# Full wwPDB EM Validation Report ⓘ

Jun 17, 2025 – 01:53 AM JST

| | | |
|---|---|---|
| PDB ID | : | 8HCR / pdb_00008hcr |
| EMDB ID | : | EMD-34664 |
| Title | : | Cryo-EM structure of the Mycobacterium tuberculosis cytochrome bcc:aa3 supercomplex and a novel inhibitor targeting subunit cytochrome cI |
| Authors | : | Mathiyazakan, V.; Gruber, G. |
| Deposited on | : | 2022-11-02 |
| Resolution | : | 4.50 Å(reported) |

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

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

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

---

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

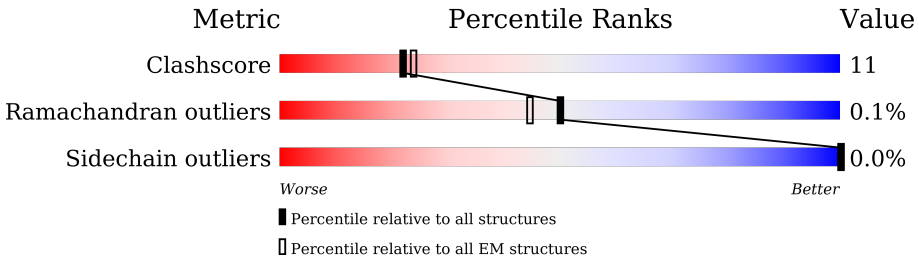
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev118 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| MolProbity | : | 4-5-2 with Phenix2.0rc1 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.44 |

# 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 4.50 Å.

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




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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 429 | 72% 16% 12% |
| 1 | M | 429 | 68% 19% 13% |
| 2 | B | 573 | 68% 23% 9% |
| 2 | N | 573 | 69% 23% 9% |
| 3 | C | 280 | 59% 19% 22% |
| 3 | O | 280 | 59% 17% 24% |
| 4 | E | 363 | 55% 21% 24% |
| 4 | Q | 363 | 55% 23% 22% |
| 5 | F | 573 | 65% 31% . |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 5 | R | 573 | 70% 26% |
| 6 | G | 203 | 72% 20% 8% |
| 6 | S | 203 | 70% 20% 9% |
| 7 | H | 139 | 82% 18% |
| 7 | T | 139 | 82% 18% |
| 8 | I | 79 | 73% 11% 15% |
| 8 | U | 79 | 70% 15% 15% |
| 9 | J | 155 | 77% 14% 8% |
| 9 | V | 155 | 70% 22% 8% |

# 2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 38845 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 Cytochrome bc1 complex Rieske iron-sulfur subunit.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 378 | Total | C | N | O | S | 0 | 0 |
| | | | 2912 | 1884 | 499 | 518 | 11 | | |
| 1 | M | 372 | Total | C | N | O | S | 0 | 0 |
| | | | 2882 | 1869 | 494 | 508 | 11 | | |

- Molecule 2 is a protein called Cytochrome bc1 complex cytochrome b subunit.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | B | 524 | Total | C | N | O | S | 0 | 0 |
| | | | 4130 | 2729 | 703 | 681 | 17 | | |
| 2 | N | 524 | Total | C | N | O | S | 0 | 0 |
| | | | 4118 | 2723 | 701 | 677 | 17 | | |

There are 48 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | 550 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| B | 551 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| B | 552 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| B | 553 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| B | 554 | GLU | - | expression tag | UNP A0A0K2HYC0 |
| B | 555 | ASN | - | expression tag | UNP A0A0K2HYC0 |
| B | 556 | LEU | - | expression tag | UNP A0A0K2HYC0 |
| B | 557 | TYR | - | expression tag | UNP A0A0K2HYC0 |
| B | 558 | PHE | - | expression tag | UNP A0A0K2HYC0 |
| B | 559 | GLN | - | expression tag | UNP A0A0K2HYC0 |
| B | 560 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| B | 561 | TYR | - | expression tag | UNP A0A0K2HYC0 |
| B | 562 | LYS | - | expression tag | UNP A0A0K2HYC0 |
| B | 563 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| B | 564 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| B | 565 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| B | 566 | ASP | - | expression tag | UNP A0A0K2HYC0 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | 567 | LYS | - | expression tag | UNP A0A0K2HYC0 |
| B | 568 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| B | 569 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| B | 570 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| B | 571 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| B | 572 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| B | 573 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| N | 550 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| N | 551 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| N | 552 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| N | 553 | GLY | - | expression tag | UNP A0A0K2HYC0 |
| N | 554 | GLU | - | expression tag | UNP A0A0K2HYC0 |
| N | 555 | ASN | - | expression tag | UNP A0A0K2HYC0 |
| N | 556 | LEU | - | expression tag | UNP A0A0K2HYC0 |
| N | 557 | TYR | - | expression tag | UNP A0A0K2HYC0 |
| N | 558 | PHE | - | expression tag | UNP A0A0K2HYC0 |
| N | 559 | GLN | - | expression tag | UNP A0A0K2HYC0 |
| N | 560 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| N | 561 | TYR | - | expression tag | UNP A0A0K2HYC0 |
| N | 562 | LYS | - | expression tag | UNP A0A0K2HYC0 |
| N | 563 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| N | 564 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| N | 565 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| N | 566 | ASP | - | expression tag | UNP A0A0K2HYC0 |
| N | 567 | LYS | - | expression tag | UNP A0A0K2HYC0 |
| N | 568 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| N | 569 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| N | 570 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| N | 571 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| N | 572 | HIS | - | expression tag | UNP A0A0K2HYC0 |
| N | 573 | HIS | - | expression tag | UNP A0A0K2HYC0 |

- Molecule 3 is a protein called Cytochrome bc1 complex cytochrome c subunit.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 3 | C | 218 | Total | C | N | O | S | 0 | 0 |
| | | | 1487 | 930 | 274 | 274 | 9 | | |
| 3 | O | 213 | Total | C | N | O | S | 0 | 0 |
| | | | 1458 | 921 | 261 | 268 | 8 | | |

- Molecule 4 is a protein called CYTOCHROME AA3 SUBUNIT CtaC.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 4 | E | 276 | Total | C | N | O | S | 0 | 0 |
| | | | 2204 | 1440 | 365 | 390 | 9 | | |
| 4 | Q | 283 | Total | C | N | O | S | 0 | 0 |
| | | | 2247 | 1465 | 375 | 398 | 9 | | |

- Molecule 5 is a protein called Probable cytochrome c oxidase subunit 1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 5 | F | 552 | Total | C | N | O | S | 0 | 0 |
| | | | 4358 | 2926 | 692 | 715 | 25 | | |
| 5 | R | 552 | Total | C | N | O | S | 0 | 0 |
| | | | 4358 | 2926 | 692 | 715 | 25 | | |

- Molecule 6 is a protein called Probable cytochrome c oxidase subunit 3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 6 | G | 186 | Total | C | N | O | S | 0 | 0 |
| | | | 1473 | 987 | 234 | 245 | 7 | | |
| 6 | S | 185 | Total | C | N | O | S | 0 | 0 |
| | | | 1467 | 984 | 233 | 243 | 7 | | |

- Molecule 7 is a protein called Cytochrome c oxidase polypeptide 4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 7 | H | 139 | Total | C | N | O | S | 0 | 0 |
| | | | 1048 | 699 | 163 | 182 | 4 | | |
| 7 | T | 139 | Total | C | N | O | S | 0 | 0 |
| | | | 1045 | 698 | 163 | 180 | 4 | | |

- Molecule 8 is a protein called CYTOCHROME AA3 SUBUNIT CtaJ.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | I | 67 | Total | C | N | O | S | 0 | 0 |
| | | | 511 | 344 | 82 | 84 | 1 | | |
| 8 | U | 67 | Total | C | N | O | S | 0 | 0 |
| | | | 510 | 344 | 82 | 83 | 1 | | |

- Molecule 9 is a protein called DUF5130 domain-containing protein.

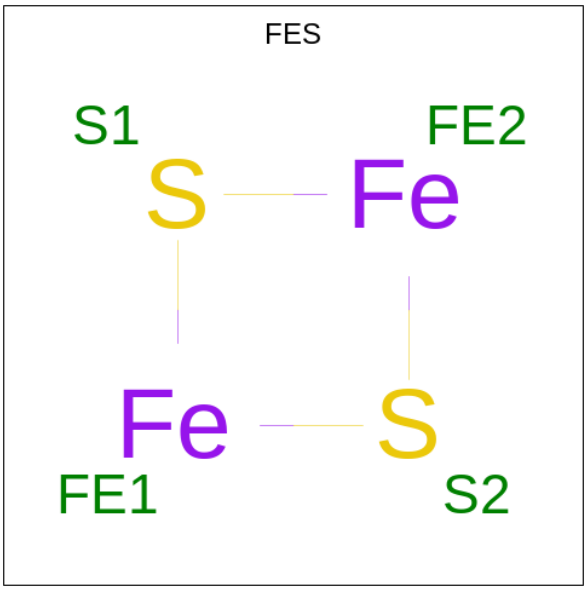
| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | J | 143 | Total | C | N | O | S | 0 | 0 |
| | | | 1019 | 645 | 177 | 195 | 2 | | |

*Continued on next page...*

*Continued from previous page...*

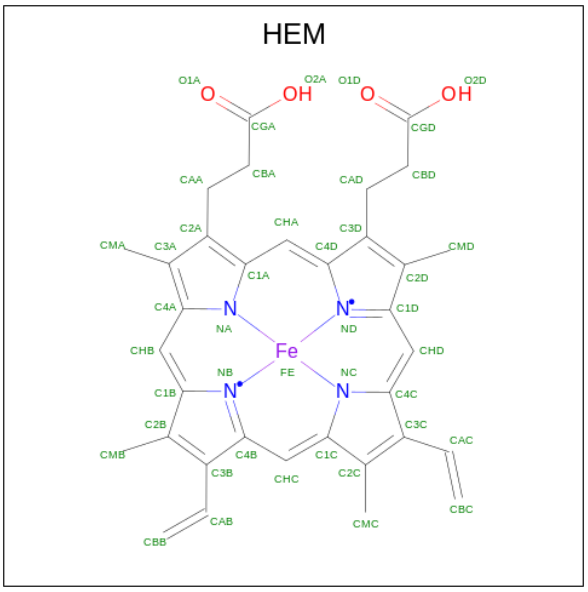
| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | V | 143 | Total | C | N | O | S | 0 | 0 |
| | | | 1028 | 649 | 180 | 197 | 2 | | |

- Molecule 10 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: $Fe_2S_2$) (labeled as "Ligand of Interest" by depositor).



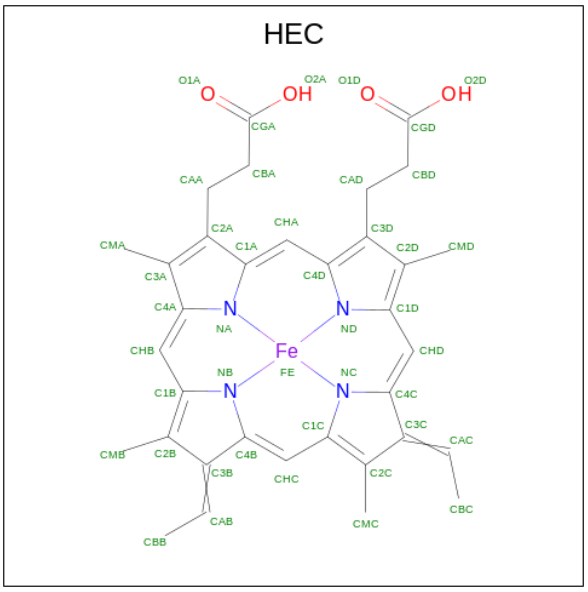

| Mol | Chain | Residues | Atoms | | | | AltConf |
|---|---|---|---|---|---|---|---|
| 10 | A | 1 | Total | Fe | S | | 0 |
| | | | 4 | 2 | 2 | | |
| 10 | M | 1 | Total | Fe | S | | 0 |
| | | | 4 | 2 | 2 | | |

- Molecule 11 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$) (labeled as "Ligand of Interest" by depositor).



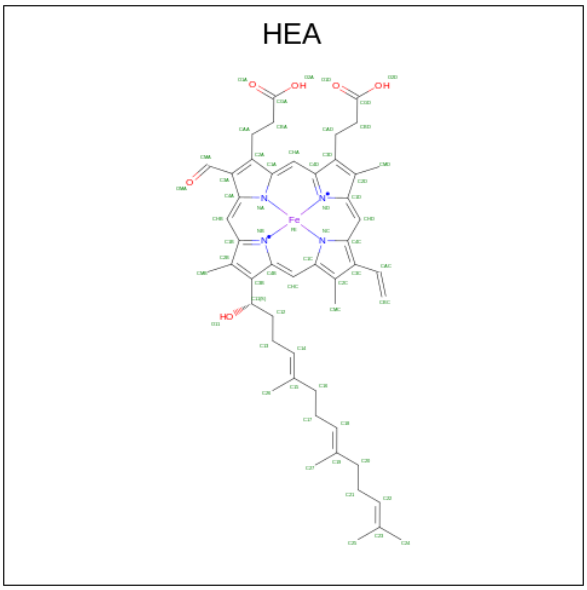

| Mol | Chain | Residues | Atoms | | | | | AltConf |
|---|---|---|---|---|---|---|---|---|
| 11 | B | 1 | Total | C | Fe | N | O | 0 |
| | | | 42 | 33 | 1 | 4 | 4 | |
| 11 | B | 1 | Total | C | Fe | N | O | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | |
| 11 | N | 1 | Total | C | Fe | N | O | 0 |
| | | | 42 | 33 | 1 | 4 | 4 | |
| 11 | N | 1 | Total | C | Fe | N | O | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | |

- Molecule 12 is HEME C (CCD ID: HEC) (formula: $C_{34}H_{34}FeN_4O_4$) (labeled as "Ligand of Interest" by depositor).



| Mol | Chain | Residues | Atoms | | | | | AltConf |
|---|---|---|---|---|---|---|---|---|
| 12 | C | 1 | Total | C | Fe | N | O | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | |
| 12 | C | 1 | Total | C | Fe | N | O | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | |
| 12 | O | 1 | Total | C | Fe | N | O | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | |
| 12 | O | 1 | Total | C | Fe | N | O | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | |

- Molecule 13 is HEME-A (CCD ID: HEA) (formula: $C_{49}H_{56}FeN_4O_6$) (labeled as "Ligand of Interest" by depositor).



