:A:918:GLU:HG2 | 1:P:1128:VAL:HG11 | 1.76 | 0.67 |
| 1:A:363:ALA:C | 1:A:527:PRO:HG3 | 2.13 | 0.67 |
| 1:D:363:ALA:N | 1:D:527:PRO:CG | 2.39 | 0.67 |
| 1:D:909:ILE:HD12 | 1:D:1047:TYR:HB3 | 1.76 | 0.67 |
| 1:P:130:VAL:HB | 1:P:168:PHE:HB3 | 1.76 | 0.66 |
| 1:A:363:ALA:C | 1:A:527:PRO:CD | 2.64 | 0.66 |
| 1:P:800:PHE:HZ | 1:P:898:PHE:CE1 | 2.13 | 0.66 |
| 1:D:426:PRO:HG2 | 1:D:429:PHE:HB2 | 1.77 | 0.65 |
| 1:D:1077:THR:HG21 | 1:P:897:PRO:HG2 | 1.78 | 0.65 |
| 1:A:712:ILE:HD11 | 1:A:1096:VAL:CB | 2.23 | 0.65 |
| 1:D:712:ILE:CD1 | 1:P:896:ILE:CD1 | 2.74 | 0.65 |
| 1:A:333:THR:OG1 | 1:A:334:ASN:N | 2.28 | 0.65 |
| 1:A:426:PRO:HG2 | 1:A:429:PHE:HB2 | 1.78 | 0.65 |
| 1:D:126:VAL:HB | 1:D:172:SER:HB2 | 1.78 | 0.65 |
| 1:A:712:ILE:HD12 | 1:A:1075:PHE:CD2 | 2.31 | 0.65 |
| 1:P:805:ILE:HA | 1:P:816:SER:HB3 | 1.78 | 0.65 |
| 1:D:526:GLY:HA2 | 1:D:529:LYS:HE3 | 0.66 | 0.64 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:F:56:ASN:HB3 | 3:F:59:GLN:HG2 | 1.80 | 0.64 |
| 1:D:1128:VAL:HG12 | 1:D:1128:VAL:O | 1.97 | 0.64 |
| 1:P:801:ASN:H | 1:P:801:ASN:HD22 | 1.44 | 0.63 |
| 1:D:902:MET:HG2 | 1:D:916:LEU:HD13 | 1.81 | 0.63 |
| 1:A:805:ILE:HD11 | 1:A:818:ILE:HD11 | 1.79 | 0.62 |
| 2:H:110:HIS:NE2 | 3:L:40:ASN:ND2 | 2.46 | 0.62 |
| 1:A:1028:LYS:NZ | 1:A:1042:PHE:O | 2.33 | 0.62 |
| 1:P:1006:THR:O | 1:P:1010:GLN:NE2 | 2.33 | 0.62 |
| 1:P:128:ILE:HB | 1:P:170:TYR:HB3 | 1.82 | 0.62 |
| 1:A:334:ASN:ND2 | 1:A:360:ASN:O | 2.33 | 0.62 |
| 1:A:905:ARG:O | 1:A:1036:GLN:NE2 | 2.33 | 0.62 |
| 1:P:130:VAL:HG12 | 1:P:130:VAL:O | 2.00 | 0.62 |
| 1:P:714:ILE:HD11 | 1:P:1096:VAL:HG11 | 1.82 | 0.62 |
| 1:P:800:PHE:CZ | 1:P:898:PHE:CE1 | 2.88 | 0.62 |
| 1:P:800:PHE:CZ | 1:P:898:PHE:CD1 | 2.76 | 0.61 |
| 1:P:915:VAL:O | 1:P:915:VAL:HG12 | 2.01 | 0.61 |
| 1:D:106:PHE:HB3 | 1:D:235:ILE:HD11 | 1.83 | 0.61 |
| 1:A:986:PRO:CD | 1:A:987:PRO:HD3 | 2.30 | 0.61 |
| 1:D:100:ILE:HG22 | 1:D:242:LEU:HB2 | 1.81 | 0.61 |
| 2:H:110:HIS:C | 2:H:111:GLY:O | 2.36 | 0.61 |
| 1:A:878:LEU:HA | 1:A:1053:PRO:HD2 | 1.82 | 0.61 |
| 1:D:526:GLY:O | 1:D:529:LYS:CD | 2.49 | 0.61 |
| 1:P:742:ILE:O | 1:P:1000:ARG:NH1 | 2.32 | 0.61 |
| 1:P:213:VAL:HG12 | 1:P:213:VAL:O | 2.01 | 0.60 |
| 1:D:1028:LYS:NZ | 1:D:1042:PHE:O | 2.34 | 0.60 |
| 1:P:715:PRO:HG3 | 1:P:1072:GLU:HG3 | 1.84 | 0.60 |
| 1:A:712:ILE:CD1 | 1:A:1096:VAL:HG12 | 2.32 | 0.60 |
| 2:H:106:GLN:O | 2:H:107:TYR:C | 2.39 | 0.60 |
| 1:D:905:ARG:O | 1:D:1036:GLN:NE2 | 2.31 | 0.60 |
| 1:A:874:THR:HA | 1:A:877:LEU:HB2 | 1.83 | 0.60 |
| 1:D:363:ALA:H | 1:D:527:PRO:CD | 2.15 | 0.59 |
| 1:D:526:GLY:O | 1:D:529:LYS:HD2 | 2.02 | 0.59 |
| 1:P:426:PRO:HB3 | 1:P:463:PRO:HB3 | 1.82 | 0.59 |
| 1:P:662:CYS:CB | 1:P:697:MET:SD | 2.84 | 0.59 |
| 1:A:811:LYS:HD3 | 1:A:813:SER:H | 1.68 | 0.59 |
| 1:P:641:ASN:HB3 | 1:P:652:GLY:H | 1.68 | 0.59 |
| 1:D:896:ILE:CG2 | 1:D:901:GLN:HB3 | 2.33 | 0.59 |
| 1:P:595:VAL:HG22 | 1:P:612:TYR:CD2 | 2.38 | 0.59 |
| 1:P:802:PHE:HB2 | 1:P:806:LEU:HG | 1.84 | 0.59 |
| 1:A:426:PRO:HB3 | 1:A:463:PRO:HB3 | 1.85 | 0.59 |
| 1:P:802:PHE:CB | 1:P:806:LEU:HG | 2.32 | 0.59 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:474:GLN:OE1 | 2:H:107:TYR:HE1 | 1.86 | 0.59 |
| 1:P:805:ILE:C | 1:P:806:LEU:O | 2.41 | 0.58 |
| 1:D:986:PRO:N | 1:D:987:PRO:CD | 2.65 | 0.58 |
| 1:A:363:ALA:HB3 | 1:A:527:PRO:CG | 2.33 | 0.58 |
| 2:B:97:ILE:CD1 | 2:B:120:THR:CG2 | 2.80 | 0.58 |
| 1:A:896:ILE:HG23 | 1:P:712:ILE:CD1 | 2.33 | 0.58 |
| 1:D:1087:ALA:HB2 | 1:D:1126:CYS:HB3 | 1.86 | 0.58 |
| 2:H:110:HIS:CD2 | 3:L:40:ASN:ND2 | 2.63 | 0.58 |
| 1:D:1115:ILE:HG23 | 1:D:1120:THR:HG21 | 1.85 | 0.58 |
| 1:P:803:SER:HB3 | 1:P:935:GLN:HE21 | 1.59 | 0.58 |
| 1:P:1028:LYS:NZ | 1:P:1042:PHE:O | 2.36 | 0.58 |
| 1:A:916:LEU:HA | 1:A:920:GLN:HE21 | 1.69 | 0.58 |
| 1:D:212:LEU:HD23 | 1:D:214:ARG:H | 1.67 | 0.58 |
| 1:A:537:LYS:N | 1:A:551:VAL:HG23 | 2.19 | 0.58 |
| 1:P:874:THR:HA | 1:P:877:LEU:HB2 | 1.86 | 0.57 |
| 2:H:97:ILE:HG13 | 2:H:120:THR:HB | 1.85 | 0.57 |
| 1:P:795:LYS:H | 1:P:795:LYS:HD2 | 1.69 | 0.57 |
| 3:F:92:GLU:CD | 3:F:116:THR:HA | 2.25 | 0.57 |
| 1:D:83:VAL:HG21 | 1:D:237:ARG:HH21 | 1.69 | 0.57 |
| 1:D:712:ILE:CG1 | 1:P:897:PRO:HD3 | 2.32 | 0.57 |
| 1:A:914:ASN:ND2 | 1:P:1123:SER:O | 2.37 | 0.57 |
| 1:D:896:ILE:HG21 | 1:D:901:GLN:HB3 | 1.85 | 0.57 |
| 1:P:326:ILE:HD11 | 1:P:534:VAL:HG12 | 1.86 | 0.57 |
| 1:P:555:SER:HB2 | 1:P:586:ASP:HB2 | 1.85 | 0.57 |
| 1:A:1104:VAL:HG23 | 1:A:1115:ILE:HA | 1.87 | 0.57 |
| 1:D:331:ASN:OD1 | 1:D:334:ASN:ND2 | 2.35 | 0.57 |
| 1:A:363:ALA:CA | 1:A:527:PRO:CD | 2.83 | 0.57 |
| 1:A:563:GLN:O | 1:A:577:ARG:NH1 | 2.38 | 0.57 |
| 1:A:716:THR:HA | 1:A:1110:TYR:CD2 | 2.40 | 0.57 |
| 1:D:712:ILE:HD13 | 1:D:1094:VAL:CG1 | 2.35 | 0.56 |
| 1:A:141:LEU:HB2 | 1:A:243:ALA:HA | 1.87 | 0.56 |
| 1:A:918:GLU:CG | 1:P:1128:VAL:CG1 | 2.83 | 0.56 |
| 1:A:805:ILE:CD1 | 1:A:818:ILE:CD1 | 2.83 | 0.56 |
| 1:A:1006:THR:O | 1:A:1010:GLN:NE2 | 2.38 | 0.56 |
| 1:A:1104:VAL:CG2 | 1:A:1115:ILE:HA | 2.36 | 0.56 |
| 1:A:537:LYS:H | 1:A:551:VAL:HG23 | 1.70 | 0.56 |
| 2:B:58:ASP:OD1 | 2:B:60:ASP:HB2 | 2.04 | 0.56 |
| 1:D:426:PRO:HB3 | 1:D:463:PRO:HB3 | 1.87 | 0.56 |
| 1:A:529:LYS:CA | 1:A:529:LYS:HE3 | 2.35 | 0.56 |
| 2:E:97:ILE:HG13 | 2:E:120:THR:HB | 1.88 | 0.56 |
| 1:A:435:ALA:HB2 | 1:A:510:VAL:HG23 | 1.88 | 0.56 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:P:718:PHE:O | 1:P:926:GLN:NE2 | 2.39 | 0.56 |
| 1:D:716:THR:CG2 | 1:D:1073:LYS:HE2 | 2.36 | 0.56 |
| 1:P:398:ASP:HB2 | 1:P:512:VAL:HB | 1.87 | 0.56 |
| 1:P:718:PHE:HA | 1:P:1069:PRO:HA | 1.88 | 0.56 |
| 2:E:110:HIS:HE1 | 3:F:38:PRO:HD2 | 1.70 | 0.56 |
| 1:A:1090:PRO:HG2 | 1:D:904:TYR:HE1 | 1.69 | 0.55 |
| 1:D:435:ALA:HB2 | 1:D:510:VAL:HG23 | 1.87 | 0.55 |
| 1:D:566:GLY:HA2 | 1:P:43:PHE:HB3 | 1.88 | 0.55 |
| 1:P:666:ILE:HD11 | 1:P:672:ALA:HB2 | 1.88 | 0.55 |
| 1:D:598:ILE:HB | 1:D:609:ALA:HB3 | 1.88 | 0.55 |
| 1:A:878:LEU:CD1 | 1:A:879:ALA:CB | 2.84 | 0.55 |
| 1:A:327:VAL:HG22 | 1:A:542:ASN:HB3 | 1.87 | 0.55 |
| 1:A:712:ILE:CD1 | 1:A:1075:PHE:CD2 | 2.89 | 0.55 |
| 1:A:874:THR:O | 1:A:878:LEU:HG | 2.07 | 0.55 |
| 2:H:6:GLN:O | 2:H:117:GLN:NE2 | 2.40 | 0.55 |
| 2:H:106:GLN:C | 2:H:108:GLY:N | 2.59 | 0.55 |
| 1:P:986:PRO:N | 1:P:987:PRO:CD | 2.70 | 0.55 |
| 1:A:918:GLU:HG3 | 1:P:1128:VAL:HG12 | 1.87 | 0.55 |
| 1:P:426:PRO:HG2 | 1:P:429:PHE:HB2 | 1.88 | 0.55 |
| 3:F:100:TRP:HA | 3:F:107:VAL:HA | 1.89 | 0.55 |
| 1:A:1054:GLN:HB2 | 1:A:1061:VAL:HB | 1.88 | 0.54 |
| 1:A:1076:THR:O | 1:A:1097:SER:HB3 | 2.07 | 0.54 |
| 1:D:858:LEU:HD13 | 1:D:959:LEU:HD22 | 1.89 | 0.54 |
| 1:A:552:LEU:HB3 | 1:A:585:LEU:HD12 | 1.88 | 0.54 |
| 1:P:127:VAL:HG12 | 1:P:171:VAL:HG22 | 1.89 | 0.54 |
| 1:D:712:ILE:CD1 | 1:D:1094:VAL:CG1 | 2.84 | 0.54 |
| 1:P:328:ARG:NH1 | 1:P:531:THR:O | 2.40 | 0.54 |
| 1:D:330:PRO:HG3 | 1:D:579:PRO:HB2 | 1.88 | 0.54 |
| 1:D:667:GLY:HA2 | 1:P:864:LEU:HA | 1.88 | 0.54 |
| 1:A:454:ARG:NH2 | 1:A:467:ASP:O | 2.41 | 0.54 |
| 1:D:882:ILE:HA | 1:D:901:GLN:HE22 | 1.72 | 0.54 |
| 2:B:6:GLN:O | 2:B:117:GLN:NE2 | 2.41 | 0.54 |
| 2:E:6:GLN:O | 2:E:117:GLN:NE2 | 2.40 | 0.54 |
| 1:D:526:GLY:N | 1:D:527:PRO:HD2 | 2.09 | 0.54 |
| 1:D:760:CYS:HA | 1:D:763:LEU:HB2 | 1.89 | 0.54 |
| 1:D:1090:PRO:HD2 | 1:P:913:GLN:HE22 | 1.73 | 0.54 |
| 1:P:817:PHE:O | 1:P:821:LEU:N | 2.36 | 0.54 |
| 1:P:905:ARG:NH1 | 1:P:1049:LEU:O | 2.35 | 0.54 |
| 1:P:1084:ASP:OD1 | 1:P:1084:ASP:O | 2.25 | 0.54 |
| 2:B:110:HIS:HE1 | 3:C:38:PRO:HD2 | 1.72 | 0.54 |
| 1:D:231:ILE:HD12 | 1:D:233:ILE:HG12 | 1.89 | 0.53 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:H:110:HIS:CD2 | 2:H:111:GLY:H | 2.26 | 0.53 |
| 2:H:33:HIS:ND1 | 2:H:103:ARG:O | 2.40 | 0.53 |
| 3:L:100:TRP:HA | 3:L:107:VAL:HA | 1.91 | 0.53 |
| 3:F:91:ASP:HB2 | 3:F:115:LEU:HD22 | 1.90 | 0.53 |
| 1:P:1046:GLY:HA3 | 1:P:1068:VAL:HG21 | 1.90 | 0.53 |
| 3:L:95:TYR:HB2 | 3:L:113:THR:HB | 1.90 | 0.53 |
| 1:P:924:ALA:O | 1:P:928:ASN:ND2 | 2.42 | 0.53 |
| 2:B:109:SER:HB2 | 3:C:56:ASN:HB2 | 1.91 | 0.53 |
| 1:D:80:ASP:OD1 | 1:D:80:ASP:N | 2.41 | 0.53 |
| 1:A:34:ARG:HH21 | 1:A:217:PRO:HG2 | 1.73 | 0.53 |
| 1:A:598:ILE:HB | 1:A:609:ALA:HB3 | 1.90 | 0.53 |
| 1:A:815:ARG:HE | 1:A:819:GLU:HG3 | 1.73 | 0.53 |
| 1:A:1126:CYS:HB3 | 1:A:1132:ILE:HD13 | 1.90 | 0.53 |
| 3:L:1:GLN:HE22 | 3:L:111:GLY:HA2 | 1.74 | 0.53 |
| 1:A:609:ALA:HB2 | 1:A:692:ILE:HD12 | 1.91 | 0.53 |
| 1:D:131:CYS:HB2 | 1:D:166:CYS:HA | 1.90 | 0.53 |
| 1:A:731:MET:H | 1:A:774:GLN:HG2 | 1.74 | 0.52 |
| 1:D:443:SER:HB3 | 1:D:499:PRO:HD3 | 1.90 | 0.52 |
| 1:P:360:ASN:H | 1:P:523:THR:HB | 1.74 | 0.52 |
| 1:P:544:ASN:HD21 | 1:P:579:PRO:HB3 | 1.75 | 0.52 |
| 2:H:15:PRO:HA | 2:H:90:LEU:HB2 | 1.91 | 0.52 |
| 1:P:537:LYS:N | 1:P:551:VAL:HG23 | 2.24 | 0.52 |
| 1:A:374:PHE:HA | 1:A:436:TRP:HB3 | 1.92 | 0.52 |
| 1:A:327:VAL:HG11 | 1:A:529:LYS:CD | 2.40 | 0.52 |
| 1:D:1109:PHE:HB3 | 1:D:1111:GLU:HG2 | 1.90 | 0.52 |
| 3:F:92:GLU:OE1 | 3:F:115:LEU:O | 2.28 | 0.52 |
| 1:A:712:ILE:HG22 | 1:A:1077:THR:HG21 | 1.89 | 0.52 |
| 1:D:1096:VAL:HG21 | 1:D:1110:TYR:HE1 | 1.75 | 0.52 |
| 1:P:83:VAL:HG12 | 1:P:239:GLN:HB2 | 1.92 | 0.52 |
| 1:P:423:TYR:HA | 1:P:461:LEU:HD22 | 1.92 | 0.52 |
| 1:A:327:VAL:CG1 | 1:A:529:LYS:CG | 2.87 | 0.51 |
| 1:A:896:ILE:HG23 | 1:P:712:ILE:HD11 | 1.92 | 0.51 |
| 1:A:986:PRO:N | 1:A:987:PRO:HD3 | 2.24 | 0.51 |
| 1:D:578:ASP:OD1 | 1:D:578:ASP:N | 2.36 | 0.51 |
| 1:P:1081:ILE:HG13 | 1:P:1135:ASN:HB3 | 1.91 | 0.51 |
| 1:A:905:ARG:NH2 | 1:A:1033:VAL:O | 2.43 | 0.51 |
| 1:P:448:ASN:ND2 | 1:P:497:PHE:O | 2.43 | 0.51 |