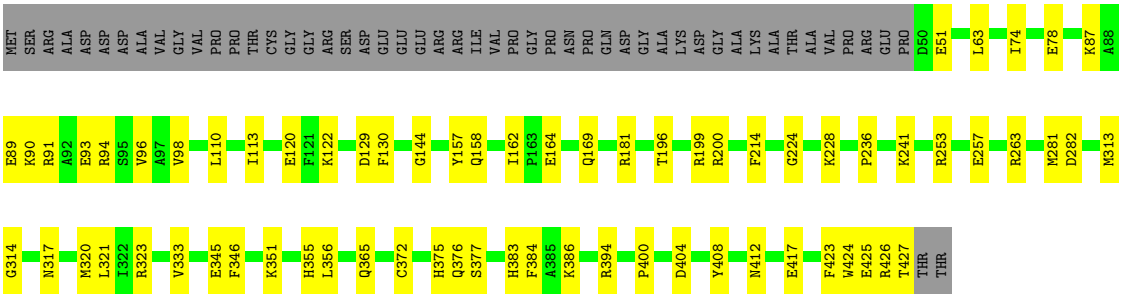

| Mol | Chain | Residues | Atoms | | | | | AltConf |
|---|---|---|---|---|---|---|---|---|
| 13 | F | 1 | Total | C | Fe | N | O | 0 |
| | | | 60 | 49 | 1 | 4 | 6 | |
| 13 | F | 1 | Total | C | Fe | N | O | 0 |
| | | | 60 | 49 | 1 | 4 | 6 | |
| 13 | R | 1 | Total | C | Fe | N | O | 0 |
| | | | 60 | 49 | 1 | 4 | 6 | |
| 13 | R | 1 | Total | C | Fe | N | O | 0 |
| | | | 60 | 49 | 1 | 4 | 6 | |

# 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. 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. 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.

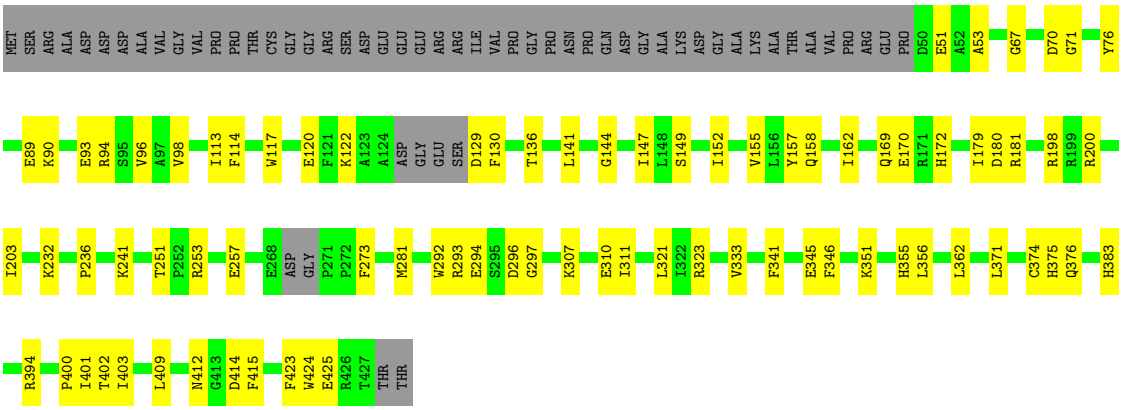
• Molecule 1: Cytochrome bc1 complex Rieske iron-sulfur subunit

Chain A:



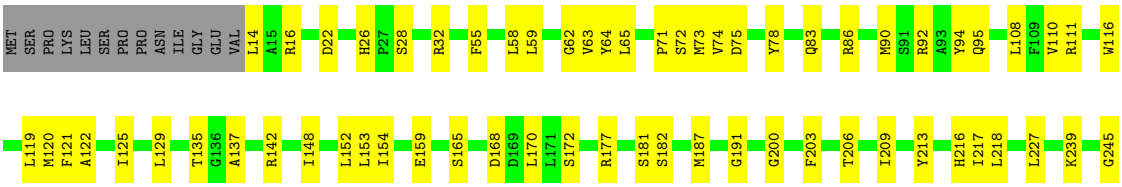

• Molecule 1: Cytochrome bc1 complex Rieske iron-sulfur subunit

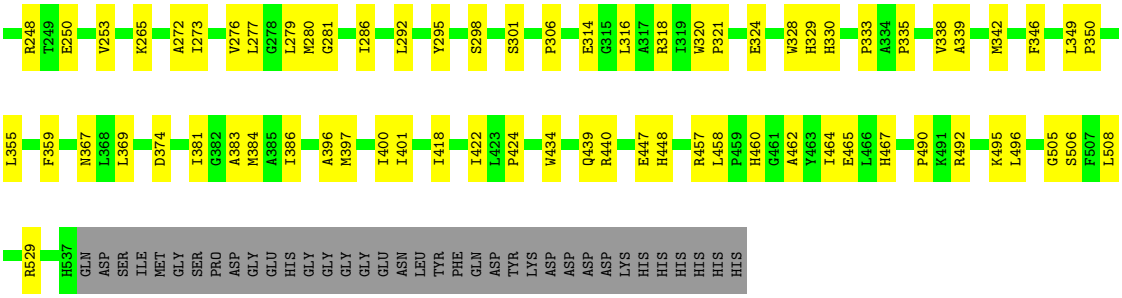
Chain M:




• Molecule 2: Cytochrome bc1 complex cytochrome b subunit

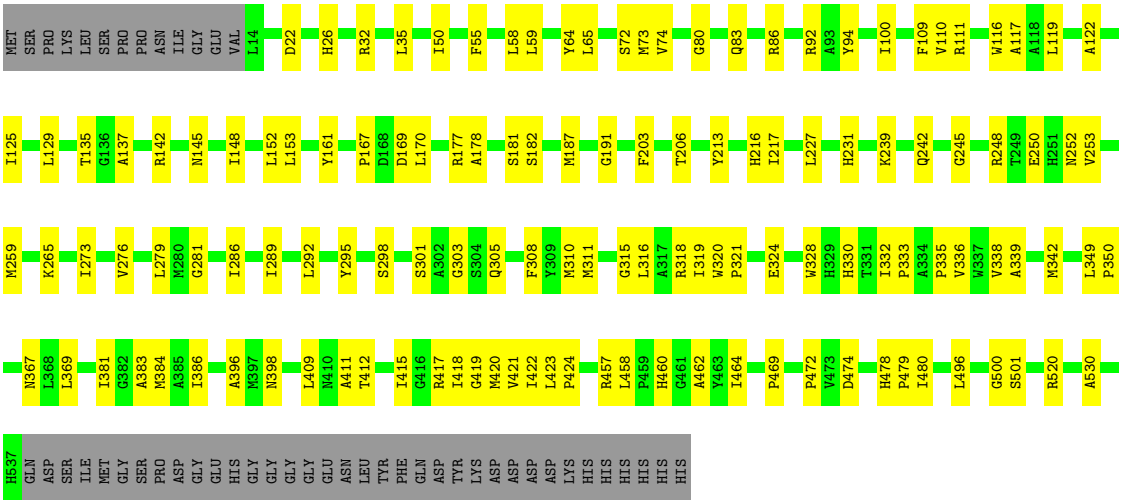
Chain B:





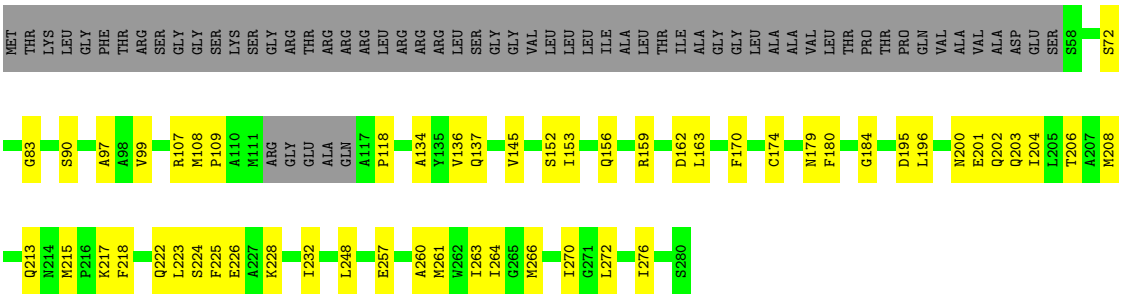

• Molecule 2: Cytochrome bc1 complex cytochrome b subunit

Chain N:



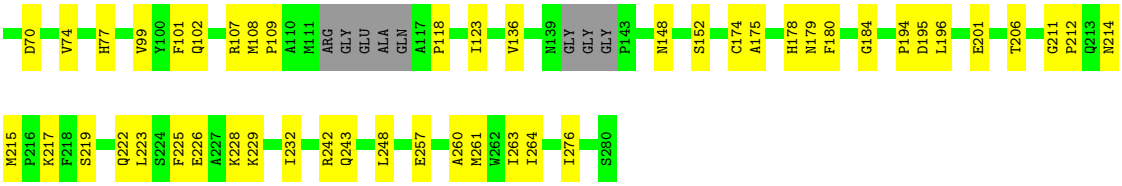

• Molecule 3: Cytochrome bc1 complex cytochrome c subunit

Chain C:



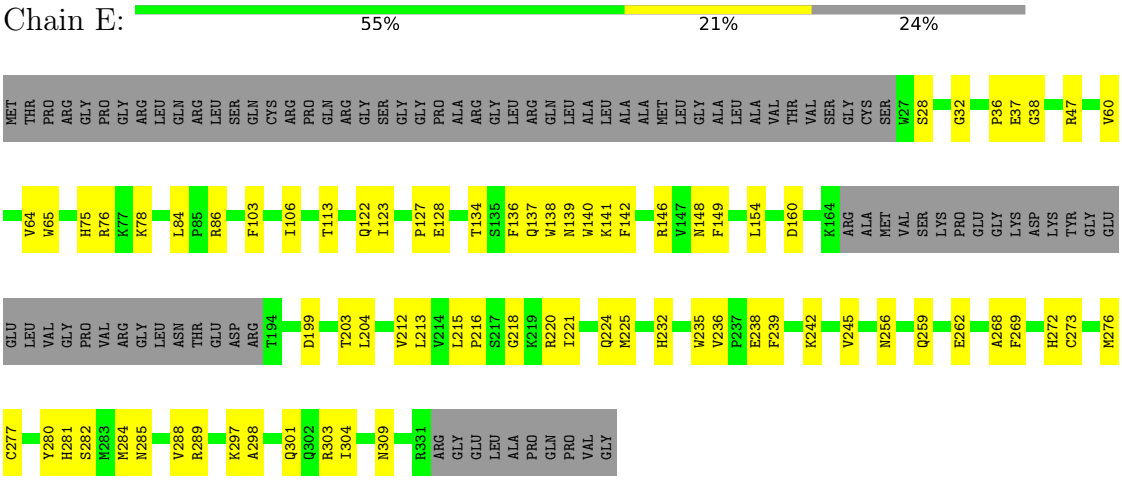

• Molecule 3: Cytochrome bc1 complex cytochrome c subunit

Chain O:



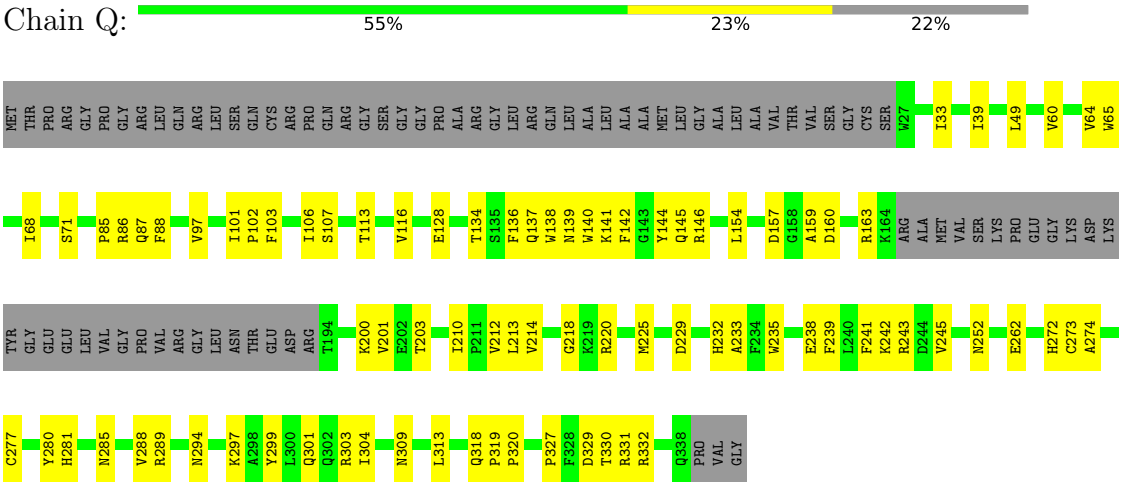

• Molecule 4: CYTOCHROME AA3 SUBUNIT CtaC

Chain E:



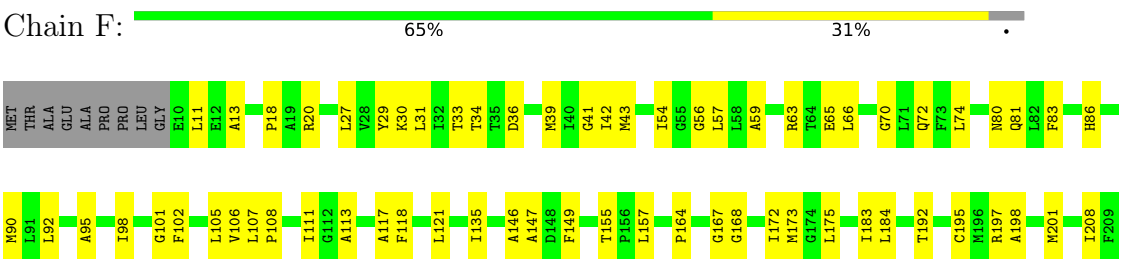

• Molecule 4: CYTOCHROME AA3 SUBUNIT CtaC

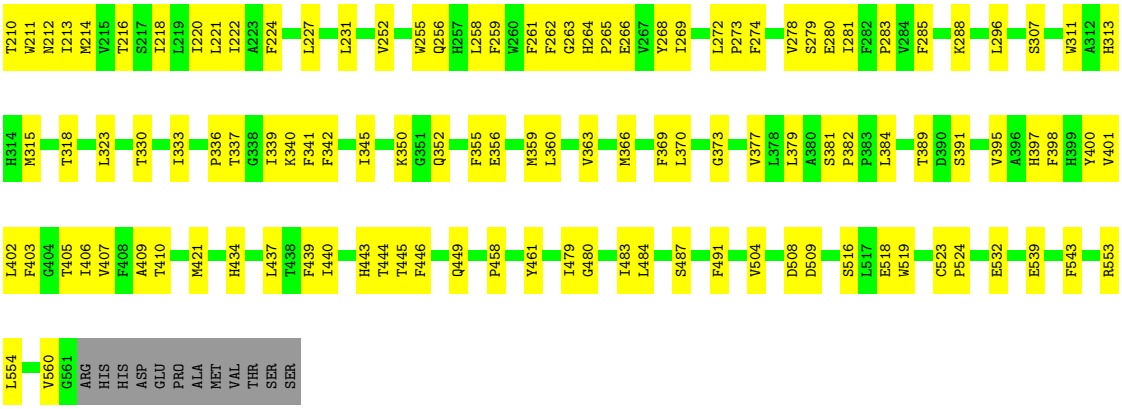
Chain Q:




• Molecule 5: Probable cytochrome c oxidase subunit 1

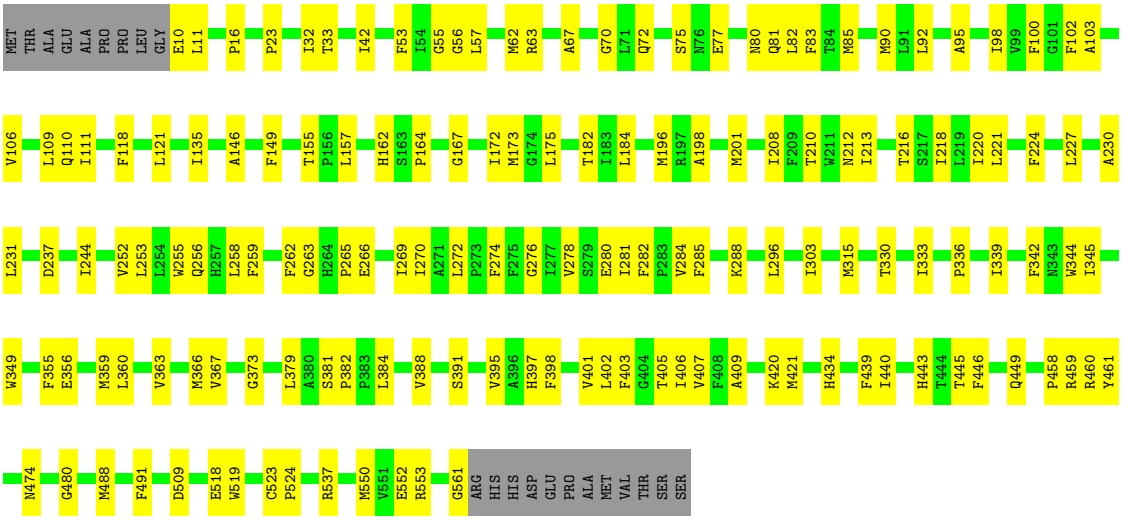
Chain F:





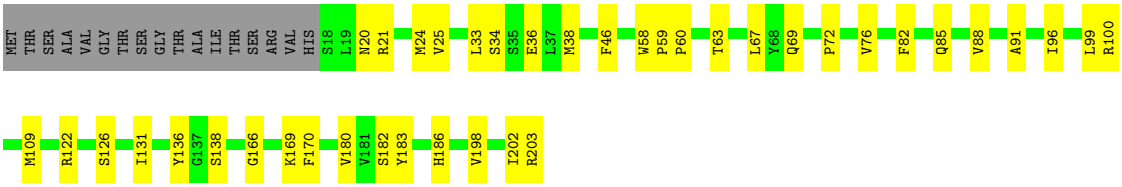

• Molecule 5: Probable cytochrome c oxidase subunit 1

Chain R:



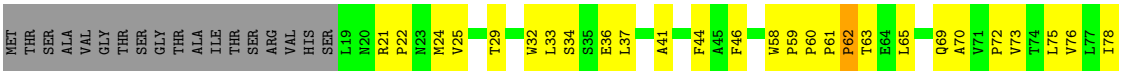

• Molecule 6: Probable cytochrome c oxidase subunit 3

Chain G:



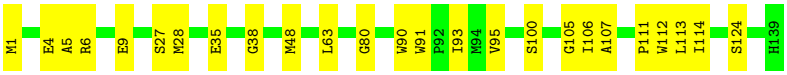

• Molecule 6: Probable cytochrome c oxidase subunit 3

Chain S:



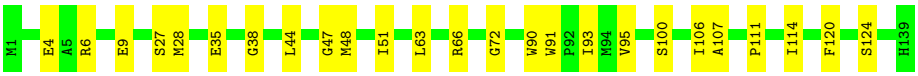
• Molecule 7: Cytochrome c oxidase polypeptide 4

Chain H:



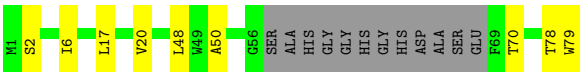

• Molecule 7: Cytochrome c oxidase polypeptide 4

Chain T:




• Molecule 8: CYTOCHROME AA3 SUBUNIT CtaJ

Chain I:

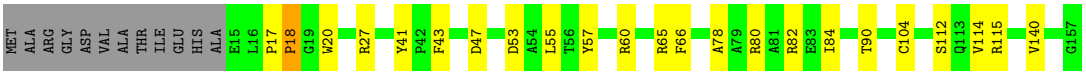



• Molecule 8: CYTOCHROME AA3 SUBUNIT CtaJ

Chain U:

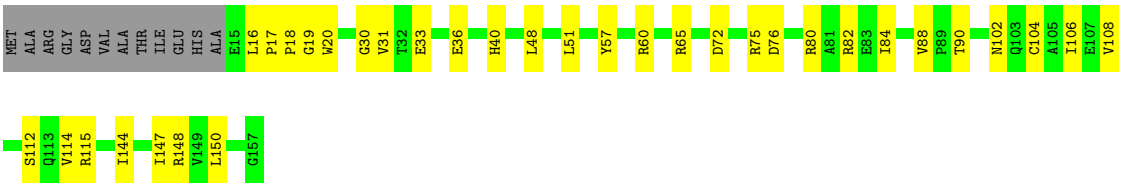
• Molecule 9: DUF5130 domain-containing protein

Chain J:




• Molecule 9: DUF5130 domain-containing protein

Chain V:



# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | TOMOGRAPHY | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of tilted images used | 100 | Depositor |
| Resolution determination method | Not provided | |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | FEI TITAN KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 40 | Depositor |
| Minimum defocus (nm) | 1000 | Depositor |
| Maximum defocus (nm) | 2000 | Depositor |
| Magnification | Not provided | |
| Image detector | GATAN K2 SUMMIT (4k x 4k) | Depositor |
| Maximum voxel value | 1.927 | Depositor |
| Minimum voxel value | -0.639 | Depositor |
| Average voxel value | 0.002 | Depositor |
| Voxel value standard deviation | 0.034 | Depositor |
| Recommended contour level | Not applicable | |
| Tomogram size (Å) | 530.0, 530.0, 530.0 | wwPDB |
| Tomogram dimensions | 500, 500, 500 | wwPDB |
| Tomogram angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Grid spacing (Å) | 1.06, 1.06, 1.06 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FES, HEA, HEC, HEM

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 | 0.11 | 0/2989 | 0.30 | 0/4056 |
| 1 | M | 0.11 | 0/2957 | 0.31 | 0/4008 |
| 2 | B | 0.12 | 0/4266 | 0.33 | 0/5821 |
| 2 | N | 0.12 | 0/4253 | 0.33 | 0/5804 |
| 3 | C | 0.12 | 0/1516 | 0.36 | 0/2061 |
| 3 | O | 0.12 | 0/1487 | 0.38 | 0/2022 |
| 4 | E | 0.11 | 0/2266 | 0.30 | 0/3090 |
| 4 | Q | 0.12 | 0/2310 | 0.32 | 0/3151 |
| 5 | F | 0.13 | 0/4517 | 0.37 | 0/6171 |
| 5 | R | 0.14 | 0/4517 | 0.36 | 0/6171 |
| 6 | G | 0.12 | 0/1523 | 0.35 | 0/2078 |
| 6 | S | 0.15 | 0/1517 | 0.41 | 0/2070 |
| 7 | H | 0.09 | 0/1081 | 0.27 | 0/1477 |
| 7 | T | 0.10 | 0/1078 | 0.27 | 0/1473 |
| 8 | I | 0.11 | 0/530 | 0.32 | 0/729 |
| 8 | U | 0.09 | 0/529 | 0.30 | 0/728 |
| 9 | J | 0.10 | 0/1038 | 0.30 | 0/1421 |
| 9 | V | 0.17 | 0/1047 | 0.40 | 0/1432 |
| All | All | 0.12 | 0/39421 | 0.34 | 0/53763 |

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 | A | 2912 | 0 | 2891 | 54 | 0 |
| 1 | M | 2882 | 0 | 2877 | 67 | 0 |
| 2 | B | 4130 | 0 | 4148 | 102 | 0 |
| 2 | N | 4118 | 0 | 4137 | 104 | 0 |
| 3 | C | 1487 | 0 | 1398 | 51 | 0 |
| 3 | O | 1458 | 0 | 1367 | 47 | 0 |
| 4 | E | 2204 | 0 | 2173 | 60 | 0 |
| 4 | Q | 2247 | 0 | 2204 | 57 | 0 |
| 5 | F | 4358 | 0 | 4320 | 135 | 0 |
| 5 | R | 4358 | 0 | 4321 | 118 | 0 |
| 6 | G | 1473 | 0 | 1458 | 30 | 0 |
| 6 | S | 1467 | 0 | 1453 | 37 | 0 |
| 7 | H | 1048 | 0 | 1027 | 18 | 0 |
| 7 | T | 1045 | 0 | 1025 | 23 | 0 |
| 8 | I | 511 | 0 | 516 | 10 | 0 |
| 8 | U | 510 | 0 | 513 | 11 | 0 |
| 9 | J | 1019 | 0 | 1019 | 19 | 0 |
| 9 | V | 1028 | 0 | 1032 | 26 | 0 |
| 10 | A | 4 | 0 | 0 | 0 | 0 |
| 10 | M | 4 | 0 | 0 | 0 | 0 |
| 11 | B | 85 | 0 | 57 | 8 | 0 |
| 11 | N | 85 | 0 | 57 | 7 | 0 |
| 12 | C | 86 | 0 | 63 | 7 | 0 |
| 12 | O | 86 | 0 | 64 | 16 | 0 |
| 13 | F | 120 | 0 | 107 | 22 | 0 |
| 13 | R | 120 | 0 | 108 | 16 | 0 |
| All | All | 38845 | 0 | 38335 | 871 | 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 11.