| 1:A:878:LEU:HD12 | 1:A:879:ALA:H | 0.60 | 0.51 |
| 1:D:897:PRO:HD2 | 1:D:900:MET:HB2 | 1.91 | 0.51 |
| 3:C:100:TRP:HA | 3:C:107:VAL:HA | 1.91 | 0.51 |
| 1:A:605:SER:OG | 1:A:606:ASN:N | 2.44 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:712:ILE:HG22 | 1:A:1077:THR:CG2 | 2.36 | 0.51 |
| 1:A:985:ASP:C | 1:A:987:PRO:CD | 2.70 | 0.51 |
| 3:F:95:TYR:HB2 | 3:F:113:THR:HB | 1.93 | 0.51 |
| 1:P:985:ASP:C | 1:P:987:PRO:HD2 | 2.30 | 0.51 |
| 1:D:201:PHE:HB3 | 1:D:229:LEU:HB2 | 1.91 | 0.51 |
| 1:P:598:ILE:HB | 1:P:609:ALA:HB3 | 1.93 | 0.51 |
| 1:A:782:PHE:O | 1:A:877:LEU:HD11 | 2.11 | 0.51 |
| 1:A:1090:PRO:HB3 | 1:A:1120:THR:HG22 | 1.93 | 0.51 |
| 1:D:609:ALA:HB2 | 1:D:692:ILE:HD12 | 1.91 | 0.51 |
| 1:A:84:LEU:HD11 | 1:A:265:TYR:HE2 | 1.76 | 0.51 |
| 1:A:895:GLN:C | 1:A:896:ILE:HG13 | 2.31 | 0.51 |
| 1:D:712:ILE:CG2 | 1:D:713:ALA:N | 2.67 | 0.51 |
| 1:A:526:GLY:N | 1:A:527:PRO:HD2 | 2.26 | 0.51 |
| 1:D:802:PHE:HA | 1:D:805:ILE:HB | 1.93 | 0.50 |
| 2:B:102:ARG:HB3 | 2:B:114:VAL:HB | 1.93 | 0.50 |
| 1:D:454:ARG:NH2 | 1:D:467:ASP:O | 2.44 | 0.50 |
| 1:P:820:ASP:O | 1:P:824:ASN:N | 2.43 | 0.50 |
| 2:E:33:HIS:ND1 | 2:E:103:ARG:O | 2.45 | 0.50 |
| 1:D:929:SER:OG | 1:D:933:LYS:NZ | 2.45 | 0.50 |
| 3:C:91:ASP:HB2 | 3:C:115:LEU:HD22 | 1.93 | 0.50 |
| 1:P:416:GLY:H | 1:P:419:ALA:HB3 | 1.77 | 0.50 |
| 2:H:109:SER:HB2 | 3:L:55:TYR:CD1 | 2.46 | 0.50 |
| 1:A:363:ALA:CA | 1:A:527:PRO:HD3 | 2.42 | 0.50 |
| 1:A:712:ILE:CD1 | 1:A:1096:VAL:CG1 | 2.89 | 0.50 |
| 1:D:210:ILE:HD12 | 1:D:212:LEU:HB3 | 1.92 | 0.50 |
| 1:P:353:TRP:O | 1:P:466:ARG:NH1 | 2.45 | 0.50 |
| 1:P:454:ARG:NH2 | 1:P:467:ASP:O | 2.45 | 0.50 |
| 1:D:565:PHE:HE2 | 1:D:567:ARG:HH21 | 1.60 | 0.50 |
| 1:A:1079:PRO:HG3 | 1:D:899:ALA:HB3 | 1.94 | 0.50 |
| 1:P:708:SER:OG | 1:P:709:ASN:N | 2.44 | 0.49 |
| 3:F:1:GLN:HE22 | 3:F:111:GLY:HA2 | 1.76 | 0.49 |
| 2:B:33:HIS:ND1 | 2:B:103:ARG:O | 2.45 | 0.49 |
| 2:B:97:ILE:CA | 2:B:120:THR:HG22 | 2.41 | 0.49 |
| 1:P:1123:SER:O | 1:P:1123:SER:OG | 2.29 | 0.49 |
| 1:D:394:ASN:ND2 | 1:D:516:GLU:O | 2.44 | 0.49 |
| 1:D:526:GLY:O | 1:D:529:LYS:HG3 | 2.12 | 0.49 |
| 1:A:448:ASN:ND2 | 1:A:497:PHE:O | 2.46 | 0.49 |
| 1:D:455:LEU:HD22 | 1:D:493:GLN:HB2 | 1.94 | 0.49 |
| 1:D:525:CYS:SG | 1:D:526:GLY:N | 2.86 | 0.49 |
| 1:P:374:PHE:HA | 1:P:436:TRP:HB3 | 1.94 | 0.49 |
| 2:H:103:ARG:HG3 | 2:H:110:HIS:O | 2.13 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:526:GLY:H | 1:A:527:PRO:HD2 | 1.77 | 0.49 |
| 1:D:454:ARG:HH11 | 1:D:491:PRO:HB2 | 1.78 | 0.49 |
| 1:D:1073:LYS:HE3 | 1:D:1075:PHE:HZ | 1.76 | 0.49 |
| 1:A:456:PHE:HB2 | 1:A:491:PRO:HA | 1.94 | 0.49 |
| 2:H:110:HIS:CG | 2:H:111:GLY:H | 2.30 | 0.49 |
| 1:D:316:SER:OG | 1:D:317:ASN:N | 2.46 | 0.49 |
| 1:A:333:THR:O | 1:A:334:ASN:O | 2.30 | 0.49 |
| 1:A:712:ILE:HD11 | 1:A:1096:VAL:CG1 | 2.43 | 0.49 |
| 1:A:753:LEU:HD13 | 1:A:997:ILE:HD11 | 1.95 | 0.49 |
| 1:P:619:GLU:HG2 | 1:P:620:VAL:HG13 | 1.95 | 0.49 |
| 1:A:974:SER:OG | 1:A:975:SER:N | 2.46 | 0.49 |
| 1:A:715:PRO:HD3 | 1:D:894:LEU:HG | 1.94 | 0.48 |
| 1:A:1104:VAL:HG22 | 1:A:1115:ILE:CD1 | 2.30 | 0.48 |
| 1:D:67:ALA:HB2 | 1:D:265:TYR:HE1 | 1.77 | 0.48 |
| 3:C:42:TYR:HB2 | 3:C:96:PHE:HB2 | 1.94 | 0.48 |
| 1:A:722:VAL:HG22 | 1:A:1065:VAL:HG22 | 1.95 | 0.48 |
| 1:A:1128:VAL:HG12 | 1:D:918:GLU:HG2 | 1.95 | 0.48 |
| 1:D:48:LEU:HB3 | 1:D:276:LEU:HD11 | 1.95 | 0.48 |
| 1:D:707:TYR:HA | 1:D:711:SER:HB3 | 1.95 | 0.48 |
| 1:P:1078:ALA:HB3 | 1:P:1133:VAL:HG22 | 1.95 | 0.48 |
| 1:A:454:ARG:HH11 | 1:A:491:PRO:HB2 | 1.78 | 0.48 |
| 1:A:1080:ALA:HB3 | 1:A:1132:ILE:HD12 | 1.95 | 0.48 |
| 1:D:474:GLN:OE1 | 2:H:107:TYR:CE1 | 2.65 | 0.48 |
| 1:A:196:ASN:O | 1:A:197:ILE:HD13 | 2.12 | 0.48 |
| 1:A:720:ILE:HG21 | 1:A:923:ILE:HG12 | 1.95 | 0.48 |
| 1:D:811:LYS:NZ | 1:D:813:SER:O | 2.41 | 0.48 |
| 1:D:666:ILE:HD11 | 1:D:670:ILE:HB | 1.96 | 0.48 |
| 1:D:979:ASP:OD1 | 1:D:983:ARG:NH2 | 2.47 | 0.48 |
| 3:L:41:TRP:HB2 | 3:L:54:ILE:HB | 1.96 | 0.48 |
| 3:L:103:SER:HB2 | 3:L:108:LEU:HD11 | 1.93 | 0.48 |
| 2:B:20:LYS:HG3 | 2:B:86:GLN:HB2 | 1.95 | 0.48 |
| 1:A:43:PHE:HB3 | 1:P:566:GLY:HA2 | 1.95 | 0.48 |
| 1:D:374:PHE:HA | 1:D:436:TRP:HB3 | 1.96 | 0.48 |
| 1:D:526:GLY:CA | 1:D:529:LYS:NZ | 2.61 | 0.48 |
| 3:C:27:SER:O | 3:C:36:GLY:N | 2.46 | 0.48 |
| 1:A:108:THR:H | 1:A:114:THR:HG21 | 1.78 | 0.48 |
| 1:P:96:GLU:OE2 | 1:P:263:ALA:N | 2.47 | 0.48 |
| 1:A:529:LYS:HE3 | 1:A:529:LYS:HA | 1.94 | 0.48 |
| 2:E:109:SER:OG | 2:E:110:HIS:N | 2.46 | 0.48 |
| 1:A:1046:GLY:HA3 | 1:A:1068:VAL:HG22 | 1.95 | 0.47 |
| 1:P:190:ARG:HG2 | 1:P:192:PHE:HE1 | 1.79 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:P:726:ILE:HG12 | 1:P:1061:VAL:HG22 | 1.96 | 0.47 |
| 1:A:598:ILE:HD11 | 1:A:611:LEU:HB2 | 1.95 | 0.47 |
| 1:A:656:VAL:HG12 | 1:A:658:ASN:H | 1.79 | 0.47 |
| 1:A:1089:PHE:HE2 | 1:A:1123:SER:HB2 | 1.78 | 0.47 |
| 1:P:815:ARG:HG2 | 1:P:871:ALA:HB1 | 1.97 | 0.47 |
| 1:D:1129:VAL:HG13 | 1:P:917:TYR:HB3 | 1.95 | 0.47 |
| 3:L:42:TYR:HB2 | 3:L:96:PHE:HB2 | 1.96 | 0.47 |
| 2:E:113:ASP:HA | 3:F:52:LEU:HB3 | 1.97 | 0.47 |
| 1:A:305:SER:OG | 1:A:306:PHE:N | 2.48 | 0.47 |
| 1:A:333:THR:O | 1:A:334:ASN:C | 2.52 | 0.47 |
| 1:A:529:LYS:CE | 1:A:529:LYS:HA | 2.44 | 0.47 |
| 1:A:887:THR:HB | 1:A:894:LEU:HD22 | 1.96 | 0.47 |
| 1:D:553:THR:O | 1:D:586:ASP:N | 2.46 | 0.47 |
| 1:P:825:LYS:HA | 1:P:825:LYS:HD3 | 1.76 | 0.47 |
| 1:P:1089:PHE:HE2 | 1:P:1123:SER:HB3 | 1.79 | 0.47 |
| 1:A:711:SER:HA | 1:A:1076:THR:HA | 1.97 | 0.47 |
| 2:E:2:VAL:HG21 | 2:E:102:ARG:HH21 | 1.80 | 0.47 |
| 1:A:327:VAL:HB | 1:A:529:LYS:HE2 | 0.62 | 0.47 |
| 1:A:443:SER:HB2 | 1:A:499:PRO:HD3 | 1.96 | 0.47 |
| 1:A:917:TYR:CA | 1:P:1129:VAL:CG2 | 2.92 | 0.47 |
| 1:D:333:THR:O | 1:D:333:THR:HG23 | 2.15 | 0.47 |
| 1:P:435:ALA:HB2 | 1:P:510:VAL:HG23 | 1.97 | 0.47 |
| 1:P:773:GLU:OE2 | 1:P:1019:ARG:NH1 | 2.47 | 0.47 |
| 3:C:95:TYR:HB2 | 3:C:113:THR:HB | 1.96 | 0.47 |
| 2:E:15:PRO:HA | 2:E:90:LEU:HB2 | 1.97 | 0.47 |
| 1:A:411:ALA:HB3 | 1:A:414:GLN:HB2 | 1.97 | 0.46 |
| 2:B:36:GLY:HA2 | 2:B:51:ILE:HA | 1.97 | 0.46 |
| 1:A:763:LEU:HD22 | 1:A:1008:VAL:HG21 | 1.97 | 0.46 |
| 1:D:1104:VAL:O | 1:D:1113:GLN:HB2 | 2.15 | 0.46 |
| 1:P:200:TYR:HD2 | 1:P:202:LYS:HE3 | 1.80 | 0.46 |
| 1:P:456:PHE:HB2 | 1:P:491:PRO:HA | 1.96 | 0.46 |
| 1:A:745:ASP:H | 1:P:319:ARG:HH22 | 1.64 | 0.46 |
| 1:D:439:ASN:OD1 | 1:D:443:SER:OG | 2.32 | 0.46 |
| 1:D:792:PRO:HD2 | 1:D:797:PHE:HZ | 1.79 | 0.46 |
| 1:D:966:LEU:O | 1:D:975:SER:OG | 2.32 | 0.46 |
| 1:A:92:PHE:HB3 | 1:A:192:PHE:HB2 | 1.98 | 0.46 |
| 1:P:524:VAL:O | 1:P:524:VAL:CG2 | 2.63 | 0.46 |
| 2:B:15:PRO:HA | 2:B:90:LEU:HB2 | 1.98 | 0.46 |
| 2:E:4:LEU:HD11 | 2:E:35:ILE:HD12 | 1.98 | 0.46 |
| 3:F:51:LYS:NZ | 3:F:63:GLY:O | 2.48 | 0.46 |
| 1:A:347:PHE:HE2 | 1:A:509:ARG:HB3 | 1.80 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:P:609:ALA:HB2 | 1:P:692:ILE:HD12 | 1.97 | 0.46 |
| 1:A:355:ARG:HG2 | 1:A:466:ARG:HH22 | 1.81 | 0.46 |
| 1:A:389:ASP:HA | 1:A:527:PRO:O | 2.15 | 0.46 |
| 1:A:804:GLN:O | 1:A:817:PHE:N | 2.47 | 0.46 |
| 1:A:881:THR:HG22 | 1:A:901:GLN:HG2 | 1.97 | 0.46 |
| 1:A:363:ALA:CB | 1:A:527:PRO:CG | 2.94 | 0.46 |
| 1:P:808:ASP:OD1 | 1:P:808:ASP:N | 2.47 | 0.46 |
| 1:D:362:VAL:HB | 1:D:527:PRO:CB | 2.45 | 0.46 |
| 1:D:118:LEU:HD11 | 1:D:133:PHE:H | 1.81 | 0.45 |
| 1:D:451:TYR:H | 1:D:495:TYR:HE1 | 1.63 | 0.45 |
| 1:P:405:ASP:N | 1:P:504:GLY:O | 2.49 | 0.45 |
| 1:P:430:THR:OG1 | 1:P:515:PHE:O | 2.34 | 0.45 |
| 1:P:911:VAL:HA | 1:P:1106:GLN:HG2 | 1.98 | 0.45 |
| 1:A:474:GLN:NE2 | 1:A:476:GLY:O | 2.50 | 0.45 |
| 1:P:879:ALA:O | 1:P:883:THR:OG1 | 2.26 | 0.45 |
| 1:A:1054:GLN:N | 1:A:1061:VAL:O | 2.48 | 0.45 |
| 1:P:650:LEU:HD11 | 1:P:666:ILE:HD13 | 1.98 | 0.45 |
| 1:D:54:LEU:HD12 | 1:D:195:LYS:HE3 | 1.99 | 0.45 |
| 1:D:746:SER:OG | 1:D:748:GLU:OE2 | 2.35 | 0.45 |
| 1:A:773:GLU:OE2 | 1:A:1019:ARG:NH1 | 2.50 | 0.45 |
| 1:A:901:GLN:HE21 | 1:A:905:ARG:NE | 2.09 | 0.45 |
| 1:D:591:SER:CB | 1:D:615:VAL:HG12 | 2.37 | 0.45 |
| 1:D:743:CYS:HB3 | 1:D:749:CYS:HB3 | 1.84 | 0.45 |
| 2:H:109:SER:CB | 3:L:55:TYR:HD1 | 2.20 | 0.45 |
| 2:H:113:ASP:HA | 3:L:52:LEU:HB3 | 1.99 | 0.45 |
| 2:B:100:CYS:H | 2:B:116:GLY:HA3 | 1.82 | 0.45 |
| 1:D:650:LEU:HD21 | 1:D:653:ALA:HB3 | 1.99 | 0.45 |
| 2:H:4:LEU:HD11 | 2:H:35:ILE:HD12 | 1.98 | 0.45 |
| 1:A:723:THR:HB | 1:A:1064:HIS:HB2 | 1.98 | 0.45 |
| 1:P:27:ALA:O | 1:P:64:TRP:N | 2.50 | 0.45 |
| 1:P:802:PHE:HB3 | 1:P:806:LEU:H | 1.81 | 0.45 |
| 1:D:127:VAL:HG23 | 1:D:127:VAL:O | 2.17 | 0.45 |
| 1:D:927:PHE:HE1 | 1:D:1063:LEU:HD23 | 1.81 | 0.45 |
| 1:P:131:CYS:HB3 | 1:P:166:CYS:HB2 | 1.76 | 0.45 |
| 1:A:405:ASP:N | 1:A:504:GLY:O | 2.50 | 0.45 |
| 2:B:4:LEU:HD13 | 2:B:100:CYS:HB3 | 1.98 | 0.45 |
| 1:A:789:TYR:OH | 1:A:892:ALA:O | 2.30 | 0.44 |
| 3:C:103:SER:HB2 | 3:C:108:LEU:HD11 | 1.98 | 0.44 |
| 1:A:361:CYS:H | 1:A:524:VAL:HG22 | 1.83 | 0.44 |
| 1:D:305:SER:OG | 1:D:306:PHE:N | 2.51 | 0.44 |
| 1:D:398:ASP:HB2 | 1:D:512:VAL:HB | 1.99 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:1114:ILE:HG22 | 1:D:1115:ILE:H | 1.81 | 0.44 |
| 1:A:363:ALA:O | 1:A:527:PRO:CB | 2.55 | 0.44 |
| 1:A:428:ASP:OD1 | 1:A:428:ASP:N | 2.43 | 0.44 |
| 1:A:886:TRP:HE1 | 1:P:1047:TYR:HH | 1.64 | 0.44 |
| 1:P:818:ILE:HD13 | 1:P:821:LEU:HD12 | 2.00 | 0.44 |
| 1:P:979:ASP:HB2 | 1:P:983:ARG:HH21 | 1.83 | 0.44 |
| 2:H:2:VAL:HG21 | 2:H:102:ARG:HH21 | 1.81 | 0.44 |
| 2:E:109:SER:HB3 | 3:F:55:TYR:HB2 | 1.99 | 0.44 |
| 1:D:94:SER:HA | 1:D:265:TYR:HB3 | 1.99 | 0.44 |
| 1:D:673:SER:OG | 1:D:674:TYR:N | 2.50 | 0.44 |
| 1:P:411:ALA:HB3 | 1:P:414:GLN:HB2 | 1.99 | 0.44 |