All (871) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:O:194:PRO:HD3 | 12:O:302:HEC:HAD2 | 1.35 | 1.06 |
| 3:O:215:MET:HE1 | 12:O:302:HEC:NA | 1.89 | 0.88 |
| 4:E:36:PRO:O | 4:E:47:ARG:NH2 | 2.09 | 0.86 |
| 3:O:194:PRO:HG2 | 12:O:302:HEC:HBA1 | 1.57 | 0.85 |
| 3:O:174:CYS:SG | 12:O:302:HEC:HBB3 | 2.17 | 0.84 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:O:194:PRO:CD | 12:O:302:HEC:HAD2 | 2.06 | 0.84 |
| 1:M:356:LEU:HD12 | 1:M:375:HIS:CE1 | 2.20 | 0.76 |
| 4:E:154:LEU:HD21 | 4:E:297:LYS:HG3 | 1.67 | 0.76 |
| 11:N:602:HEM:HHC | 11:N:602:HEM:HBB2 | 1.68 | 0.75 |
| 3:O:263:ILE:HG23 | 3:O:264:ILE:HG12 | 1.67 | 0.75 |
| 5:F:216:THR:HG21 | 5:F:273:PRO:HD3 | 1.69 | 0.74 |
| 4:Q:160:ASP:O | 4:Q:163:ARG:NH1 | 2.20 | 0.74 |
| 1:M:144:GLY:HA3 | 2:N:279:LEU:HG | 1.70 | 0.73 |
| 5:R:363:VAL:HA | 5:R:366:MET:HE3 | 1.70 | 0.73 |
| 4:Q:101:ILE:HG13 | 4:Q:102:PRO:HD3 | 1.70 | 0.72 |
| 2:N:301:SER:HB3 | 3:O:180:PHE:HE1 | 1.54 | 0.72 |
| 3:C:179:ASN:ND2 | 3:C:184:GLY:O | 2.22 | 0.72 |
| 3:O:179:ASN:ND2 | 3:O:184:GLY:O | 2.22 | 0.72 |
| 3:O:225:PHE:HA | 3:O:228:LYS:HE2 | 1.72 | 0.72 |
| 5:F:363:VAL:HA | 5:F:366:MET:HE3 | 1.71 | 0.71 |
| 3:O:223:LEU:O | 3:O:228:LYS:NZ | 2.23 | 0.71 |
| 5:F:149:PHE:HB3 | 5:F:157:LEU:HD22 | 1.73 | 0.71 |
| 3:C:223:LEU:O | 3:C:228:LYS:NZ | 2.24 | 0.71 |
| 5:F:80:ASN:HA | 5:F:83:PHE:CE1 | 2.25 | 0.71 |
| 5:R:80:ASN:HA | 5:R:83:PHE:CE1 | 2.26 | 0.71 |
| 1:A:320:MET:HE2 | 1:A:351:LYS:HG3 | 1.72 | 0.71 |
| 5:F:377:VAL:HG21 | 13:F:601:HEA:H251 | 1.72 | 0.71 |
| 1:A:89:GLU:OE2 | 1:M:200:ARG:NH2 | 2.24 | 0.70 |
| 4:Q:159:ALA:HB2 | 4:Q:200:LYS:HG3 | 1.73 | 0.70 |
| 3:C:213:GLN:NE2 | 12:C:301:HEC:O2D | 2.24 | 0.70 |
| 9:J:47:ASP:HB3 | 9:J:140:VAL:HG11 | 1.73 | 0.70 |
| 6:S:198:VAL:HA | 6:S:202:ILE:HD12 | 1.73 | 0.70 |
| 5:R:149:PHE:HB3 | 5:R:157:LEU:HD22 | 1.73 | 0.70 |
| 3:O:215:MET:HE1 | 12:O:302:HEC:C4A | 2.22 | 0.69 |
| 6:S:41:ALA:HB2 | 7:T:44:LEU:HD13 | 1.74 | 0.69 |
| 2:B:152:LEU:HD21 | 2:B:227:LEU:HB3 | 1.73 | 0.69 |
| 5:F:198:ALA:HB3 | 5:F:201:MET:HB2 | 1.73 | 0.69 |
| 5:F:65:GLU:HG2 | 5:F:74:LEU:HD23 | 1.73 | 0.69 |
| 4:E:218:GLY:HA2 | 4:E:262:GLU:HB2 | 1.74 | 0.69 |
| 5:R:33:THR:HG22 | 7:T:90:TRP:HB3 | 1.72 | 0.69 |
| 5:R:395:VAL:HA | 5:R:398:PHE:CE1 | 2.28 | 0.68 |
| 5:R:198:ALA:HB3 | 5:R:201:MET:HB2 | 1.74 | 0.68 |
| 4:Q:145:GLN:HG2 | 4:Q:146:ARG:HG3 | 1.74 | 0.68 |
| 4:E:142:PHE:HB2 | 4:E:203:THR:HB | 1.75 | 0.68 |
| 3:C:215:MET:HE3 | 12:C:302:HEC:C4B | 2.21 | 0.68 |
| 4:E:225:MET:HB3 | 4:E:245:VAL:HG13 | 1.75 | 0.68 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 4:Q:229:ASP:OD2 | 5:R:162:HIS:NE2 | 2.27 | 0.67 |
| 1:A:321:LEU:HD11 | 1:A:346:PHE:HD2 | 1.58 | 0.67 |
| 7:H:95:VAL:HG22 | 7:H:124:SER:HB2 | 1.74 | 0.67 |
| 3:C:225:PHE:HA | 3:C:228:LYS:HE2 | 1.77 | 0.66 |
| 4:Q:86:ARG:HB3 | 4:Q:88:PHE:HD1 | 1.60 | 0.66 |
| 4:Q:65:TRP:HH2 | 5:R:367:VAL:HG13 | 1.61 | 0.66 |
| 5:F:146:ALA:HA | 5:F:167:GLY:HA3 | 1.78 | 0.66 |
| 5:F:256:GLN:HB3 | 5:F:315:MET:HE1 | 1.78 | 0.66 |
| 5:R:256:GLN:HB3 | 5:R:315:MET:HE1 | 1.78 | 0.66 |
| 5:F:33:THR:HG22 | 7:H:90:TRP:HB3 | 1.78 | 0.65 |
| 5:R:111:ILE:HD11 | 5:R:210:THR:HG21 | 1.78 | 0.65 |
| 5:F:440:ILE:HA | 5:F:443:HIS:CE1 | 2.32 | 0.65 |
| 3:C:263:ILE:HG23 | 3:C:264:ILE:HG12 | 1.79 | 0.65 |
| 6:S:180:VAL:HA | 6:S:183:TYR:CE1 | 2.32 | 0.65 |
| 4:E:242:LYS:NZ | 5:F:389:THR:O | 2.30 | 0.65 |
| 3:C:83:GLY:HA3 | 3:C:90:SER:HA | 1.77 | 0.65 |
| 5:F:212:ASN:ND2 | 5:F:272:LEU:O | 2.30 | 0.65 |
| 3:O:101:PHE:HB2 | 3:O:206:THR:HG23 | 1.79 | 0.64 |
| 5:F:11:LEU:HD12 | 8:I:48:LEU:HD22 | 1.78 | 0.64 |
| 5:F:211:TRP:HA | 5:F:214:MET:SD | 2.38 | 0.64 |
| 2:N:152:LEU:HD21 | 2:N:227:LEU:HB3 | 1.79 | 0.64 |
| 3:O:243:GLN:HG3 | 3:O:248:LEU:HD13 | 1.79 | 0.64 |
| 2:B:272:ALA:HB1 | 3:C:272:LEU:HD13 | 1.80 | 0.64 |
| 5:R:373:GLY:HA3 | 13:R:601:HEA:H262 | 1.79 | 0.64 |
| 6:S:37:LEU:HG | 7:T:44:LEU:HD21 | 1.78 | 0.64 |
| 4:Q:134:THR:HB | 4:Q:141:LYS:HB3 | 1.80 | 0.64 |
| 4:Q:142:PHE:HB2 | 4:Q:203:THR:HB | 1.79 | 0.64 |
| 3:C:97:ALA:HB1 | 3:C:206:THR:HG23 | 1.79 | 0.64 |
| 5:R:81:GLN:NE2 | 5:R:146:ALA:O | 2.31 | 0.63 |
| 13:R:602:HEA:HBC1 | 13:R:602:HEA:HMC3 | 1.80 | 0.63 |
| 9:V:75:ARG:HG3 | 9:V:76:ASP:H | 1.64 | 0.63 |
| 1:M:400:PRO:HB2 | 1:M:412:ASN:HB3 | 1.81 | 0.63 |
| 5:R:55:GLY:HA3 | 5:R:90:MET:HE2 | 1.79 | 0.63 |
| 4:E:212:VAL:HB | 4:E:309:ASN:HD21 | 1.63 | 0.63 |
| 3:O:108:MET:SD | 3:O:109:PRO:HD2 | 2.39 | 0.63 |
| 5:F:117:ALA:H | 5:F:192:THR:HG22 | 1.64 | 0.63 |
| 5:R:106:VAL:O | 5:R:110:GLN:N | 2.29 | 0.62 |
| 1:A:376:GLN:OE1 | 2:B:318:ARG:NH1 | 2.32 | 0.62 |
| 8:I:2:SER:HA | 8:I:6:ILE:HB | 1.80 | 0.62 |
| 6:S:76:VAL:HG13 | 6:S:109:MET:HG3 | 1.80 | 0.62 |
| 5:R:405:THR:HG23 | 5:R:406:ILE:HG12 | 1.81 | 0.62 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:F:81:GLN:NE2 | 5:F:146:ALA:O | 2.25 | 0.62 |
| 4:Q:232:HIS:O | 4:Q:245:VAL:N | 2.32 | 0.62 |
| 6:G:180:VAL:HA | 6:G:183:TYR:CE1 | 2.35 | 0.62 |
| 2:N:242:GLN:NE2 | 2:N:252:ASN:O | 2.33 | 0.62 |
| 1:A:417:GLU:OE2 | 1:A:417:GLU:N | 2.33 | 0.62 |
| 2:N:472:PRO:HB2 | 2:N:480:ILE:HD12 | 1.81 | 0.62 |
| 5:F:208:ILE:HG13 | 5:F:296:LEU:HD23 | 1.82 | 0.61 |
| 5:F:323:LEU:HD11 | 5:F:382:PRO:HB3 | 1.83 | 0.61 |
| 3:O:109:PRO:HG3 | 12:O:301:HEC:CHC | 2.30 | 0.61 |
| 8:U:71:VAL:HG21 | 9:V:82:ARG:HB2 | 1.81 | 0.61 |
| 3:C:108:MET:HE3 | 3:C:109:PRO:HG2 | 1.83 | 0.61 |
| 5:F:183:ILE:HG13 | 5:F:224:PHE:HD2 | 1.65 | 0.61 |
| 5:R:288:LYS:NZ | 5:R:349:TRP:O | 2.32 | 0.61 |
| 1:A:424:TRP:O | 2:B:330:HIS:ND1 | 2.30 | 0.61 |
| 1:A:355:HIS:CE1 | 1:A:356:LEU:HG | 2.35 | 0.61 |
| 4:Q:137:GLN:HG3 | 4:Q:138:TRP:CE3 | 2.36 | 0.60 |
| 5:R:285:PHE:HE2 | 5:R:356:GLU:HB2 | 1.66 | 0.60 |
| 6:S:61:PRO:C | 6:S:63:THR:H | 2.08 | 0.60 |
| 1:M:129:ASP:OD1 | 1:M:130:PHE:N | 2.34 | 0.60 |
| 2:N:83:GLN:HA | 2:N:86:ARG:HG3 | 1.83 | 0.60 |
| 4:Q:218:GLY:HA2 | 4:Q:262:GLU:HB2 | 1.83 | 0.60 |
| 4:E:215:LEU:HD12 | 4:E:216:PRO:HD2 | 1.82 | 0.60 |
| 5:R:62:MET:HE2 | 5:R:82:LEU:HG | 1.83 | 0.60 |
| 5:R:230:ALA:HA | 6:S:46:PHE:HZ | 1.66 | 0.60 |
| 3:O:212:PRO:HD2 | 3:O:215:MET:HG2 | 1.84 | 0.60 |
| 5:F:285:PHE:HE2 | 5:F:356:GLU:HB2 | 1.67 | 0.60 |
| 5:R:216:THR:O | 5:R:220:ILE:HG12 | 2.02 | 0.59 |
| 9:V:147:ILE:HD12 | 9:V:150:LEU:HD21 | 1.84 | 0.59 |
| 6:G:76:VAL:HG13 | 6:G:109:MET:HG3 | 1.83 | 0.59 |
| 6:S:122:ARG:HH21 | 6:S:126:SER:HB3 | 1.66 | 0.59 |
| 1:A:158:GLN:HG2 | 1:A:162:ILE:HD12 | 1.83 | 0.59 |
| 5:R:173:MET:HG3 | 7:T:107:ALA:HB2 | 1.83 | 0.59 |
| 11:N:601:HEM:HMB1 | 11:N:601:HEM:HBB2 | 1.85 | 0.59 |
| 2:B:292:LEU:HG | 3:C:180:PHE:HD2 | 1.68 | 0.59 |
| 4:E:86:ARG:HH22 | 5:F:560:VAL:HG11 | 1.68 | 0.59 |
| 5:F:509:ASP:HB2 | 5:F:519:TRP:HB3 | 1.84 | 0.59 |
| 5:R:95:ALA:HB1 | 5:R:270:ILE:HG21 | 1.83 | 0.59 |
| 7:T:95:VAL:HG22 | 7:T:124:SER:HB2 | 1.85 | 0.59 |
| 6:G:198:VAL:HA | 6:G:202:ILE:HD12 | 1.85 | 0.59 |
| 4:Q:289:ARG:NH2 | 4:Q:318:GLN:OE1 | 2.34 | 0.59 |
| 1:A:400:PRO:HB2 | 1:A:412:ASN:HB3 | 1.85 | 0.58 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 13:F:601:HEA:HMC3 | 13:F:601:HEA:HBC1 | 1.85 | 0.58 |
| 9:J:65:ARG:HH22 | 9:J:90:THR:H | 1.49 | 0.58 |
| 5:R:100:PHE:HE2 | 5:R:182:THR:HA | 1.68 | 0.58 |
| 7:T:35:GLU:OE1 | 7:T:38:GLY:N | 2.31 | 0.58 |
| 2:B:213:TYR:O | 2:B:217:ILE:HG12 | 2.02 | 0.58 |
| 2:N:305:GLN:HA | 2:N:311:MET:HE1 | 1.85 | 0.58 |
| 5:R:402:LEU:HD13 | 13:R:601:HEA:HBC2 | 1.85 | 0.58 |
| 5:R:445:THR:HB | 5:R:480:GLY:HA3 | 1.85 | 0.58 |
| 1:A:120:GLU:N | 1:A:120:GLU:OE1 | 2.36 | 0.58 |
| 2:B:440:ARG:HH12 | 5:R:23:PRO:HG2 | 1.68 | 0.58 |
| 5:F:516:SER:OG | 5:F:518:GLU:OE1 | 2.19 | 0.58 |
| 5:R:42:ILE:HD11 | 5:R:421:MET:HG2 | 1.85 | 0.58 |
| 4:E:232:HIS:O | 4:E:245:VAL:N | 2.32 | 0.58 |
| 5:F:278:VAL:HA | 5:F:281:ILE:HG22 | 1.84 | 0.58 |
| 1:M:158:GLN:HG2 | 1:M:162:ILE:HD12 | 1.85 | 0.58 |
| 3:O:214:ASN:O | 12:O:302:HEC:HBC3 | 2.02 | 0.58 |
| 3:C:72:SER:HB3 | 12:C:301:HEC:HBB1 | 1.85 | 0.58 |
| 2:N:318:ARG:NH1 | 2:N:396:ALA:O | 2.37 | 0.58 |
| 11:B:601:HEM:HMB1 | 11:B:601:HEM:HBB2 | 1.84 | 0.58 |
| 2:N:135:THR:HB | 2:N:369:LEU:HD13 | 1.86 | 0.58 |
| 2:B:32:ARG:NH2 | 1:M:180:ASP:OD1 | 2.35 | 0.58 |
| 5:R:70:GLY:O | 5:R:72:GLN:NE2 | 2.37 | 0.57 |
| 4:Q:329:ASP:OD2 | 4:Q:331:ARG:HG2 | 2.04 | 0.57 |
| 7:H:35:GLU:OE1 | 7:H:38:GLY:N | 2.29 | 0.57 |
| 6:S:44:PHE:HE2 | 6:S:198:VAL:HG21 | 1.69 | 0.57 |
| 5:F:70:GLY:O | 5:F:72:GLN:NE2 | 2.37 | 0.57 |
| 8:U:75:ALA:HB3 | 9:V:108:VAL:H | 1.69 | 0.57 |
| 5:F:164:PRO:HG2 | 3:O:118:PRO:HD2 | 1.87 | 0.57 |
| 8:U:52:THR:HA | 9:V:65:ARG:HH21 | 1.69 | 0.57 |
| 4:E:78:LYS:HD2 | 5:F:352:GLN:HB3 | 1.87 | 0.57 |
| 5:F:227:LEU:HD22 | 5:F:262:PHE:CZ | 2.39 | 0.57 |
| 4:Q:113:THR:HG21 | 5:R:382:PRO:HD2 | 1.86 | 0.57 |
| 5:R:278:VAL:HA | 5:R:281:ILE:HG22 | 1.87 | 0.57 |
| 5:R:355:PHE:HA | 5:R:359:MET:SD | 2.45 | 0.57 |
| 2:B:116:TRP:CD1 | 2:B:281:GLY:HA2 | 2.40 | 0.57 |
| 3:C:208:MET:HE1 | 3:C:228:LYS:HD2 | 1.86 | 0.57 |
| 4:E:113:THR:HG21 | 5:F:382:PRO:HD2 | 1.86 | 0.57 |
| 3:O:211:GLY:HA3 | 3:O:217:LYS:HB3 | 1.86 | 0.57 |
| 11:N:602:HEM:HBC2 | 11:N:602:HEM:HMC2 | 1.87 | 0.56 |
| 4:Q:225:MET:HB3 | 4:Q:245:VAL:HG13 | 1.87 | 0.56 |
| 5:R:270:ILE:HG22 | 5:R:406:ILE:HD11 | 1.87 | 0.56 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:F:341:PHE:HD2 | 13:F:601:HEA:H273 | 1.70 | 0.56 |
| 1:A:394:ARG:NH2 | 2:B:324:GLU:OE1 | 2.38 | 0.56 |
| 2:B:339:ALA:HA | 2:B:342:MET:HE2 | 1.87 | 0.56 |
| 3:C:208:MET:HE1 | 3:C:223:LEU:HD23 | 1.86 | 0.56 |
| 3:C:224:SER:C | 3:C:228:LYS:HZ1 | 2.12 | 0.56 |
| 4:E:220:ARG:NH2 | 4:E:259:GLN:OE1 | 2.38 | 0.56 |
| 4:E:225:MET:HB2 | 4:E:256:ASN:HB2 | 1.88 | 0.56 |
| 8:U:79:TRP:HE1 | 9:V:106:ILE:HD11 | 1.69 | 0.56 |
| 2:N:469:PRO:HB3 | 2:N:479:PRO:HB3 | 1.88 | 0.56 |
| 5:R:276:GLY:O | 5:R:280:GLU:HG2 | 2.06 | 0.56 |
| 9:V:72:ASP:OD2 | 9:V:102:ASN:ND2 | 2.37 | 0.56 |
| 4:E:128:GLU:O | 4:E:146:ARG:NH1 | 2.39 | 0.56 |
| 1:A:426:ARG:HG3 | 1:A:427:THR:H | 1.71 | 0.56 |
| 2:N:319:ILE:HD12 | 2:N:420:MET:HE2 | 1.88 | 0.56 |
| 5:R:379:LEU:HD21 | 13:R:601:HEA:HBA2 | 1.88 | 0.55 |
| 1:M:94:ARG:O | 1:M:98:VAL:HG23 | 2.06 | 0.55 |
| 5:R:63:ARG:HH21 | 5:R:446:PHE:HE1 | 1.55 | 0.55 |
| 5:F:274:PHE:CD1 | 5:F:409:ALA:HB3 | 2.41 | 0.55 |
| 2:B:265:LYS:HE3 | 3:C:276:ILE:HG23 | 1.89 | 0.55 |
| 5:F:532:GLU:OE2 | 9:J:27:ARG:NH1 | 2.40 | 0.55 |
| 3:C:200:ASN:HB3 | 3:C:203:GLN:OE1 | 2.06 | 0.55 |
| 5:F:90:MET:HB3 | 13:F:602:HEA:CAC | 2.37 | 0.55 |
| 5:F:445:THR:O | 5:F:449:GLN:NE2 | 2.39 | 0.55 |
| 6:G:91:ALA:HB2 | 6:G:99:LEU:HD12 | 1.87 | 0.55 |
| 4:Q:272:HIS:ND1 | 4:Q:285:ASN:OD1 | 2.34 | 0.55 |
| 6:S:58:TRP:CG | 6:S:59:PRO:HD3 | 2.42 | 0.55 |
| 5:F:379:LEU:HD21 | 13:F:601:HEA:HBA2 | 1.87 | 0.55 |
| 6:G:58:TRP:CG | 6:G:59:PRO:HD3 | 2.41 | 0.55 |
| 3:O:260:ALA:HA | 3:O:263:ILE:HG22 | 1.89 | 0.55 |
| 2:N:419:GLY:HA2 | 2:N:423:LEU:HD23 | 1.88 | 0.55 |
| 4:Q:154:LEU:HD21 | 4:Q:297:LYS:HB2 | 1.89 | 0.55 |
| 2:B:62:GLY:C | 11:B:602:HEM:HAC | 2.32 | 0.55 |
| 6:G:63:THR:HG21 | 6:G:136:TYR:HE2 | 1.72 | 0.55 |
| 1:M:70:ASP:OD1 | 2:N:32:ARG:NH1 | 2.40 | 0.55 |
| 2:B:65:LEU:HB3 | 11:B:602:HEM:HMD1 | 1.89 | 0.55 |
| 2:B:170:LEU:HD23 | 2:B:295:TYR:HA | 1.89 | 0.55 |
| 1:A:144:GLY:HA3 | 2:B:279:LEU:HG | 1.89 | 0.54 |
| 1:A:356:LEU:HD22 | 2:B:182:SER:HB2 | 1.89 | 0.54 |
| 5:F:173:MET:HG3 | 7:H:107:ALA:HB2 | 1.89 | 0.54 |
| 5:F:337:THR:HG21 | 13:F:601:HEA:H263 | 1.90 | 0.54 |
| 5:F:90:MET:HB3 | 13:F:602:HEA:CBC | 2.37 | 0.54 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 4:Q:103:PHE:HA | 4:Q:106:ILE:HG12 | 1.90 | 0.54 |
| 2:N:72:SER:HB3 | 2:N:92:ARG:HB3 | 1.89 | 0.54 |
| 2:N:142:ARG:NH2 | 2:N:239:LYS:O | 2.39 | 0.54 |
| 3:O:99:VAL:HG21 | 3:O:136:VAL:HG21 | 1.90 | 0.54 |
| 5:R:330:THR:O | 5:R:333:ILE:HG22 | 2.08 | 0.54 |
| 6:S:199:ILE:HG23 | 6:S:200:TYR:CD2 | 2.43 | 0.54 |
| 1:M:351:LYS:NZ | 2:N:298:SER:O | 2.41 | 0.54 |
| 12:O:302:HEC:CBC | 12:O:302:HEC:HHD | 2.38 | 0.54 |
| 9:J:17:PRO:HD2 | 9:J:20:TRP:HB2 | 1.88 | 0.54 |
| 6:S:61:PRO:N | 6:S:62:PRO:HD2 | 2.23 | 0.54 |
| 5:F:155:THR:HG22 | 5:F:255:TRP:HB3 | 1.89 | 0.54 |
| 7:H:1:MET:HE1 | 7:H:5:ALA:HB2 | 1.90 | 0.53 |
| 1:M:170:GLU:HG3 | 1:M:172:HIS:CE1 | 2.43 | 0.53 |
| 2:N:213:TYR:O | 2:N:217:ILE:HG12 | 2.09 | 0.53 |
| 5:F:155:THR:HG21 | 5:F:252:VAL:HA | 1.91 | 0.53 |
| 2:N:501:SER:O | 2:N:520:ARG:NH2 | 2.31 | 0.53 |
| 3:O:148:ASN:N | 3:O:152:SER:O | 2.35 | 0.53 |
| 2:B:73:MET:HE3 | 2:B:209:ILE:HG21 | 1.91 | 0.53 |
| 1:M:51:GLU:HG2 | 1:M:53:ALA:H | 1.72 | 0.53 |
| 1:M:424:TRP:O | 2:N:330:HIS:ND1 | 2.31 | 0.53 |
| 2:B:187:MET:HB3 | 2:B:191:GLY:HA2 | 1.89 | 0.53 |
| 2:N:94:TYR:OH | 2:N:289:ILE:O | 2.24 | 0.53 |
| 5:R:109:LEU:HB3 | 5:R:518:GLU:OE1 | 2.08 | 0.53 |
| 2:B:286:ILE:HG13 | 3:C:257:GLU:CD | 2.34 | 0.53 |
| 5:F:42:ILE:HD11 | 5:F:421:MET:HG2 | 1.89 | 0.53 |
| 5:R:155:THR:HG21 | 5:R:252:VAL:HA | 1.89 | 0.53 |
| 6:S:41:ALA:HB2 | 7:T:44:LEU:HD22 | 1.91 | 0.53 |
| 5:F:373:GLY:HA2 | 13:F:601:HEA:H132 | 1.91 | 0.53 |
| 3:O:226:GLU:HA | 3:O:229:LYS:HG2 | 1.90 | 0.53 |
| 9:V:19:GLY:O | 9:V:30:GLY:HA2 | 2.08 | 0.53 |
| 8:I:2:SER:H | 8:I:6:ILE:HD13 | 1.73 | 0.53 |
| 2:B:165:SER:HA | 2:B:172:SER:HB2 | 1.91 | 0.52 |
| 5:F:29:TYR:O | 5:F:33:THR:OG1 | 2.16 | 0.52 |
| 6:S:22:PRO:HD3 | 7:T:66:ARG:HD3 | 1.90 | 0.52 |
| 1:M:423:PHE:HE2 | 1:M:425:GLU:HB2 | 1.73 | 0.52 |
| 2:N:50:ILE:HD11 | 2:N:273:ILE:HD13 | 1.91 | 0.52 |
| 5:R:135:ILE:HD11 | 7:T:100:SER:HB2 | 1.91 | 0.52 |
| 3:C:99:VAL:HG21 | 3:C:136:VAL:HG11 | 1.91 | 0.52 |
| 1:M:376:GLN:HG2 | 2:N:409:LEU:HD21 | 1.92 | 0.52 |
| 13:R:602:HEA:HBA1 | 13:R:602:HEA:HHA | 1.91 | 0.52 |
| 5:F:379:LEU:HG | 13:F:601:HEA:HMA | 1.92 | 0.52 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 9:J:65:ARG:NH2 | 9:J:90:THR:OG1 | 2.43 | 0.52 |
| 1:A:200:ARG:NH2 | 1:M:89:GLU:OE2 | 2.43 | 0.52 |
| 5:F:27:LEU:O | 5:F:31:LEU:N | 2.40 | 0.52 |
| 5:F:336:PRO:O | 5:F:340:LYS:HG2 | 2.10 | 0.52 |
| 6:G:58:TRP:CD1 | 6:G:59:PRO:HD3 | 2.45 | 0.52 |
| 2:B:280:MET:HE1 | 3:C:261:MET:HE1 | 1.91 | 0.52 |
| 5:F:401:VAL:O | 5:F:405:THR:HG22 | 2.09 | 0.52 |
| 6:G:85:GLN:HA | 6:G:88:VAL:HG12 | 1.92 | 0.52 |
| 1:M:423:PHE:CE2 | 1:M:425:GLU:HB2 | 2.45 | 0.52 |
| 2:N:458:LEU:HD22 | 2:N:462:ALA:HB3 | 1.92 | 0.52 |
| 5:R:401:VAL:O | 5:R:405:THR:HG22 | 2.09 | 0.52 |
| 2:B:301:SER:HB3 | 3:C:180:PHE:HE1 | 1.73 | 0.52 |
| 4:Q:136:PHE:CE1 | 4:Q:139:ASN:HB3 | 2.44 | 0.52 |
| 4:Q:213:LEU:HB3 | 4:Q:288:VAL:HG12 | 1.91 | 0.52 |
| 5:R:16:PRO:HB3 | 9:V:48:LEU:HD11 | 1.90 | 0.52 |
| 2:N:316:LEU:HD23 | 2:N:338:VAL:HG13 | 1.92 | 0.52 |
| 4:Q:65:TRP:CH2 | 5:R:367:VAL:HG13 | 2.44 | 0.52 |
| 5:R:155:THR:HG22 | 5:R:255:TRP:HB3 | 1.91 | 0.52 |
| 4:E:303:ARG:NH2 | 4:E:309:ASN:OD1 | 2.43 | 0.52 |
| 2:N:305:GLN:HE21 | 2:N:318:ARG:HH22 | 1.58 | 0.52 |
| 3:C:72:SER:O | 12:C:301:HEC:HHC | 2.09 | 0.51 |
| 2:N:129:LEU:HD13 | 2:N:153:LEU:HD22 | 1.92 | 0.51 |
| 4:Q:301:GLN:HA | 4:Q:304:ILE:HD12 | 1.92 | 0.51 |
| 5:R:57:LEU:HB3 | 13:R:602:HEA:H201 | 1.92 | 0.51 |
| 5:R:272:LEU:HD21 | 5:R:303:ILE:HG21 | 1.91 | 0.51 |
| 5:R:388:VAL:O | 5:R:391:SER:OG | 2.26 | 0.51 |
| 1:A:90:LYS:O | 1:A:93:GLU:HG3 | 2.09 | 0.51 |
| 2:B:490:PRO:HG3 | 2:B:496:LEU:HD21 | 1.92 | 0.51 |
| 5:R:90:MET:HB3 | 13:R:602:HEA:CAC | 2.40 | 0.51 |