| 2:H:36:GLY:HA2 | 2:H:51:ILE:HA | 1.99 | 0.44 |
| 1:A:39:PRO:HG3 | 1:A:51:THR:HG21 | 2.00 | 0.44 |
| 1:D:369:TYR:OH | 1:D:388:ASN:ND2 | 2.51 | 0.44 |
| 1:D:1136:THR:OG1 | 1:D:1137:VAL:N | 2.51 | 0.44 |
| 2:H:13:LYS:HD2 | 2:H:13:LYS:HA | 1.81 | 0.44 |
| 3:L:51:LYS:HB3 | 3:L:51:LYS:HE2 | 1.73 | 0.44 |
| 1:P:805:ILE:O | 1:P:816:SER:CB | 2.63 | 0.44 |
| 1:D:199:GLY:HA3 | 1:D:232:GLY:HA2 | 1.99 | 0.44 |
| 1:D:201:PHE:HD2 | 1:D:229:LEU:HD12 | 1.82 | 0.44 |
| 1:D:736:VAL:HG23 | 1:D:858:LEU:HD23 | 2.00 | 0.44 |
| 1:P:453:TYR:HB3 | 1:P:495:TYR:CZ | 2.53 | 0.44 |
| 1:A:1089:PHE:CD1 | 1:D:913:GLN:HB2 | 2.53 | 0.43 |
| 1:D:1089:PHE:CE2 | 1:D:1123:SER:OG | 2.72 | 0.43 |
| 2:H:52:ILE:HB | 2:H:63:TYR:OH | 2.18 | 0.43 |
| 1:A:896:ILE:HA | 1:P:712:ILE:HD13 | 2.00 | 0.43 |
| 1:A:555:SER:OG | 1:A:556:ASN:N | 2.51 | 0.43 |
| 1:P:804:GLN:O | 1:P:818:ILE:N | 2.52 | 0.43 |
| 1:D:591:SER:HB3 | 1:D:615:VAL:HG11 | 1.97 | 0.43 |
| 2:H:85:LEU:HD12 | 2:H:85:LEU:HA | 1.82 | 0.43 |
| 2:B:52:ILE:HD12 | 2:B:74:PHE:HB3 | 2.01 | 0.43 |
| 2:E:85:LEU:HD12 | 2:E:85:LEU:HA | 1.79 | 0.43 |
| 1:A:398:ASP:HB3 | 1:A:512:VAL:HB | 1.99 | 0.43 |
| 1:D:526:GLY:O | 1:D:529:LYS:CG | 2.66 | 0.43 |
| 1:P:1046:GLY:HA3 | 1:P:1068:VAL:CG2 | 2.48 | 0.43 |
| 1:A:394:ASN:ND2 | 1:A:516:GLU:O | 2.51 | 0.43 |
| 1:D:37:TYR:OH | 1:D:54:LEU:O | 2.27 | 0.43 |
| 1:D:101:ILE:HA | 1:D:242:LEU:HA | 1.99 | 0.43 |
| 1:D:220:PHE:HE2 | 1:D:285:ILE:HG22 | 1.84 | 0.43 |
| 1:P:118:LEU:HD13 | 1:P:118:LEU:HA | 1.90 | 0.43 |
| 1:P:328:ARG:NE | 1:P:578:ASP:OD1 | 2.50 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 1:A:327:VAL:CB | 1:A:529:LYS:CE | 2.41 | 0.43 |
| 1:A:457:ARG:HH21 | 1:A:467:ASP:HB2 | 1.83 | 0.43 |
| 1:A:468:ILE:HD11 | 3:F:100:TRP:HZ2 | 1.84 | 0.43 |
| 1:D:763:LEU:HD22 | 1:D:1008:VAL:HG21 | 2.00 | 0.43 |
| 1:P:948:LEU:HD23 | 1:P:948:LEU:HA | 1.82 | 0.43 |
| 1:A:877:LEU:HD23 | 1:A:888:PHE:HZ | 1.84 | 0.43 |
| 1:A:895:GLN:O | 1:A:896:ILE:HG13 | 2.18 | 0.43 |
| 1:D:885:GLY:HA3 | 1:D:896:ILE:HD12 | 2.00 | 0.43 |
| 1:D:1067:TYR:HH | 1:D:1109:PHE:N | 2.16 | 0.43 |
| 2:H:61:THR:HB | 2:H:63:TYR:CE2 | 2.54 | 0.43 |
| 1:D:773:GLU:OE2 | 1:D:1019:ARG:NH1 | 2.52 | 0.43 |
| 1:P:92:PHE:HB3 | 1:P:192:PHE:HB2 | 2.00 | 0.43 |
| 2:H:62:ARG:HE | 2:H:62:ARG:HB2 | 1.68 | 0.43 |
| 3:L:27:SER:HA | 3:L:78:THR:HG22 | 2.01 | 0.43 |
| 2:B:85:LEU:HD12 | 2:B:85:LEU:HA | 1.83 | 0.43 |
| 1:P:1086:LYS:HD2 | 1:P:1088:HIS:HE1 | 1.83 | 0.43 |
| 2:E:16:GLY:N | 2:E:90:LEU:O | 2.48 | 0.43 |
| 1:P:391:CYS:SG | 1:P:392:PHE:N | 2.92 | 0.42 |
| 1:P:914:ASN:ND2 | 1:P:1111:GLU:OE2 | 2.52 | 0.42 |
| 1:A:379:CYS:HA | 1:A:432:CYS:HA | 2.00 | 0.42 |
| 1:D:379:CYS:HA | 1:D:432:CYS:HA | 2.02 | 0.42 |
| 1:D:948:LEU:HD23 | 1:D:948:LEU:HA | 1.83 | 0.42 |
| 1:P:689:SER:O | 1:P:689:SER:OG | 2.33 | 0.42 |
| 1:A:131:CYS:HB2 | 1:A:166:CYS:HB2 | 1.45 | 0.42 |
| 1:A:222:ALA:HB2 | 1:A:285:ILE:HB | 2.01 | 0.42 |
| 1:D:212:LEU:HD21 | 1:D:215:ASP:O | 2.08 | 0.42 |
| 1:P:363:ALA:H | 1:P:526:GLY:N | 2.17 | 0.42 |
| 2:H:100:CYS:H | 2:H:116:GLY:HA3 | 1.83 | 0.42 |
| 3:F:37:ASN:ND2 | 3:F:100:TRP:O | 2.40 | 0.42 |
| 1:A:332:ILE:HG13 | 1:A:332:ILE:O | 2.19 | 0.42 |
| 1:A:815:ARG:HH21 | 1:A:819:GLU:HG3 | 1.83 | 0.42 |
| 1:A:905:ARG:NH1 | 1:A:1035:GLY:O | 2.50 | 0.42 |
| 1:P:749:CYS:O | 1:P:753:LEU:N | 2.52 | 0.42 |
| 1:A:60:SER:OG | 1:A:61:ASN:N | 2.52 | 0.42 |
| 1:A:328:ARG:HD3 | 1:A:543:PHE:HE1 | 1.83 | 0.42 |
| 1:A:569:ILE:H | 1:A:569:ILE:HG13 | 1.63 | 0.42 |
| 1:A:712:ILE:HG13 | 1:A:1075:PHE:CB | 2.30 | 0.42 |
| 1:P:457:ARG:HE | 1:P:461:LEU:HD12 | 1.85 | 0.42 |
| 3:L:65:SER:OG | 3:L:67:ASP:N | 2.53 | 0.42 |
| 2:B:62:ARG:HH12 | 2:B:103:ARG:HH12 | 1.67 | 0.42 |
| 3:C:41:TRP:HB2 | 3:C:54:ILE:HB | 2.00 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:1086:LYS:HB2 | 1:A:1122:VAL:HG13 | 2.01 | 0.42 |
| 1:D:127:VAL:HG23 | 1:D:129:LYS:HZ3 | 1.84 | 0.42 |
| 1:D:356:LYS:NZ | 1:D:357:ARG:O | 2.50 | 0.42 |
| 1:D:712:ILE:HD13 | 1:D:712:ILE:HG21 | 1.79 | 0.42 |
| 1:A:423:TYR:HA | 1:A:461:LEU:HD22 | 2.02 | 0.42 |
| 1:D:196:ASN:ND2 | 1:D:235:ILE:HG21 | 2.34 | 0.42 |
| 1:P:396:TYR:O | 1:P:514:SER:OG | 2.34 | 0.42 |
| 1:P:822:LEU:HD13 | 1:P:1056:ALA:HB2 | 2.01 | 0.42 |
| 2:E:49:VAL:O | 2:E:64:SER:OG | 2.22 | 0.42 |
| 1:A:393:THR:OG1 | 1:A:516:GLU:O | 2.36 | 0.42 |
| 1:A:466:ARG:HG2 | 1:A:468:ILE:HG23 | 2.02 | 0.42 |
| 1:A:916:LEU:O | 1:P:1129:VAL:HG22 | 2.19 | 0.42 |
| 1:A:55:PHE:HD2 | 1:A:275:PHE:CG | 2.38 | 0.42 |
| 1:A:806:LEU:HD21 | 1:A:879:ALA:HB3 | 2.01 | 0.42 |
| 1:D:712:ILE:CD1 | 1:D:1094:VAL:HG11 | 2.46 | 0.42 |
| 1:P:986:PRO:HD2 | 1:P:987:PRO:HD3 | 2.02 | 0.42 |
| 1:A:439:ASN:HA | 1:A:442:ASP:HB2 | 2.01 | 0.42 |
| 1:A:917:TYR:CB | 1:P:1129:VAL:HG21 | 2.43 | 0.42 |
| 1:D:669:GLY:N | 1:P:864:LEU:O | 2.49 | 0.42 |
| 1:D:906:PHE:CZ | 1:D:915:VAL:HB | 2.55 | 0.42 |
| 3:C:30:ILE:HG23 | 3:C:39:VAL:HB | 2.02 | 0.42 |
| 1:A:474:GLN:OE1 | 2:E:107:TYR:OH | 2.29 | 0.41 |
| 1:D:126:VAL:HG12 | 1:D:128:ILE:HG13 | 2.02 | 0.41 |
| 1:D:498:GLN:HG3 | 1:D:500:THR:H | 1.85 | 0.41 |
| 1:P:394:ASN:HD22 | 1:P:516:GLU:HB3 | 1.85 | 0.41 |
| 1:A:59:PHE:HD2 | 1:A:293:LEU:HD21 | 1.84 | 0.41 |
| 1:A:1135:ASN:OD1 | 1:A:1136:THR:N | 2.53 | 0.41 |
| 1:D:518:LEU:HD23 | 1:D:518:LEU:HA | 1.89 | 0.41 |
| 1:D:1089:PHE:HE2 | 1:D:1123:SER:OG | 2.03 | 0.41 |
| 1:D:1094:VAL:HG13 | 1:P:900:MET:HE1 | 2.02 | 0.41 |
| 3:L:60:ARG:NH1 | 3:L:69:PHE:O | 2.52 | 0.41 |
| 1:A:132:GLU:H | 1:A:166:CYS:HB2 | 1.85 | 0.41 |
| 1:A:331:ASN:O | 1:A:333:THR:CG2 | 2.56 | 0.41 |
| 1:A:806:LEU:HD23 | 1:A:806:LEU:HA | 1.94 | 0.41 |
| 1:P:464:PHE:HB3 | 3:C:36:GLY:HA2 | 2.01 | 0.41 |
| 1:P:567:ARG:HD3 | 1:P:571:ASP:HA | 2.03 | 0.41 |
| 1:D:1081:ILE:HG23 | 1:D:1135:ASN:HD21 | 1.85 | 0.41 |
| 1:P:330:PRO:HA | 1:P:580:GLN:HG2 | 2.01 | 0.41 |
| 1:P:800:PHE:CD2 | 1:P:800:PHE:N | 2.89 | 0.41 |
| 1:P:1116:THR:OG1 | 1:P:1118:ASP:OD1 | 2.34 | 0.41 |
| 1:A:452:ARG:HB3 | 1:A:492:LEU:HB3 | 2.02 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:716:THR:HG21 | 1:D:1073:LYS:HE2 | 2.03 | 0.41 |
| 1:A:328:ARG:HE | 1:A:578:ASP:HB2 | 1.85 | 0.41 |
| 1:A:416:GLY:H | 1:A:419:ALA:HB3 | 1.86 | 0.41 |
| 1:P:290:ASP:O | 1:P:297:SER:HB3 | 2.21 | 0.41 |
| 1:P:1068:VAL:HA | 1:P:1069:PRO:HD3 | 1.91 | 0.41 |
| 2:E:58:ASP:N | 2:E:58:ASP:OD1 | 2.53 | 0.41 |
| 1:A:707:TYR:HE1 | 1:D:897:PRO:HA | 1.85 | 0.41 |
| 1:A:723:THR:O | 1:A:1064:HIS:N | 2.51 | 0.41 |
| 1:D:526:GLY:N | 1:D:527:PRO:HD3 | 2.33 | 0.41 |
| 1:P:393:THR:OG1 | 1:P:516:GLU:O | 2.31 | 0.41 |
| 1:P:800:PHE:HB3 | 1:P:802:PHE:CD1 | 2.55 | 0.41 |
| 1:P:896:ILE:HG13 | 1:P:901:GLN:HB2 | 2.02 | 0.41 |
| 1:A:194:PHE:HE1 | 1:A:203:ILE:HG23 | 1.86 | 0.41 |
| 1:D:106:PHE:CD1 | 1:D:238:PHE:HB2 | 2.56 | 0.41 |
| 1:D:452:ARG:HB3 | 1:D:492:LEU:HB3 | 2.02 | 0.41 |
| 1:D:722:VAL:HG22 | 1:D:1065:VAL:HG22 | 2.03 | 0.41 |
| 1:D:1128:VAL:O | 1:D:1128:VAL:CG1 | 2.67 | 0.41 |
| 1:P:34:ARG:HH21 | 1:P:217:PRO:HG2 | 1.85 | 0.41 |
| 1:P:379:CYS:HA | 1:P:432:CYS:HA | 2.02 | 0.41 |
| 1:P:822:LEU:HD22 | 1:P:945:LEU:HD11 | 2.02 | 0.41 |
| 2:H:38:VAL:HB | 2:H:99:TYR:HB2 | 2.03 | 0.41 |
| 1:A:339:GLY:O | 1:A:343:ASN:N | 2.54 | 0.41 |
| 1:A:707:TYR:HE2 | 1:D:796:ASP:OD1 | 2.04 | 0.41 |
| 1:D:707:TYR:HE2 | 1:P:796:ASP:OD1 | 2.04 | 0.41 |
| 1:D:731:MET:HG3 | 1:D:1018:ILE:HG13 | 2.03 | 0.41 |
| 2:H:102:ARG:HB3 | 2:H:114:VAL:HB | 2.03 | 0.41 |
| 2:E:20:LYS:HG3 | 2:E:86:GLN:HB2 | 2.02 | 0.41 |
| 1:A:802:PHE:HD1 | 1:A:805:ILE:HB | 1.86 | 0.40 |
| 1:A:883:THR:O | 1:A:896:ILE:N | 2.54 | 0.40 |
| 1:D:405:ASP:N | 1:D:504:GLY:O | 2.53 | 0.40 |
| 1:D:428:ASP:OD1 | 1:D:428:ASP:N | 2.47 | 0.40 |
| 1:D:712:ILE:HG23 | 1:P:895:GLN:O | 2.20 | 0.40 |
| 1:D:800:PHE:HB2 | 1:D:802:PHE:CE2 | 2.57 | 0.40 |
| 1:D:805:ILE:HG23 | 1:D:1054:GLN:HE22 | 1.86 | 0.40 |
| 1:P:1037:SER:OG | 1:P:1043:CYS:SG | 2.72 | 0.40 |
| 2:B:97:ILE:HA | 2:B:120:THR:HG22 | 2.04 | 0.40 |
| 1:P:213:VAL:O | 1:P:213:VAL:CG1 | 2.68 | 0.40 |
| 1:P:530:SER:O | 1:P:530:SER:OG | 2.32 | 0.40 |
| 1:D:716:THR:HG22 | 1:D:1073:LYS:HE2 | 2.02 | 0.40 |
| 1:D:905:ARG:HD3 | 1:D:1050:MET:HB3 | 2.03 | 0.40 |
| 1:D:985:ASP:OD1 | 1:D:985:ASP:N | 2.54 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:P:985:ASP:HB2 | 1:P:987:PRO:HD2 | 2.02 | 0.40 |
| 2:E:2:VAL:HG21 | 2:E:102:ARG:HE | 1.87 | 0.40 |
| 2:E:41:LYS:HB3 | 2:E:44:LYS:HD3 | 2.03 | 0.40 |
| 1:D:303:LEU:HD12 | 1:D:308:VAL:HG22 | 2.04 | 0.40 |
| 1:D:822:LEU:HD22 | 1:D:945:LEU:HD21 | 2.03 | 0.40 |
| 2:H:15:PRO:HG3 | 2:H:123:VAL:HG21 | 2.03 | 0.40 |
| 2:E:13:LYS:HD2 | 2:E:13:LYS:HA | 1.81 | 0.40 |
| 1:A:903:ALA:HB1 | 1:A:913:GLN:HG3 | 2.04 | 0.40 |
| 1:D:1023:ASN:O | 1:D:1027:THR:OG1 | 2.33 | 0.40 |
| 1:P:994:ASP:HA | 1:P:997:ILE:HG22 | 2.02 | 0.40 |
| 2:E:15:PRO:HG3 | 2:E:123:VAL:HG21 | 2.03 | 0.40 |
| 2:E:62:ARG:HB3 | 3:F:105:ASN:HD21 | 1.87 | 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 | 942/1259 (75%) | 890 (94%) | 47 (5%) | 5 (0%) | 29 | 62 |
| 1 | D | 937/1259 (74%) | 884 (94%) | 53 (6%) | 0 | 100 | 100 |
| 1 | P | 925/1259 (74%) | 851 (92%) | 67 (7%) | 7 (1%) | 19 | 52 |
| 2 | B | 119/121 (98%) | 116 (98%) | 3 (2%) | 0 | 100 | 100 |
| 2 | E | 119/121 (98%) | 117 (98%) | 2 (2%) | 0 | 100 | 100 |
| 2 | H | 119/121 (98%) | 113 (95%) | 4 (3%) | 2 (2%) | 9 | 37 |
| 3 | C | 108/110 (98%) | 98 (91%) | 10 (9%) | 0 | 100 | 100 |
| 3 | F | 108/110 (98%) | 99 (92%) | 9 (8%) | 0 | 100 | 100 |
| 3 | L | 108/110 (98%) | 99 (92%) | 9 (8%) | 0 | 100 | 100 |
| All | All | 3485/4470 (78%) | 3267 (94%) | 204 (6%) | 14 (0%) | 38 | 67 |