| 5:R:420:LYS:HE3 | 5:R:518:GLU:HG3 | 1.91 | 0.51 |
| 4:E:134:THR:HB | 4:E:141:LYS:HB3 | 1.92 | 0.51 |
| 4:E:232:HIS:CE1 | 4:E:284:MET:HE1 | 2.44 | 0.51 |
| 4:E:276:MET:HE2 | 4:E:276:MET:HA | 1.92 | 0.51 |
| 7:T:111:PRO:HA | 7:T:114:ILE:HG12 | 1.92 | 0.51 |
| 13:F:602:HEA:HBA1 | 13:F:602:HEA:HHA | 1.92 | 0.51 |
| 1:M:362:LEU:HB2 | 1:M:371:LEU:HB2 | 1.93 | 0.51 |
| 2:N:305:GLN:NE2 | 2:N:318:ARG:HH22 | 2.09 | 0.51 |
| 5:R:336:PRO:HA | 5:R:339:ILE:HD12 | 1.92 | 0.51 |
| 4:E:137:GLN:HG3 | 4:E:138:TRP:CE3 | 2.46 | 0.51 |
| 2:N:116:TRP:CD1 | 2:N:281:GLY:HA2 | 2.45 | 0.51 |
| 2:N:187:MET:HB3 | 2:N:191:GLY:H | 1.76 | 0.51 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:R:434:HIS:CD2 | 5:R:491:PHE:HB2 | 2.46 | 0.51 |
| 6:S:29:THR:HG21 | 6:S:180:VAL:HB | 1.91 | 0.51 |
| 5:F:107:LEU:HB3 | 5:F:108:PRO:HD3 | 1.93 | 0.51 |
| 13:F:602:HEA:HBC1 | 13:F:602:HEA:HMC3 | 1.92 | 0.51 |
| 5:F:484:LEU:HD23 | 13:F:602:HEA:H11 | 1.92 | 0.51 |
| 7:T:47:GLY:O | 7:T:51:ILE:HG23 | 2.11 | 0.51 |
| 2:B:318:ARG:HD2 | 2:B:396:ALA:HA | 1.93 | 0.51 |
| 1:M:273:PHE:HB2 | 1:M:292:TRP:HZ3 | 1.76 | 0.51 |
| 5:R:459:ARG:NH2 | 13:R:602:HEA:HAD2 | 2.25 | 0.51 |
| 6:S:21:ARG:HB3 | 7:T:63:LEU:HD11 | 1.93 | 0.51 |
| 5:F:523:CYS:HB3 | 5:F:524:PRO:HD3 | 1.93 | 0.51 |
| 1:M:120:GLU:N | 1:M:120:GLU:OE1 | 2.44 | 0.51 |
| 2:N:315:GLY:HA2 | 2:N:396:ALA:HB2 | 1.93 | 0.50 |
| 1:A:129:ASP:OD1 | 1:A:130:PHE:N | 2.39 | 0.50 |
| 2:B:135:THR:HB | 2:B:369:LEU:HD13 | 1.92 | 0.50 |
| 9:J:41:TYR:HB3 | 9:J:43:PHE:HD1 | 1.77 | 0.50 |
| 1:M:90:LYS:O | 1:M:93:GLU:HG3 | 2.11 | 0.50 |
| 1:M:292:TRP:HE1 | 1:M:294:GLU:HG3 | 1.76 | 0.50 |
| 5:R:458:PRO:HG2 | 5:R:461:TYR:CZ | 2.47 | 0.50 |
| 9:V:80:ARG:O | 9:V:84:ILE:HG12 | 2.10 | 0.50 |
| 2:N:73:MET:HE3 | 2:N:73:MET:HA | 1.94 | 0.50 |
| 4:Q:68:ILE:O | 4:Q:71:SER:OG | 2.25 | 0.50 |
| 1:A:63:LEU:HD21 | 1:A:74:ILE:HD12 | 1.93 | 0.50 |
| 4:E:213:LEU:HB3 | 4:E:288:VAL:HG12 | 1.93 | 0.50 |
| 1:M:152:ILE:HA | 1:M:155:VAL:HG12 | 1.92 | 0.50 |
| 5:R:208:ILE:HG13 | 5:R:296:LEU:HD23 | 1.92 | 0.50 |
| 5:R:379:LEU:HG | 13:R:601:HEA:HMA | 1.93 | 0.50 |
| 5:F:264:HIS:CE1 | 5:F:313:HIS:HE2 | 2.29 | 0.50 |
| 5:F:355:PHE:HA | 5:F:359:MET:SD | 2.51 | 0.50 |
| 4:Q:313:LEU:HD22 | 4:Q:320:PRO:HA | 1.94 | 0.50 |
| 4:E:235:TRP:HZ3 | 5:F:458:PRO:HD3 | 1.75 | 0.50 |
| 5:F:63:ARG:NH2 | 5:F:66:LEU:HD23 | 2.26 | 0.50 |
| 1:M:356:LEU:HD22 | 2:N:182:SER:HB2 | 1.93 | 0.50 |
| 3:O:108:MET:HG2 | 3:O:123:ILE:HD12 | 1.94 | 0.50 |
| 5:R:81:GLN:O | 5:R:85:MET:HG2 | 2.11 | 0.50 |
| 1:A:94:ARG:O | 1:A:98:VAL:HG23 | 2.11 | 0.50 |
| 1:A:281:MET:HB2 | 1:A:323:ARG:HH11 | 1.77 | 0.50 |
| 1:A:351:LYS:NZ | 2:B:298:SER:O | 2.44 | 0.50 |
| 2:N:35:LEU:HB3 | 2:N:259:MET:HE2 | 1.94 | 0.50 |
| 5:R:172:ILE:HG23 | 5:R:231:LEU:HG | 1.94 | 0.50 |
| 1:M:307:LYS:O | 1:M:311:ILE:HG12 | 2.12 | 0.49 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:F:395:VAL:HA | 5:F:398:PHE:CE1 | 2.47 | 0.49 |
| 5:F:402:LEU:O | 5:F:406:ILE:HG22 | 2.12 | 0.49 |
| 1:M:323:ARG:HE | 1:M:345:GLU:HG3 | 1.76 | 0.49 |
| 4:Q:138:TRP:CD1 | 4:Q:280:TYR:HB2 | 2.47 | 0.49 |
| 5:R:67:ALA:HA | 5:R:474:ASN:HD22 | 1.77 | 0.49 |
| 5:R:172:ILE:HG22 | 5:R:173:MET:HE2 | 1.94 | 0.49 |
| 4:E:232:HIS:HE1 | 4:E:284:MET:HE1 | 1.77 | 0.49 |
| 4:E:268:ALA:HB2 | 4:E:289:ARG:HE | 1.77 | 0.49 |
| 5:F:34:THR:OG1 | 5:F:36:ASP:OD1 | 2.20 | 0.49 |
| 2:B:129:LEU:HD13 | 2:B:153:LEU:HD22 | 1.92 | 0.49 |
| 2:B:316:LEU:HG | 2:B:338:VAL:HG22 | 1.92 | 0.49 |
| 5:R:552:GLU:CD | 5:R:552:GLU:H | 2.19 | 0.49 |
| 3:C:108:MET:SD | 3:C:109:PRO:HD2 | 2.52 | 0.49 |
| 4:E:65:TRP:HE1 | 5:F:370:LEU:HD22 | 1.76 | 0.49 |
| 1:M:96:VAL:HG21 | 1:M:157:TYR:HB2 | 1.93 | 0.49 |
| 5:F:147:ALA:HB2 | 5:F:168:GLY:HA2 | 1.94 | 0.49 |
| 1:M:394:ARG:NH2 | 2:N:324:GLU:OE1 | 2.45 | 0.49 |
| 2:N:80:GLY:O | 2:N:86:ARG:NH1 | 2.43 | 0.49 |
| 4:E:225:MET:N | 4:E:225:MET:HE2 | 2.27 | 0.49 |
| 2:N:411:ALA:O | 2:N:415:ILE:HG13 | 2.13 | 0.49 |
| 6:S:73:VAL:HB | 6:S:113:PHE:HD1 | 1.78 | 0.49 |
| 2:B:383:ALA:HA | 2:B:386:ILE:HG22 | 1.95 | 0.49 |
| 2:N:303:GLY:HA3 | 3:O:180:PHE:CZ | 2.48 | 0.49 |
| 13:R:601:HEA:HMC3 | 13:R:601:HEA:HBC1 | 1.95 | 0.49 |
| 5:R:459:ARG:HH21 | 13:R:602:HEA:HAD2 | 1.78 | 0.49 |
| 4:E:128:GLU:H | 4:E:220:ARG:HB2 | 1.78 | 0.48 |
| 4:E:277:CYS:SG | 4:E:281:HIS:ND1 | 2.86 | 0.48 |
| 6:G:122:ARG:HH21 | 6:G:126:SER:HA | 1.78 | 0.48 |
| 1:M:355:HIS:ND1 | 1:M:356:LEU:HG | 2.28 | 0.48 |
| 4:Q:157:ASP:OD1 | 4:Q:157:ASP:N | 2.45 | 0.48 |
| 5:R:62:MET:HE1 | 5:R:83:PHE:HB3 | 1.95 | 0.48 |
| 5:R:121:LEU:HD12 | 5:R:184:LEU:HD12 | 1.94 | 0.48 |
| 1:A:96:VAL:HG21 | 1:A:157:TYR:HB2 | 1.95 | 0.48 |
| 2:B:458:LEU:HD22 | 2:B:462:ALA:HB3 | 1.95 | 0.48 |
| 5:R:381:SER:HB3 | 5:R:384:LEU:HB2 | 1.95 | 0.48 |
| 7:T:6:ARG:O | 7:T:9:GLU:HG3 | 2.13 | 0.48 |
| 4:E:84:LEU:O | 5:F:553:ARG:NH2 | 2.44 | 0.48 |
| 4:E:236:VAL:HG12 | 4:E:239:PHE:H | 1.78 | 0.48 |
| 2:N:474:ASP:OD1 | 2:N:478:HIS:N | 2.46 | 0.48 |
| 5:R:460:ARG:HH21 | 13:R:602:HEA:CGD | 2.25 | 0.48 |
| 7:H:91:TRP:O | 7:H:95:VAL:HG23 | 2.13 | 0.48 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 4:Q:299:TYR:OH | 4:Q:309:ASN:OD1 | 2.31 | 0.48 |
| 8:I:70:THR:OG1 | 9:J:112:SER:HB3 | 2.13 | 0.48 |
| 2:N:286:ILE:HG13 | 3:O:257:GLU:CD | 2.38 | 0.48 |
| 2:N:383:ALA:HA | 2:N:386:ILE:HG22 | 1.94 | 0.48 |
| 5:R:284:VAL:HG13 | 5:R:285:PHE:HD1 | 1.77 | 0.48 |
| 1:A:164:GLU:N | 1:A:164:GLU:OE1 | 2.46 | 0.48 |
| 3:C:215:MET:HE1 | 12:C:302:HEC:C1B | 2.42 | 0.48 |
| 5:F:56:GLY:HA3 | 13:F:602:HEA:H161 | 1.95 | 0.48 |
| 5:R:265:PRO:O | 5:R:269:ILE:HG12 | 2.14 | 0.48 |
| 5:F:373:GLY:C | 13:F:601:HEA:H162 | 2.38 | 0.48 |
| 9:J:57:TYR:HD1 | 9:J:60:ARG:HH21 | 1.61 | 0.48 |
| 1:A:228:LYS:HE3 | 2:B:200:GLY:HA2 | 1.96 | 0.48 |
| 2:B:218:LEU:HD21 | 11:N:602:HEM:HBC1 | 1.95 | 0.48 |
| 3:O:108:MET:CG | 3:O:109:PRO:HD2 | 2.44 | 0.48 |
| 4:Q:277:CYS:SG | 4:Q:281:HIS:ND1 | 2.85 | 0.48 |
| 5:R:537:ARG:HH22 | 7:T:72:GLY:HA2 | 1.79 | 0.48 |
| 3:C:170:PHE:HA | 3:C:174:CYS:SG | 2.54 | 0.48 |
| 4:E:38:GLY:N | 4:E:47:ARG:HH22 | 2.10 | 0.48 |
| 5:F:285:PHE:CE2 | 5:F:356:GLU:HB2 | 2.49 | 0.48 |
| 5:F:445:THR:HB | 5:F:480:GLY:HA3 | 1.96 | 0.48 |
| 1:A:224:GLY:HA3 | 1:M:114:PHE:HZ | 1.79 | 0.48 |
| 1:A:236:PRO:HA | 1:A:241:LYS:HG2 | 1.94 | 0.48 |
| 2:N:119:LEU:HD22 | 2:N:308:PHE:HE1 | 1.79 | 0.48 |
| 2:N:170:LEU:HA | 2:N:295:TYR:HD1 | 1.78 | 0.48 |
| 12:O:301:HEC:HHC | 12:O:301:HEC:HBB3 | 1.96 | 0.48 |
| 5:F:135:ILE:HD11 | 7:H:100:SER:HB2 | 1.95 | 0.47 |
| 2:N:137:ALA:HB2 | 2:N:369:LEU:HD21 | 1.95 | 0.47 |
| 2:N:216:HIS:HE1 | 11:N:602:HEM:NB | 2.12 | 0.47 |
| 2:B:384:MET:SD | 2:B:424:PRO:HB3 | 2.54 | 0.47 |
| 3:C:152:SER:OG | 3:C:153:ILE:N | 2.46 | 0.47 |
| 5:F:111:ILE:HG13 | 5:F:197:ARG:HG3 | 1.96 | 0.47 |
| 5:F:439:PHE:O | 5:F:443:HIS:ND1 | 2.47 | 0.47 |
| 5:F:458:PRO:HG2 | 5:F:461:TYR:CZ | 2.48 | 0.47 |
| 2:N:458:LEU:O | 2:N:460:HIS:N | 2.47 | 0.47 |
| 9:V:112:SER:HA | 9:V:115:ARG:CZ | 2.44 | 0.47 |
| 1:A:282:ASP:HB3 | 3:C:217:LYS:HD2 | 1.96 | 0.47 |
| 6:G:169:LYS:N | 2:N:500:GLY:O | 2.47 | 0.47 |
| 9:J:80:ARG:HH22 | 9:J:84:ILE:HD11 | 1.79 | 0.47 |
| 2:N:384:MET:SD | 2:N:424:PRO:HB3 | 2.54 | 0.47 |
| 2:B:206:THR:HB | 2:N:92:ARG:HH21 | 1.78 | 0.47 |
| 2:B:349:LEU:HB3 | 2:B:350:PRO:HD3 | 1.96 | 0.47 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 4:E:60:VAL:O | 4:E:64:VAL:HG23 | 2.15 | 0.47 |
| 5:R:95:ALA:O | 5:R:98:ILE:HG22 | 2.15 | 0.47 |
| 7:T:91:TRP:O | 7:T:95:VAL:HG23 | 2.14 | 0.47 |
| 2:B:159:GLU:HG3 | 11:B:602:HEM:HMB3 | 1.96 | 0.47 |
| 2:B:245:GLY:HA3 | 2:B:248:ARG:HD3 | 1.96 | 0.47 |