All (14) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 332 | ILE |
| 1 | A | 334 | ASN |
| 1 | P | 800 | PHE |
| 1 | P | 801 | ASN |
| 2 | H | 107 | TYR |
| 2 | H | 111 | GLY |
| 1 | P | 802 | PHE |
| 1 | P | 803 | SER |
| 1 | A | 333 | THR |
| 1 | A | 528 | LYS |
| 1 | P | 806 | LEU |
| 1 | P | 799 | GLY |
| 1 | P | 805 | ILE |
| 1 | A | 526 | GLY |

## 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 | 839/1091 (77%) | 836 (100%) | 3 (0%) | 91 | 95 |
| 1 | D | 841/1091 (77%) | 834 (99%) | 7 (1%) | 81 | 89 |
| 1 | P | 840/1091 (77%) | 831 (99%) | 9 (1%) | 73 | 85 |
| 2 | B | 102/102 (100%) | 102 (100%) | 0 | 100 | 100 |
| 2 | E | 102/102 (100%) | 102 (100%) | 0 | 100 | 100 |
| 2 | H | 102/102 (100%) | 100 (98%) | 2 (2%) | 55 | 76 |
| 3 | C | 88/88 (100%) | 88 (100%) | 0 | 100 | 100 |
| 3 | F | 88/88 (100%) | 88 (100%) | 0 | 100 | 100 |
| 3 | L | 88/88 (100%) | 88 (100%) | 0 | 100 | 100 |
| All | All | 3090/3843 (80%) | 3069 (99%) | 21 (1%) | 84 | 90 |

All (21) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
| --- | --- | --- | --- |
| 1 | A | 529 | LYS |
| 1 | A | 979 | ASP |
| 1 | A | 1126 | CYS |
| 1 | D | 131 | CYS |
| 1 | D | 361 | CYS |
| 1 | D | 391 | CYS |
| 1 | D | 538 | CYS |
| 1 | D | 590 | CYS |
| 1 | D | 738 | CYS |
| 1 | D | 820 | ASP |
| 1 | P | 361 | CYS |
| 1 | P | 525 | CYS |
| 1 | P | 590 | CYS |
| 1 | P | 718 | PHE |
| 1 | P | 800 | PHE |
| 1 | P | 801 | ASN |
| 1 | P | 802 | PHE |
| 1 | P | 1082 | CYS |
| 1 | P | 1126 | CYS |
| 2 | H | 107 | TYR |
| 2 | H | 109 | SER |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (46) such sidechains are listed below:

| Mol | Chain | Res | Type |
| --- | --- | --- | --- |
| 1 | A | 710 | ASN |
| 1 | A | 901 | GLN |
| 1 | A | 920 | GLN |
| 1 | A | 978 | ASN |
| 1 | A | 1002 | GLN |
| 1 | A | 1011 | GLN |
| 1 | A | 1023 | ASN |
| 1 | A | 1054 | GLN |
| 1 | A | 1119 | ASN |
| 1 | D | 196 | ASN |
| 1 | D | 211 | ASN |
| 1 | D | 388 | ASN |
| 1 | D | 901 | GLN |
| 1 | D | 919 | ASN |
| 1 | D | 935 | GLN |
| 1 | D | 978 | ASN |
| 1 | D | 1023 | ASN |
| 1 | D | 1054 | GLN |

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| Mol | Chain | Res | Type |
|-----|-------|------|------|
| 1 | P | 125 | ASN |
| 1 | P | 360 | ASN |
| 1 | P | 370 | ASN |
| 1 | P | 394 | ASN |
| 1 | P | 544 | ASN |
| 1 | P | 774 | GLN |
| 1 | P | 804 | GLN |
| 1 | P | 913 | GLN |
| 1 | P | 935 | GLN |
| 1 | P | 978 | ASN |
| 1 | P | 1002 | GLN |
| 1 | P | 1023 | ASN |
| 1 | P | 1054 | GLN |
| 1 | P | 1108 | ASN |
| 1 | P | 1113 | GLN |
| 3 | L | 1 | GLN |
| 3 | L | 29 | ASN |
| 3 | L | 40 | ASN |
| 3 | L | 105 | ASN |
| 2 | B | 110 | HIS |
| 3 | C | 29 | ASN |
| 3 | C | 59 | GLN |
| 3 | C | 88 | GLN |
| 2 | E | 68 | GLN |
| 2 | E | 110 | HIS |
| 3 | F | 1 | GLN |
| 3 | F | 29 | ASN |
| 3 | F | 105 | ASN |

### 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 monosaccharides in this entry.

## 5.6　Ligand geometry　ⓘ

There are no ligands in this entry.

## 5.7　Other polymers　ⓘ

There are no such residues in this entry.

## 5.8　Polymer linkage issues　ⓘ

There are no chain breaks in this entry.

# 6　Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-39546. 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 ⓘ
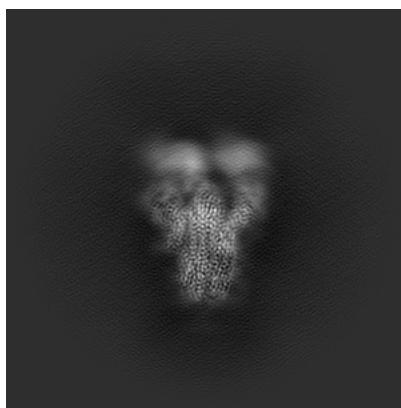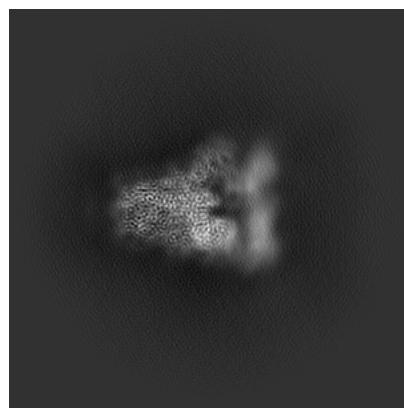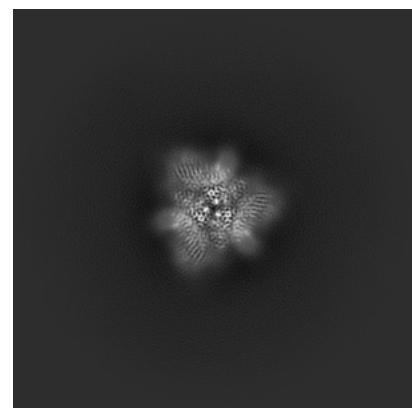
### 6.1.1　Primary map