| 5:F:172:ILE:HG22 | 5:F:173:MET:HE2 | 1.96 | 0.47 |
| 7:H:6:ARG:NE | 7:H:9:GLU:OE2 | 2.47 | 0.47 |
| 2:N:178:ALA:O | 2:N:182:SER:OG | 2.27 | 0.47 |
| 4:E:301:GLN:HA | 4:E:304:ILE:HD12 | 1.97 | 0.47 |
| 2:N:328:TRP:H | 2:N:328:TRP:CD1 | 2.32 | 0.47 |
| 7:T:4:GLU:OE1 | 7:T:4:GLU:N | 2.46 | 0.47 |
| 1:A:196:THR:HB | 1:A:199:ARG:HE | 1.78 | 0.47 |
| 2:B:83:GLN:HA | 2:B:86:ARG:HG3 | 1.97 | 0.47 |
| 2:B:397:MET:SD | 2:B:401:ILE:HG13 | 2.54 | 0.47 |
| 2:B:447:GLU:OE1 | 2:B:448:HIS:NE2 | 2.47 | 0.47 |
| 3:C:109:PRO:HG3 | 12:C:301:HEC:C1C | 2.44 | 0.47 |
| 5:F:13:ALA:HB1 | 8:I:50:ALA:HB2 | 1.96 | 0.47 |
| 5:F:258:LEU:HD22 | 6:G:46:PHE:HE1 | 1.79 | 0.47 |
| 7:H:90:TRP:O | 7:H:93:ILE:HG22 | 2.14 | 0.47 |
| 3:O:226:GLU:OE2 | 3:O:226:GLU:N | 2.37 | 0.47 |
| 4:E:272:HIS:ND1 | 4:E:285:ASN:OD1 | 2.42 | 0.47 |
| 8:I:17:LEU:HA | 8:I:20:VAL:HG22 | 1.96 | 0.47 |
| 5:R:263:GLY:O | 5:R:266:GLU:HB2 | 2.15 | 0.47 |
| 3:C:226:GLU:OE1 | 3:C:226:GLU:N | 2.36 | 0.47 |
| 5:F:172:ILE:HG23 | 5:F:231:LEU:HG | 1.97 | 0.47 |
| 6:G:131:ILE:O | 6:G:138:SER:OG | 2.30 | 0.47 |
| 1:M:296:ASP:OD1 | 1:M:297:GLY:N | 2.47 | 0.47 |
| 2:N:245:GLY:HA3 | 2:N:248:ARG:HD3 | 1.97 | 0.47 |
| 3:O:219:SER:O | 3:O:222:GLN:NE2 | 2.48 | 0.47 |
| 5:R:440:ILE:HA | 5:R:443:HIS:NE2 | 2.30 | 0.47 |
| 5:R:523:CYS:HB2 | 5:R:524:PRO:HD3 | 1.97 | 0.47 |
| 5:F:397:HIS:O | 5:F:401:VAL:HG22 | 2.14 | 0.46 |
| 2:N:418:ILE:O | 2:N:422:ILE:HG12 | 2.14 | 0.46 |
| 1:A:169:GLN:HB3 | 2:B:253:VAL:HB | 1.96 | 0.46 |
| 4:E:138:TRP:CD1 | 4:E:280:TYR:HB2 | 2.50 | 0.46 |
| 1:M:333:VAL:HG21 | 1:M:383:HIS:ND1 | 2.29 | 0.46 |
| 5:R:220:ILE:HG23 | 5:R:224:PHE:CD2 | 2.51 | 0.46 |
| 5:R:269:ILE:HG13 | 5:R:270:ILE:HG12 | 1.96 | 0.46 |
| 6:S:76:VAL:HG22 | 6:S:109:MET:HE3 | 1.97 | 0.46 |
| 8:I:79:TRP:CG | 9:J:104:CYS:HB3 | 2.50 | 0.46 |
| 1:M:355:HIS:CE1 | 1:M:356:LEU:HG | 2.50 | 0.46 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:N:35:LEU:HB3 | 2:N:259:MET:CE | 2.45 | 0.46 |
| 4:Q:97:VAL:O | 4:Q:101:ILE:HG12 | 2.15 | 0.46 |
| 5:R:403:PHE:CE2 | 5:R:407:VAL:HG21 | 2.50 | 0.46 |
| 9:V:144:ILE:HG22 | 9:V:148:ARG:HE | 1.80 | 0.46 |
| 2:B:316:LEU:HD23 | 2:B:338:VAL:HG13 | 1.97 | 0.46 |
| 2:B:465:GLU:HB3 | 2:B:467:HIS:CD2 | 2.50 | 0.46 |
| 3:C:156:GLN:HE22 | 3:C:159:ARG:HH21 | 1.64 | 0.46 |
| 2:N:421:VAL:HG13 | 2:N:422:ILE:HG23 | 1.98 | 0.46 |
| 2:B:328:TRP:H | 2:B:328:TRP:CD1 | 2.33 | 0.46 |
| 2:N:177:ARG:O | 2:N:181:SER:HB3 | 2.16 | 0.46 |
| 9:V:17:PRO:O | 9:V:18:PRO:C | 2.58 | 0.46 |
| 1:A:355:HIS:CE1 | 1:A:375:HIS:ND1 | 2.84 | 0.46 |
| 9:J:112:SER:HA | 9:J:115:ARG:CZ | 2.45 | 0.46 |
| 1:M:141:LEU:HA | 2:N:279:LEU:HD23 | 1.98 | 0.46 |
| 5:R:237:ASP:OD2 | 5:R:244:ILE:HB | 2.16 | 0.46 |
| 1:A:323:ARG:NE | 1:A:345:GLU:HG3 | 2.31 | 0.46 |
| 5:F:111:ILE:HG23 | 5:F:113:ALA:H | 1.80 | 0.46 |
| 5:F:121:LEU:HD12 | 5:F:184:LEU:HD12 | 1.96 | 0.46 |
| 5:F:258:LEU:HD12 | 5:F:259:PHE:N | 2.30 | 0.46 |
| 1:M:198:ARG:HA | 1:M:198:ARG:HD2 | 1.83 | 0.46 |
| 1:M:253:ARG:HB2 | 1:M:257:GLU:OE2 | 2.16 | 0.46 |
| 1:M:307:LYS:O | 1:M:310:GLU:HG3 | 2.16 | 0.46 |
| 3:O:196:LEU:HA | 12:O:302:HEC:O2A | 2.16 | 0.46 |
| 5:R:258:LEU:HD12 | 5:R:259:PHE:N | 2.30 | 0.46 |
| 5:F:212:ASN:O | 5:F:216:THR:HG23 | 2.16 | 0.46 |
| 2:B:92:ARG:NH2 | 2:N:206:THR:HB | 2.31 | 0.45 |
| 2:B:120:MET:HG2 | 2:B:277:LEU:HD21 | 1.98 | 0.45 |
| 5:F:389:THR:C | 5:F:391:SER:H | 2.24 | 0.45 |
| 5:F:449:GLN:OE1 | 5:F:449:GLN:N | 2.49 | 0.45 |
| 2:N:177:ARG:HB2 | 2:N:203:PHE:CZ | 2.50 | 0.45 |
| 6:S:58:TRP:CD1 | 6:S:59:PRO:HD3 | 2.51 | 0.45 |
| 1:A:93:GLU:HA | 1:A:96:VAL:HG12 | 1.99 | 0.45 |
| 4:E:146:ARG:NH1 | 4:E:148:ASN:HB2 | 2.31 | 0.45 |
| 4:E:215:LEU:HD11 | 4:E:221:ILE:HD12 | 1.97 | 0.45 |
| 3:O:215:MET:HE1 | 12:O:302:HEC:CHB | 2.46 | 0.45 |
| 5:R:173:MET:SD | 7:T:106:ILE:HG23 | 2.56 | 0.45 |
| 5:F:268:TYR:HD2 | 5:F:307:SER:HB2 | 1.82 | 0.45 |
| 5:F:373:GLY:HA3 | 13:F:601:HEA:H262 | 1.98 | 0.45 |
| 5:R:274:PHE:HD2 | 5:R:409:ALA:HB3 | 1.80 | 0.45 |
| 5:R:445:THR:HG23 | 5:R:446:PHE:CD1 | 2.51 | 0.45 |
| 6:S:70:ALA:O | 6:S:73:VAL:HG22 | 2.17 | 0.45 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 7:T:90:TRP:O | 7:T:93:ILE:HG22 | 2.16 | 0.45 |
| 1:A:78:GLU:HG3 | 2:B:529:ARG:HH12 | 1.81 | 0.45 |
| 2:B:90:MET:HE3 | 2:B:94:TYR:HD2 | 1.82 | 0.45 |
| 4:E:122:GLN:HG2 | 4:E:123:ILE:N | 2.32 | 0.45 |
| 6:G:82:PHE:HA | 6:G:85:GLN:CD | 2.41 | 0.45 |
| 7:H:105:GLY:HA2 | 7:H:113:LEU:HD23 | 1.98 | 0.45 |
| 2:N:458:LEU:HD11 | 2:N:464:ILE:HG12 | 1.97 | 0.45 |
| 2:B:55:PHE:O | 2:B:59:LEU:HD23 | 2.17 | 0.45 |
| 2:B:72:SER:O | 2:B:73:MET:HE2 | 2.17 | 0.45 |
| 2:B:508:LEU:HD22 | 6:S:101:ARG:HG2 | 1.98 | 0.45 |
| 5:F:265:PRO:O | 5:F:269:ILE:HG12 | 2.16 | 0.45 |
| 1:M:321:LEU:HD11 | 1:M:346:PHE:CD2 | 2.52 | 0.45 |
| 2:N:398:ASN:OD1 | 2:N:412:THR:OG1 | 2.23 | 0.45 |
| 5:R:53:PHE:CE1 | 5:R:488:MET:HG2 | 2.52 | 0.45 |
| 5:R:218:ILE:O | 5:R:221:LEU:HG | 2.17 | 0.45 |
| 1:A:333:VAL:HG21 | 1:A:383:HIS:ND1 | 2.31 | 0.45 |
| 2:B:301:SER:HB3 | 3:C:180:PHE:CE1 | 2.50 | 0.45 |
| 7:H:112:TRP:H | 7:H:112:TRP:CD1 | 2.34 | 0.45 |
| 1:M:130:PHE:H | 3:O:242:ARG:HH21 | 1.63 | 0.45 |
| 1:M:321:LEU:HD11 | 1:M:346:PHE:HD2 | 1.81 | 0.45 |
| 3:O:174:CYS:SG | 12:O:302:HEC:CBB | 2.98 | 0.45 |
| 1:A:355:HIS:O | 1:A:356:LEU:HD23 | 2.17 | 0.45 |
| 1:A:423:PHE:HD1 | 1:A:425:GLU:H | 1.65 | 0.45 |
| 5:F:195:CYS:SG | 6:G:20:ASN:ND2 | 2.90 | 0.45 |
| 5:F:288:LYS:HB3 | 5:F:288:LYS:HE2 | 1.72 | 0.45 |
| 5:F:434:HIS:CD2 | 5:F:491:PHE:HB2 | 2.52 | 0.45 |
| 5:R:359:MET:SD | 5:R:360:LEU:N | 2.90 | 0.45 |
| 1:A:181:ARG:NH1 | 2:N:22:ASP:OD2 | 2.39 | 0.45 |
| 2:B:121:PHE:CZ | 11:B:601:HEM:HBB1 | 2.52 | 0.45 |
| 2:B:250:GLU:CD | 2:B:367:ASN:H | 2.24 | 0.45 |
| 3:C:228:LYS:O | 3:C:232:ILE:HG23 | 2.17 | 0.45 |
| 4:E:139:ASN:OD1 | 4:E:140:TRP:N | 2.46 | 0.45 |
| 2:N:64:TYR:HD2 | 2:N:65:LEU:HD22 | 1.80 | 0.45 |
| 6:S:75:LEU:HA | 6:S:78:ILE:HG12 | 1.99 | 0.45 |
| 2:B:116:TRP:CZ2 | 2:B:286:ILE:HB | 2.51 | 0.45 |
| 4:E:76:ARG:O | 4:E:78:LYS:N | 2.49 | 0.45 |
| 5:F:59:ALA:HB2 | 5:F:86:HIS:CE1 | 2.52 | 0.45 |
| 2:N:419:GLY:O | 2:N:423:LEU:HB2 | 2.17 | 0.45 |
| 5:R:303:ILE:HG13 | 5:R:336:PRO:HB2 | 1.99 | 0.45 |
| 13:R:602:HEA:H271 | 13:R:602:HEA:H211 | 1.40 | 0.45 |
| 1:A:426:ARG:HG3 | 1:A:427:THR:N | 2.32 | 0.45 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:75:ASP:OD1 | 2:B:75:ASP:N | 2.50 | 0.45 |
| 3:C:248:LEU:HD23 | 3:C:248:LEU:H | 1.82 | 0.45 |
| 4:E:127:PRO:O | 4:E:146:ARG:NH2 | 2.40 | 0.45 |
| 5:F:381:SER:HB3 | 5:F:384:LEU:HB2 | 1.98 | 0.45 |
| 1:M:251:THR:O | 1:M:293:ARG:NH2 | 2.50 | 0.45 |
| 3:O:70:ASP:HA | 3:O:74:VAL:HG23 | 1.99 | 0.45 |
| 3:O:77:HIS:CD2 | 12:O:301:HEC:NB | 2.85 | 0.45 |
| 4:Q:210:ILE:HG13 | 4:Q:327:PRO:HB3 | 1.98 | 0.45 |
| 5:R:398:PHE:HA | 5:R:401:VAL:HG22 | 1.99 | 0.45 |
| 2:B:137:ALA:HB2 | 2:B:369:LEU:HD21 | 1.99 | 0.44 |
| 4:E:75:HIS:CD2 | 5:F:350:LYS:H | 2.36 | 0.44 |
| 4:E:136:PHE:CZ | 4:E:139:ASN:HB3 | 2.53 | 0.44 |
| 6:G:82:PHE:HD1 | 6:G:85:GLN:HE22 | 1.63 | 0.44 |
| 1:M:155:VAL:HG23 | 2:N:265:LYS:NZ | 2.32 | 0.44 |
| 4:Q:142:PHE:CE2 | 4:Q:213:LEU:HB2 | 2.52 | 0.44 |
| 5:R:92:LEU:HD13 | 5:R:175:LEU:HD22 | 1.99 | 0.44 |
| 1:A:372:CYS:HB3 | 1:A:377:SER:HB3 | 1.99 | 0.44 |
| 6:G:21:ARG:HB2 | 7:H:63:LEU:HD11 | 1.99 | 0.44 |
| 9:J:55:LEU:HD11 | 9:J:66:PHE:HB2 | 1.99 | 0.44 |
| 4:Q:49:LEU:HD22 | 4:Q:116:VAL:HG21 | 1.98 | 0.44 |
| 4:Q:128:GLU:H | 4:Q:220:ARG:HB3 | 1.81 | 0.44 |
| 6:S:76:VAL:HG13 | 6:S:109:MET:HE3 | 1.98 | 0.44 |
| 3:C:145:VAL:HG13 | 3:C:202:GLN:HE21 | 1.82 | 0.44 |
| 5:F:218:ILE:O | 5:F:221:LEU:HG | 2.17 | 0.44 |
| 5:F:479:ILE:O | 5:F:483:ILE:HG12 | 2.18 | 0.44 |