|  X  |  Y  |  Z  |

### 6.1.2　Raw map



|  X  |  Y  |  Z  |
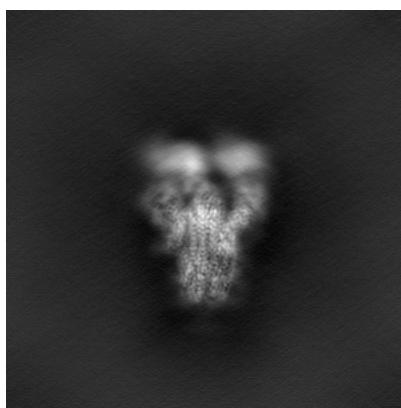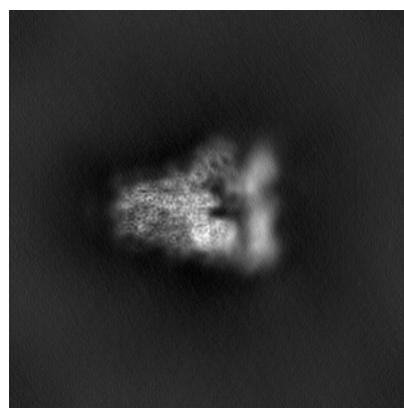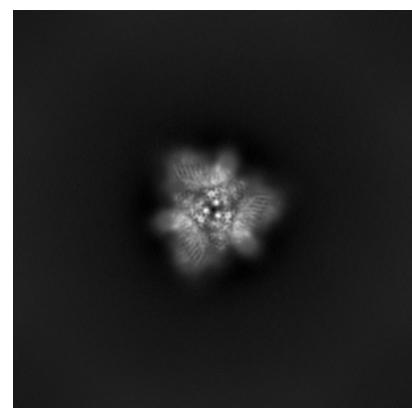
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices ⓘ
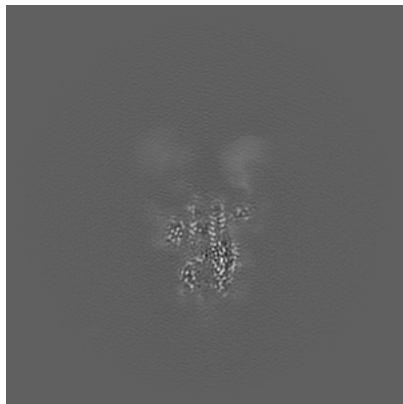
### 6.2.1 Primary map
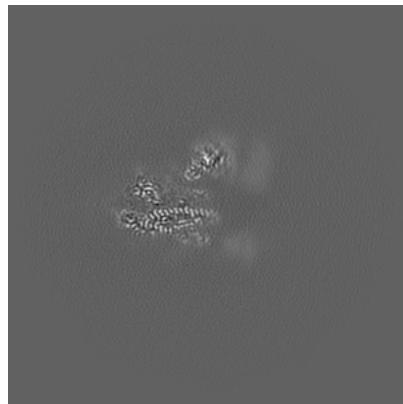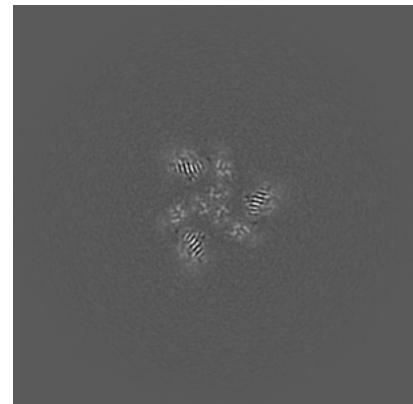


| X Index: 192 | Y Index: 192 | Z Index: 192 |

### 6.2.2 Raw map
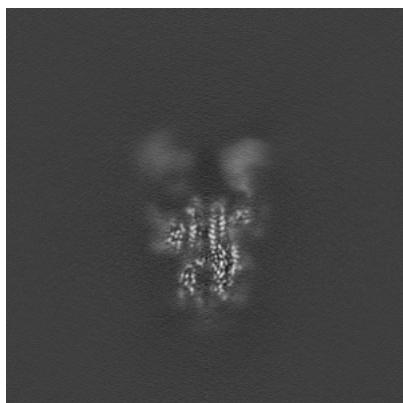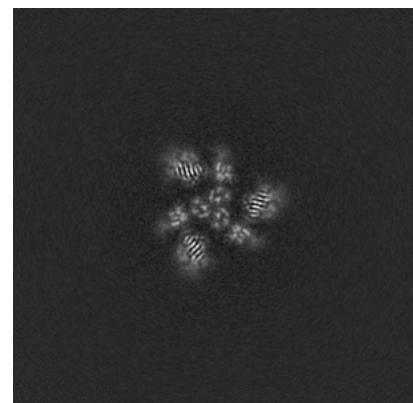


| X Index: 192 | Y Index: 192 | Z Index: 192 |

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

## 6.3   Largest variance slices ⓘ

### 6.3.1   Primary map
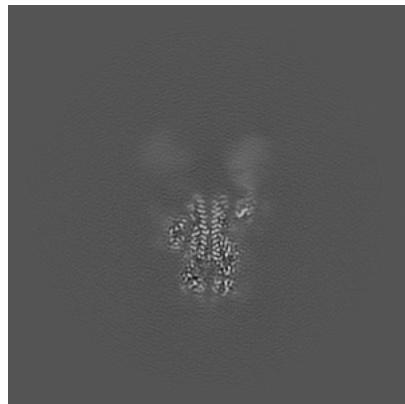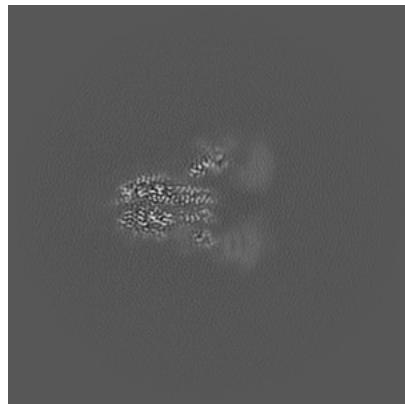


X Index: 195      Y Index: 185      Z Index: 191
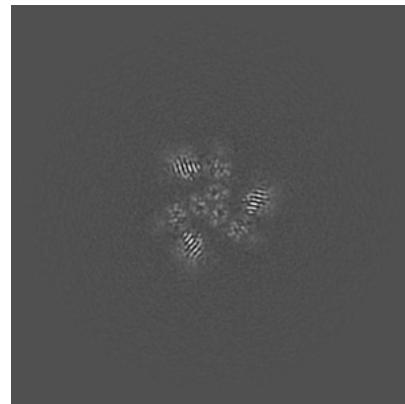
### 6.3.2   Raw map
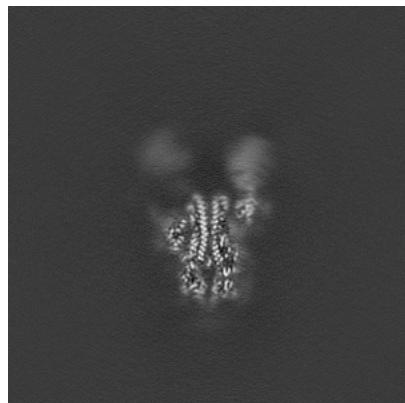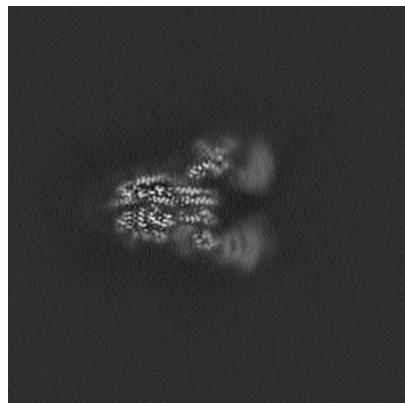


X Index: 196      Y Index: 185      Z Index: 190
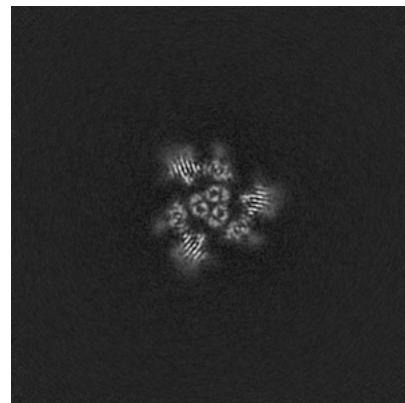
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map
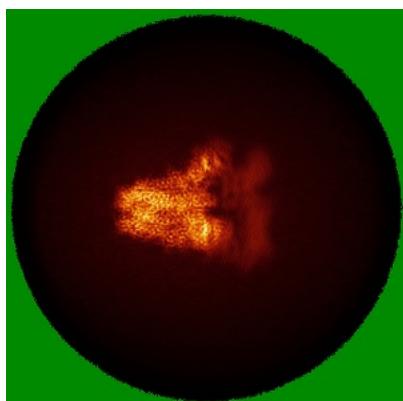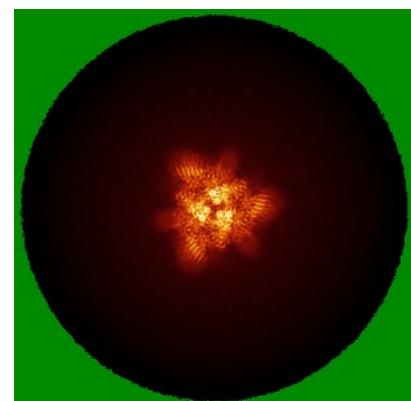


|   |   |   |
|---|---|---|
| X | Y | Z |

### 6.4.2 Raw map



|   |   |   |
|---|---|---|
| X | Y | Z |
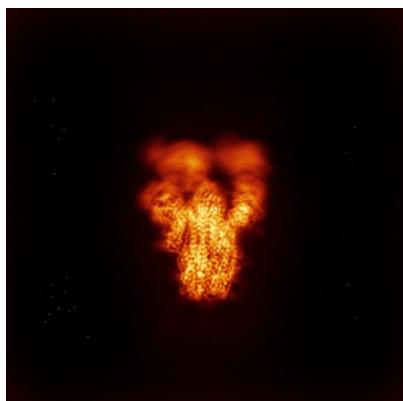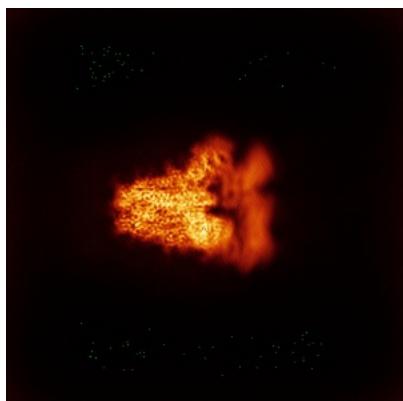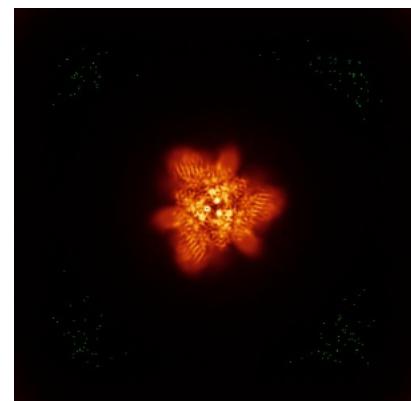
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views ⓘ

### 6.5.1 Primary map



| X | Y | Z |
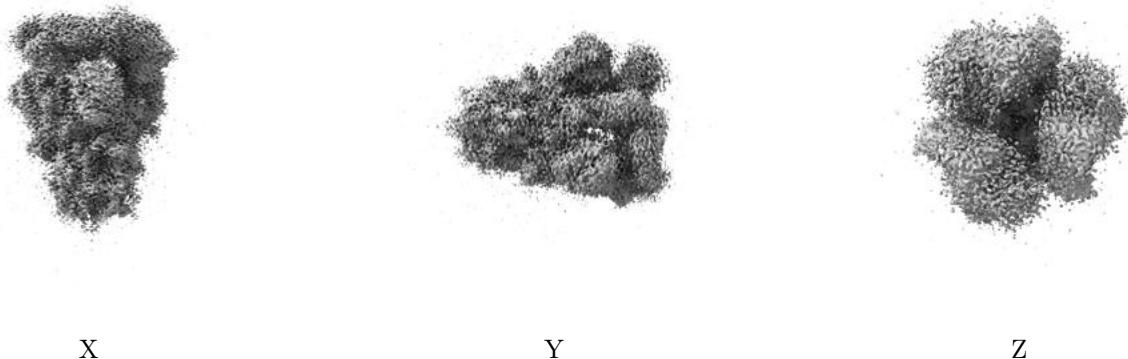
The images above show the 3D surface view of the map at the recommended contour level 0.22. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



| X | Y | Z |
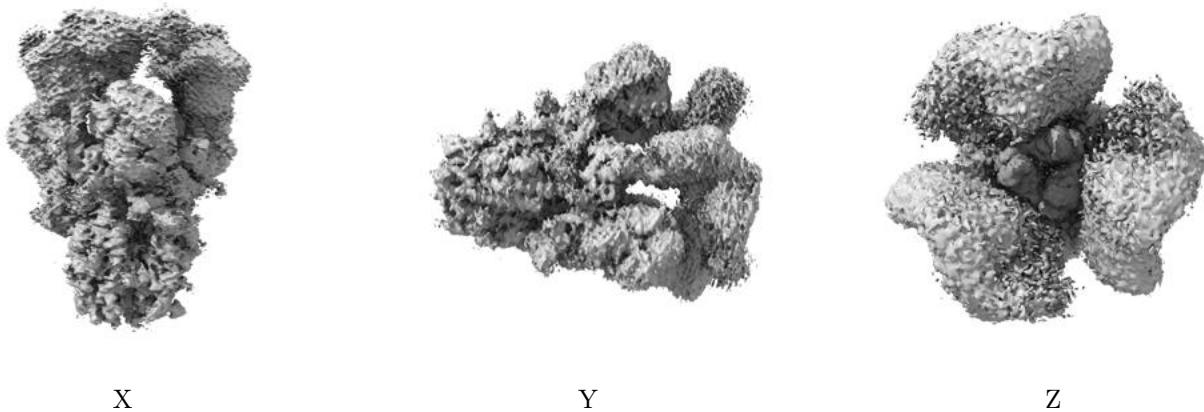
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

## 6.6 Mask visualisation ⓘ

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)
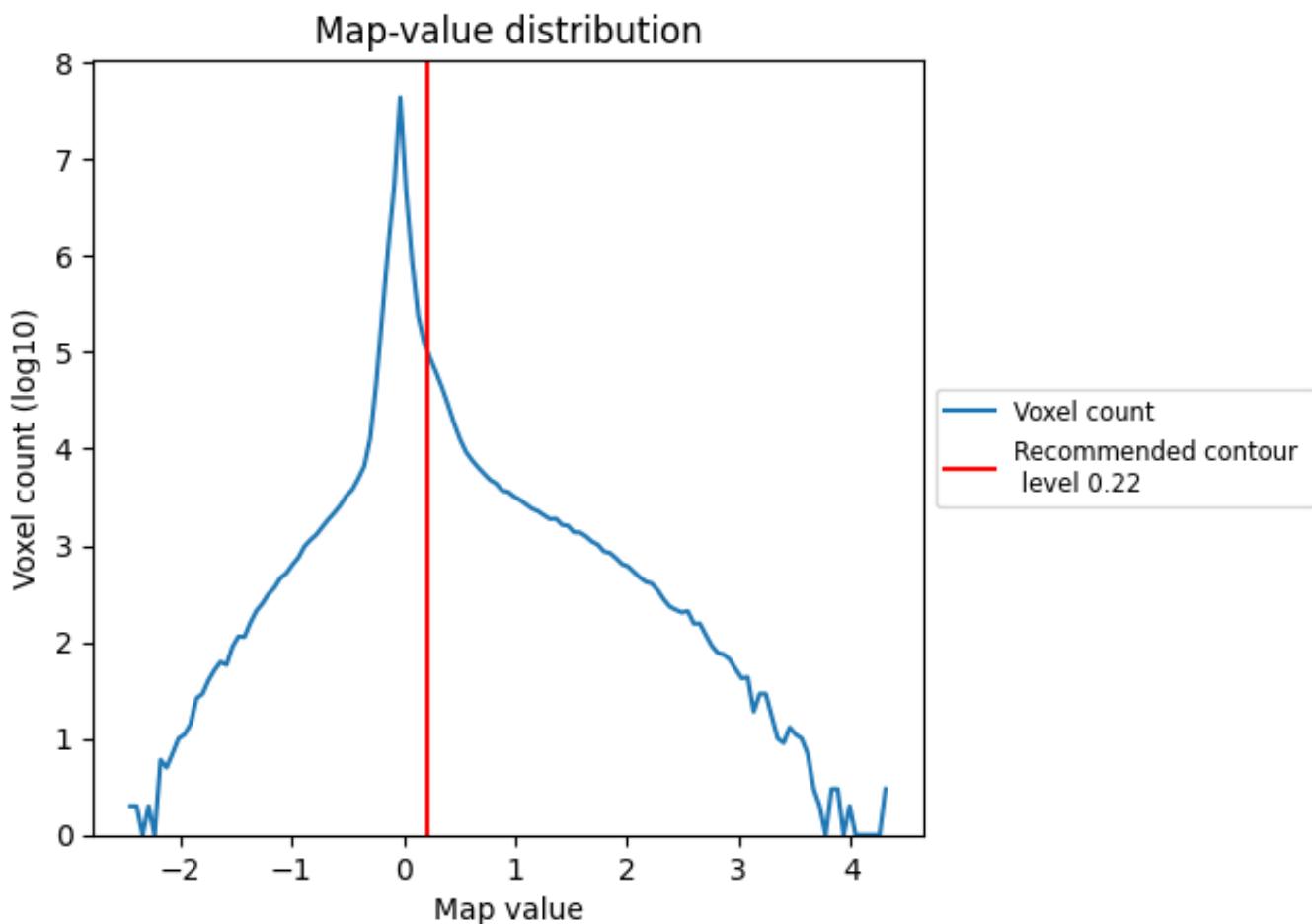


The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

## 7.2   Volume estimate ⓘ
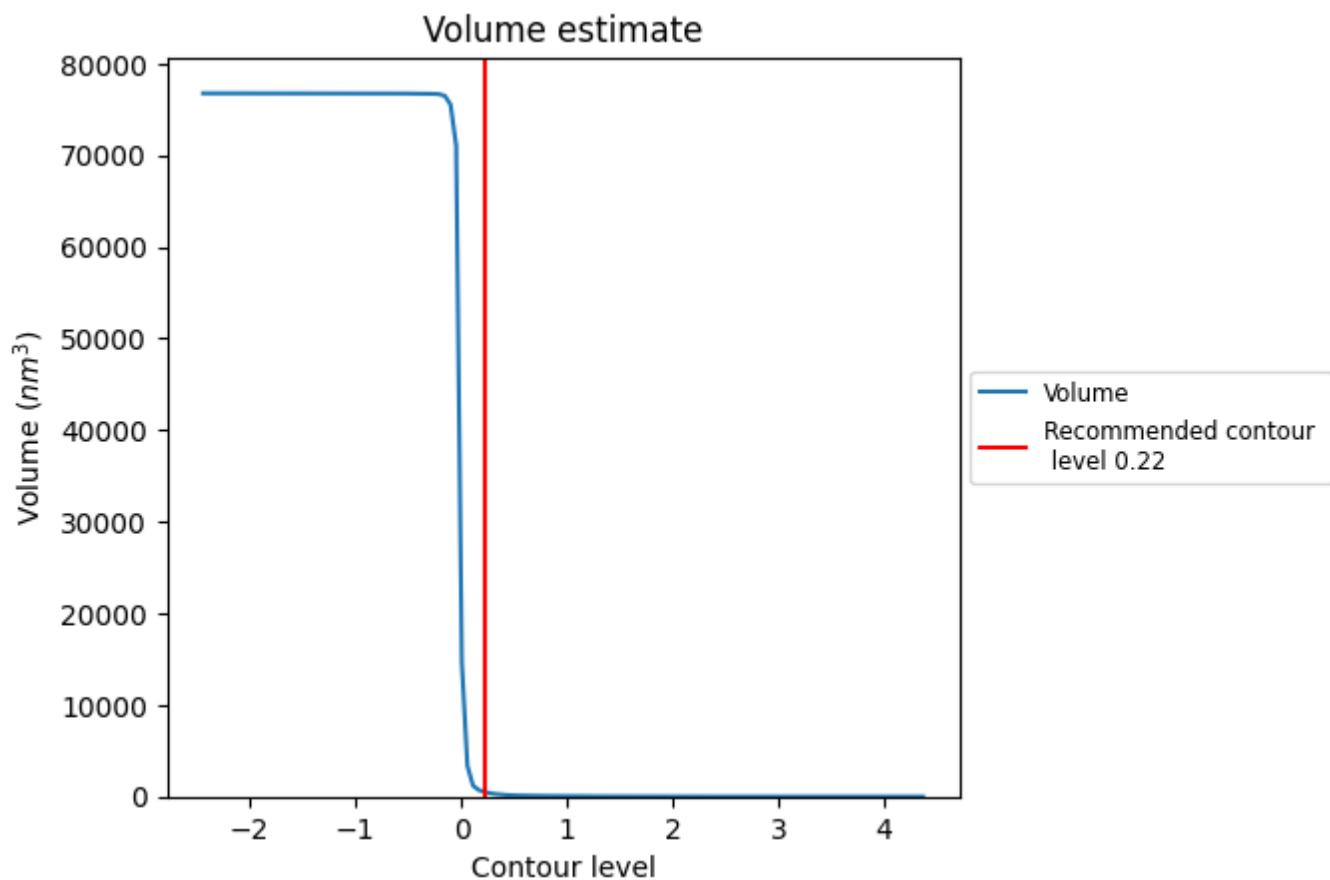


The volume at the recommended contour level is 501 nm$^3$; this corresponds to an approximate mass of 453 kDa.

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 ⓘ
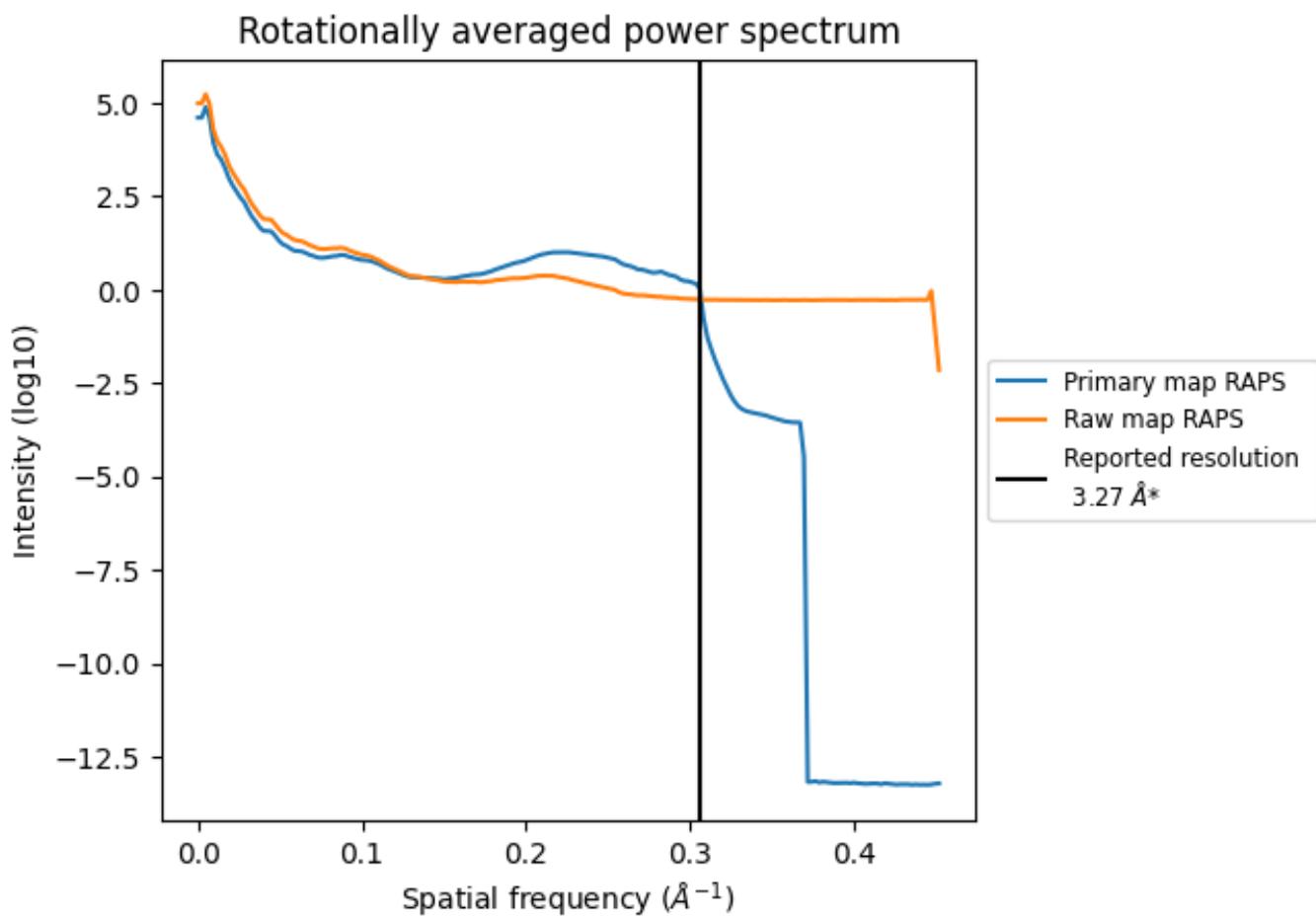


*Reported resolution corresponds to spatial frequency of 0.306 Å$^{-1}$

# 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 ⓘ
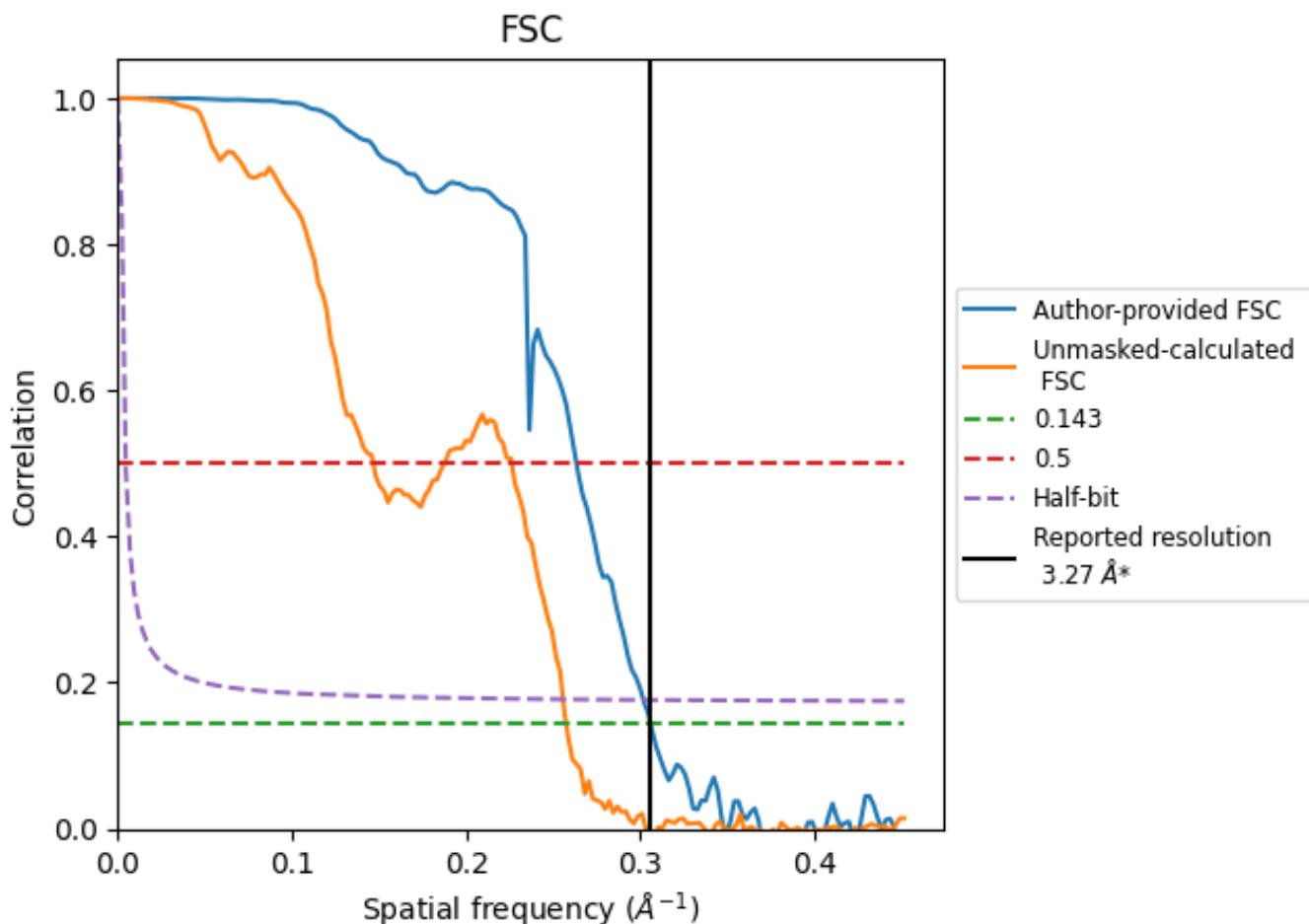


*Reported resolution corresponds to spatial frequency of 0.306 Å$^{-1}$

## 8.2 Resolution estimates (i)

| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|:---:|:---:|:---:|:---:|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 3.27 | - | - |
| Author-provided FSC curve | 3.27 | 3.80 | 3.31 |
| Unmasked-calculated* | 3.88 | 6.81 | 3.91 |

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.88 differs from the reported value 3.27 by more than 10 %

# 9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-39546 and PDB model 8YRO. Per-residue inclusion information can be found in section 3 on page 11.

## 9.1 Map-model overlay ⓘ



| X | Y | Z |
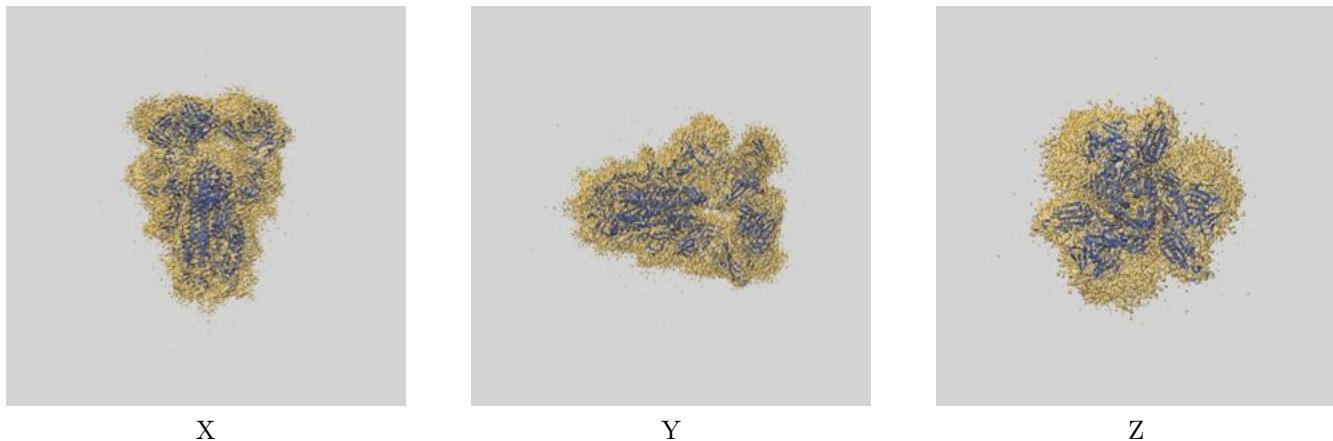
The images above show the 3D surface view of the map at the recommended contour level 0.22 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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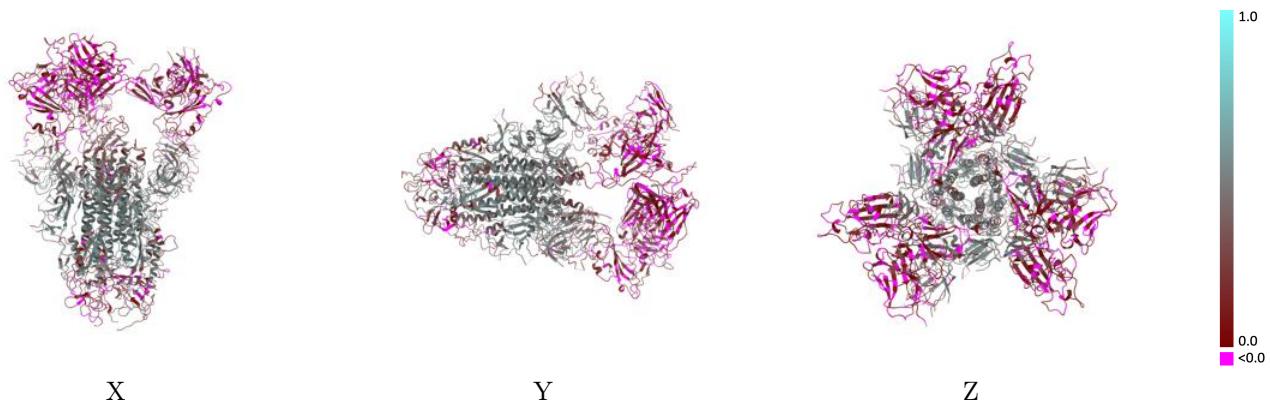


The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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)
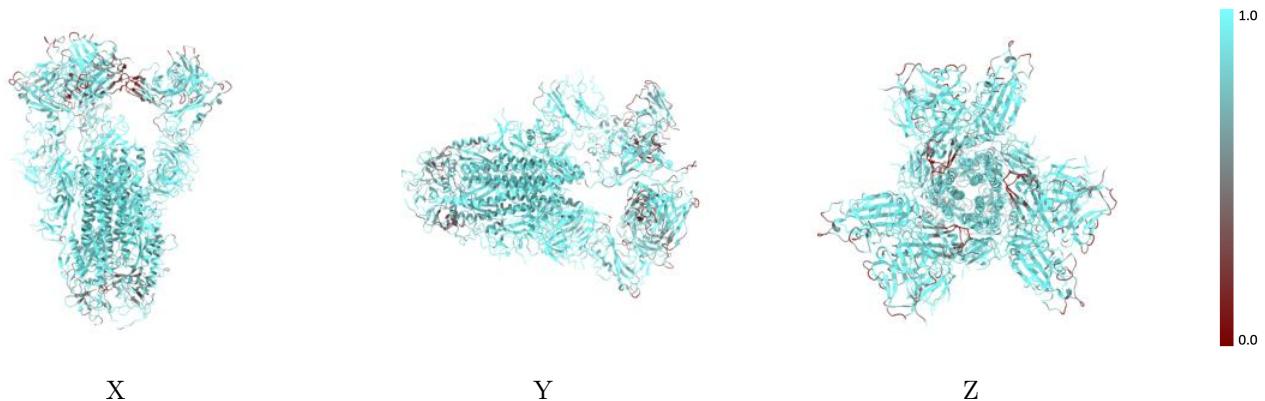


The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.22).

## 9.4　Atom inclusion ⓘ
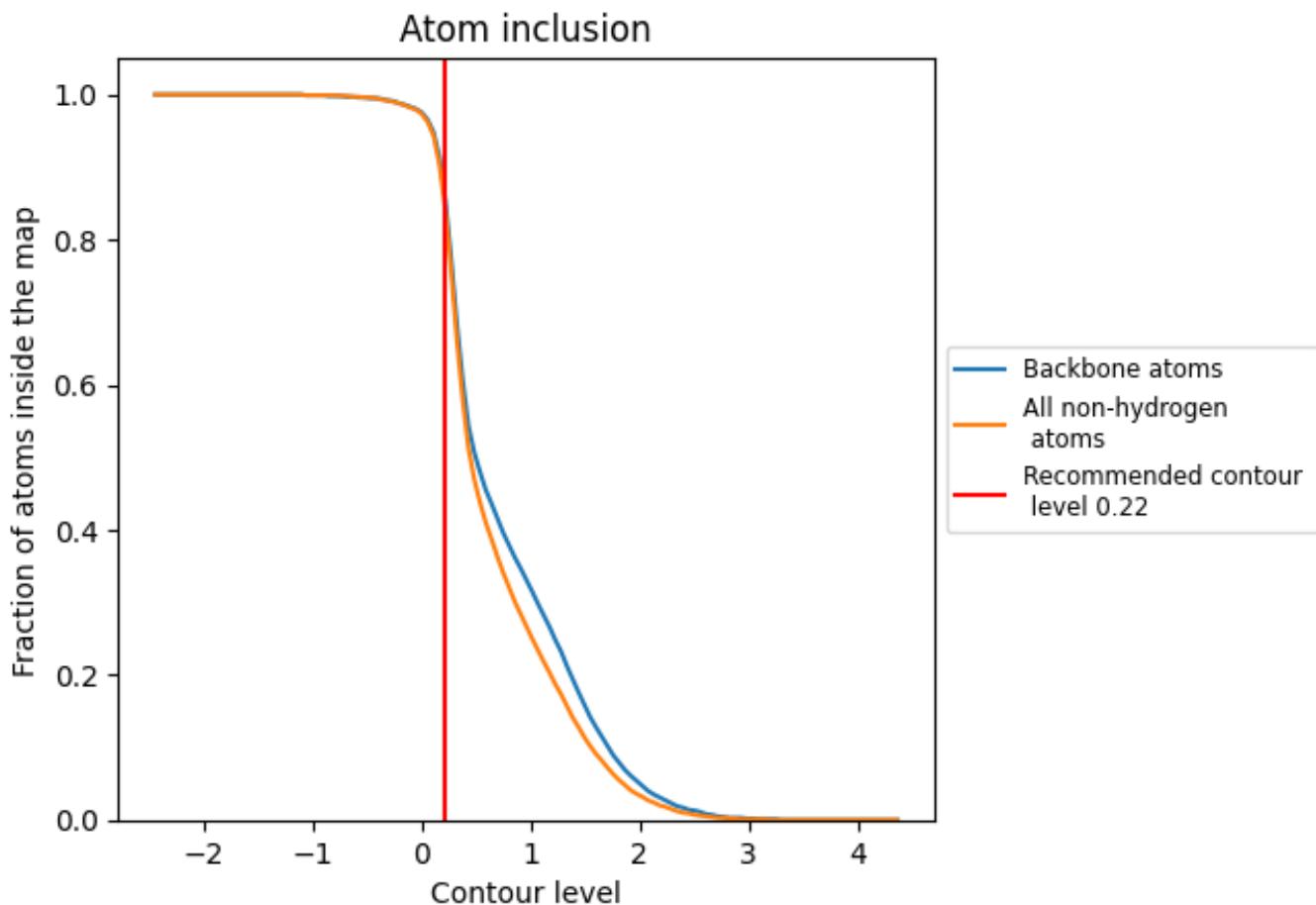
Atom inclusion



At the recommended contour level, 85% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

## 9.5   Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.22) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|:-----:|:--------------:|:-------:|
| All | 0.8400 | 0.2830 |
| A | 0.8690 | 0.3260 |
| B | 0.7130 | 0.0410 |
| C | 0.6390 | 0.0720 |
| D | 0.8800 | 0.3380 |
| E | 0.7070 | 0.0460 |
| F | 0.6430 | 0.0650 |
| H | 0.7050 | 0.0400 |
| L | 0.6290 | 0.0670 |
| P | 0.8830 | 0.3440 |

1.0

0.0
<0.0