| 13:F:602:HEA:HHA | 13:F:602:HEA:CBA | 2.47 | 0.44 |
| 4:Q:235:TRP:HZ3 | 5:R:458:PRO:HD3 | 1.83 | 0.44 |
| 5:R:10:GLU:HB3 | 5:R:11:LEU:H | 1.53 | 0.44 |
| 2:B:457:ARG:NH2 | 5:R:196:MET:HE1 | 2.32 | 0.44 |
| 4:E:37:GLU:C | 4:E:47:ARG:HH22 | 2.26 | 0.44 |
| 5:F:336:PRO:HA | 5:F:339:ILE:HD12 | 2.00 | 0.44 |
| 1:M:273:PHE:HB2 | 1:M:292:TRP:CZ3 | 2.52 | 0.44 |
| 4:Q:294:ASN:HA | 4:Q:297:LYS:HG2 | 1.99 | 0.44 |
| 5:R:118:PHE:HB3 | 5:R:121:LEU:HD23 | 1.98 | 0.44 |
| 6:G:69:GLN:C | 6:G:72:PRO:HD2 | 2.42 | 0.44 |
| 1:M:93:GLU:HA | 1:M:96:VAL:HG12 | 2.00 | 0.44 |
| 3:O:261:MET:HE2 | 3:O:261:MET:HA | 1.99 | 0.44 |
| 2:B:58:LEU:HD23 | 11:B:602:HEM:C3B | 2.53 | 0.44 |
| 6:G:60:PRO:HG2 | 6:G:63:THR:OG1 | 2.17 | 0.44 |
| 3:O:178:HIS:ND1 | 3:O:196:LEU:HD21 | 2.32 | 0.44 |
| 4:E:37:GLU:HA | 4:E:47:ARG:HH12 | 1.83 | 0.44 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:F:222:ILE:HA | 6:G:38:MET:SD | 2.58 | 0.44 |
| 5:F:543:PHE:CE2 | 5:F:554:LEU:HD11 | 2.53 | 0.44 |
| 6:G:33:LEU:HA | 6:G:36:GLU:CD | 2.43 | 0.44 |
| 4:E:224:GLN:C | 4:E:225:MET:HE2 | 2.43 | 0.44 |
| 4:E:273:CYS:HB3 | 4:E:281:HIS:HE1 | 1.82 | 0.44 |
| 5:F:315:MET:O | 5:F:318:THR:OG1 | 2.34 | 0.44 |
| 6:S:60:PRO:HG2 | 6:S:63:THR:OG1 | 2.18 | 0.44 |
| 1:A:93:GLU:HB2 | 1:M:203:ILE:HD11 | 1.99 | 0.43 |
| 2:B:492:ARG:HB2 | 2:B:495:LYS:HG2 | 2.00 | 0.43 |
| 5:F:41:GLY:HA3 | 5:F:105:LEU:HD22 | 2.00 | 0.43 |
| 6:G:96:ILE:HD11 | 6:G:170:PHE:HB2 | 1.99 | 0.43 |
| 3:O:178:HIS:HD1 | 3:O:196:LEU:HD21 | 1.83 | 0.43 |
| 5:R:212:ASN:ND2 | 5:R:272:LEU:O | 2.47 | 0.43 |
| 2:B:458:LEU:HD11 | 2:B:464:ILE:HG12 | 2.00 | 0.43 |
| 4:E:137:GLN:HE21 | 4:E:138:TRP:CG | 2.35 | 0.43 |
| 2:N:316:LEU:HD12 | 2:N:319:ILE:HD11 | 2.00 | 0.43 |
| 4:Q:201:VAL:HG11 | 4:Q:303:ARG:HB3 | 1.99 | 0.43 |
| 5:R:446:PHE:HA | 5:R:449:GLN:OE1 | 2.17 | 0.43 |
| 5:R:459:ARG:NH2 | 13:R:602:HEA:O1D | 2.50 | 0.43 |
| 3:C:118:PRO:HG2 | 5:R:164:PRO:HB2 | 2.01 | 0.43 |
| 5:F:543:PHE:HE2 | 5:F:554:LEU:HD11 | 1.83 | 0.43 |
| 1:M:232:LYS:HB2 | 1:M:232:LYS:HE3 | 1.74 | 0.43 |
| 2:N:58:LEU:HD11 | 2:N:117:ALA:C | 2.44 | 0.43 |
| 12:O:302:HEC:HBC3 | 12:O:302:HEC:HHD | 1.98 | 0.43 |
| 4:Q:136:PHE:HE2 | 4:Q:141:LYS:HB2 | 1.83 | 0.43 |
| 2:B:92:ARG:HH21 | 2:N:206:THR:HB | 1.82 | 0.43 |
| 3:C:208:MET:CE | 3:C:228:LYS:HD2 | 2.48 | 0.43 |
| 5:F:95:ALA:O | 5:F:98:ILE:HG22 | 2.19 | 0.43 |
| 5:F:262:PHE:O | 5:F:266:GLU:HG2 | 2.19 | 0.43 |
| 13:F:602:HEA:H212 | 13:F:602:HEA:H271 | 1.69 | 0.43 |
| 9:J:80:ARG:O | 9:J:84:ILE:HG12 | 2.18 | 0.43 |
| 1:M:401:ILE:HD12 | 1:M:409:LEU:HD12 | 2.00 | 0.43 |
| 6:S:69:GLN:C | 6:S:72:PRO:HD2 | 2.44 | 0.43 |
| 1:A:214:PHE:CZ | 1:M:147:ILE:HD12 | 2.53 | 0.43 |
| 1:A:263:ARG:NH2 | 3:C:222:GLN:O | 2.51 | 0.43 |
| 2:B:59:LEU:O | 2:B:63:VAL:HG23 | 2.17 | 0.43 |
| 2:B:374:ASP:O | 2:B:439:GLN:NE2 | 2.52 | 0.43 |
| 2:B:397:MET:SD | 2:B:400:ILE:HB | 2.58 | 0.43 |
| 3:C:201:GLU:HA | 3:C:204:ILE:HD12 | 1.99 | 0.43 |
| 4:E:146:ARG:HH11 | 4:E:148:ASN:HB2 | 1.83 | 0.43 |
| 13:F:601:HEA:H261 | 13:F:601:HEA:H172 | 1.65 | 0.43 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 6:G:67:LEU:HD11 | 6:G:203:ARG:HH22 | 1.83 | 0.43 |
| 1:M:341:PHE:CG | 1:M:400:PRO:HG3 | 2.54 | 0.43 |
| 2:N:339:ALA:HA | 2:N:342:MET:HG2 | 2.01 | 0.43 |
| 8:U:23:VAL:O | 8:U:27:SER:OG | 2.32 | 0.43 |
| 2:B:216:HIS:HE1 | 11:B:602:HEM:C1B | 2.37 | 0.43 |
| 2:B:320:TRP:CD2 | 2:B:321:PRO:HD2 | 2.54 | 0.43 |
| 2:B:355:LEU:O | 2:B:359:PHE:HB2 | 2.17 | 0.43 |
| 2:B:458:LEU:O | 2:B:460:HIS:N | 2.52 | 0.43 |
| 7:H:1:MET:SD | 7:H:4:GLU:HB2 | 2.59 | 0.43 |
| 1:M:113:ILE:O | 1:M:117:TRP:HB2 | 2.17 | 0.43 |
| 2:N:64:TYR:CD2 | 2:N:110:VAL:HG11 | 2.54 | 0.43 |
| 5:R:75:SER:OG | 5:R:77:GLU:OE1 | 2.26 | 0.43 |
| 9:V:114:VAL:HG13 | 9:V:114:VAL:O | 2.19 | 0.43 |
| 7:H:80:GLY:H | 2:N:457:ARG:HB3 | 1.83 | 0.43 |
| 9:V:36:GLU:OE1 | 9:V:36:GLU:N | 2.52 | 0.43 |
| 2:B:381:ILE:O | 2:B:384:MET:HB3 | 2.19 | 0.43 |
| 5:F:210:THR:HG22 | 5:F:214:MET:HE1 | 2.01 | 0.43 |
| 5:F:220:ILE:HG23 | 5:F:224:PHE:CE2 | 2.54 | 0.43 |
| 5:F:437:LEU:HD23 | 5:F:487:SER:HA | 2.01 | 0.43 |
| 9:J:114:VAL:O | 9:J:114:VAL:HG13 | 2.19 | 0.43 |
| 1:M:67:GLY:O | 1:M:71:GLY:N | 2.51 | 0.43 |
| 5:R:439:PHE:O | 5:R:443:HIS:CD2 | 2.72 | 0.43 |
| 5:R:459:ARG:HG3 | 5:R:460:ARG:HG3 | 2.00 | 0.43 |
| 5:R:550:MET:SD | 5:R:553:ARG:HD3 | 2.59 | 0.43 |
| 6:S:33:LEU:HD11 | 6:S:184:TYR:HD1 | 1.84 | 0.43 |
| 6:S:63:THR:HG21 | 6:S:136:TYR:HE2 | 1.83 | 0.43 |
| 1:A:122:LYS:HD3 | 1:A:122:LYS:HA | 1.80 | 0.43 |
| 3:C:215:MET:CE | 12:C:302:HEC:C1B | 2.96 | 0.43 |
| 5:F:400:TYR:OH | 5:F:446:PHE:O | 2.34 | 0.43 |
| 6:G:182:SER:O | 6:G:186:HIS:ND1 | 2.46 | 0.43 |
| 2:N:320:TRP:CD2 | 2:N:321:PRO:HD2 | 2.54 | 0.43 |
| 2:N:333:PRO:HB2 | 2:N:335:PRO:HD2 | 2.01 | 0.43 |
| 3:O:195:ASP:OD1 | 3:O:196:LEU:N | 2.52 | 0.43 |
| 9:V:48:LEU:O | 9:V:51:LEU:HG | 2.19 | 0.43 |
| 9:J:17:PRO:HG2 | 9:J:20:TRP:CD1 | 2.54 | 0.43 |
| 1:M:169:GLN:HB3 | 2:N:253:VAL:HB | 2.01 | 0.43 |
| 2:N:332:ILE:HG23 | 2:N:336:VAL:HG21 | 2.01 | 0.43 |
| 5:R:227:LEU:HD13 | 5:R:262:PHE:CE2 | 2.54 | 0.43 |
| 5:R:342:PHE:HA | 5:R:345:ILE:HG22 | 2.00 | 0.43 |
| 9:V:57:TYR:HA | 9:V:60:ARG:HG2 | 2.01 | 0.43 |
| 1:A:87:LYS:O | 1:A:91:ARG:HG3 | 2.19 | 0.42 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:72:SER:OG | 2:B:74:VAL:HG12 | 2.19 | 0.42 |
| 2:B:177:ARG:O | 2:B:181:SER:HB3 | 2.18 | 0.42 |
| 4:E:103:PHE:HA | 4:E:106:ILE:HG12 | 2.01 | 0.42 |
| 5:F:263:GLY:O | 5:F:266:GLU:HB2 | 2.19 | 0.42 |
| 1:M:136:THR:HG23 | 2:N:109:PHE:HB2 | 2.00 | 0.42 |
| 2:N:119:LEU:HD23 | 2:N:119:LEU:HA | 1.90 | 0.42 |
| 2:N:148:ILE:O | 2:N:152:LEU:HD23 | 2.19 | 0.42 |
| 4:Q:101:ILE:HG13 | 4:Q:102:PRO:CD | 2.44 | 0.42 |
| 4:Q:252:ASN:HB3 | 5:R:253:LEU:HD23 | 2.00 | 0.42 |
| 5:R:11:LEU:HD12 | 8:U:48:LEU:HD22 | 2.01 | 0.42 |
| 2:B:119:LEU:HB2 | 3:C:261:MET:HE3 | 2.01 | 0.42 |
| 2:B:148:ILE:O | 2:B:152:LEU:HD23 | 2.19 | 0.42 |
| 3:C:107:ARG:HB2 | 3:C:107:ARG:NH1 | 2.34 | 0.42 |
| 5:F:92:LEU:HD13 | 5:F:175:LEU:HD22 | 2.00 | 0.42 |
| 6:G:33:LEU:HA | 6:G:36:GLU:OE2 | 2.19 | 0.42 |
| 6:G:63:THR:HG21 | 6:G:136:TYR:CE2 | 2.52 | 0.42 |
| 6:G:100:ARG:NH2 | 6:G:166:GLY:HA2 | 2.34 | 0.42 |
| 1:M:281:MET:HB2 | 1:M:323:ARG:HH11 | 1.83 | 0.42 |
| 2:N:265:LYS:HE3 | 3:O:276:ILE:HG23 | 2.01 | 0.42 |
| 5:R:67:ALA:HA | 5:R:474:ASN:ND2 | 2.33 | 0.42 |
| 8:U:4:MET:HE2 | 8:U:4:MET:HA | 2.02 | 0.42 |
| 3:C:195:ASP:OD1 | 3:C:196:LEU:N | 2.52 | 0.42 |
| 1:M:374:CYS:HB3 | 1:M:375:HIS:CE1 | 2.54 | 0.42 |
| 3:O:108:MET:HG3 | 3:O:109:PRO:HD2 | 2.01 | 0.42 |
| 4:Q:233:ALA:HB3 | 4:Q:274:ALA:HB3 | 2.01 | 0.42 |
| 5:R:56:GLY:HA3 | 13:R:602:HEA:H161 | 2.01 | 0.42 |
| 5:R:103:ALA:HB2 | 5:R:213:ILE:HD11 | 2.01 | 0.42 |
| 3:C:208:MET:HE3 | 3:C:218:PHE:HB3 | 2.01 | 0.42 |
| 4:E:141:LYS:HD2 | 4:E:204:LEU:HD12 | 2.01 | 0.42 |
| 5:F:483:ILE:HD12 | 8:I:17:LEU:HD21 | 2.02 | 0.42 |
| 1:M:122:LYS:HA | 1:M:122:LYS:HD3 | 1.79 | 0.42 |
| 2:N:111:ARG:NH2 | 11:N:602:HEM:O2A | 2.48 | 0.42 |
| 2:N:273:ILE:HA | 2:N:276:VAL:HG12 | 1.99 | 0.42 |
| 4:Q:319:PRO:HA | 4:Q:320:PRO:HD3 | 1.96 | 0.42 |
| 9:V:75:ARG:HG3 | 9:V:76:ASP:N | 2.32 | 0.42 |
| 2:B:64:TYR:CD2 | 2:B:110:VAL:HG11 | 2.55 | 0.42 |
| 5:F:539:GLU:N | 5:F:539:GLU:OE1 | 2.53 | 0.42 |
| 13:F:602:HEA:C18 | 13:F:602:HEA:H261 | 2.50 | 0.42 |
| 1:M:76:TYR:CZ | 2:N:530:ALA:HB2 | 2.54 | 0.42 |
| 1:M:323:ARG:NE | 1:M:345:GLU:HG3 | 2.35 | 0.42 |
| 2:N:161:TYR:HA | 2:N:310:MET:HE2 | 2.00 | 0.42 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:N:496:LEU:HD23 | 2:N:496:LEU:H | 1.83 | 0.42 |
| 4:Q:154:LEU:HD11 | 4:Q:297:LYS:HB3 | 2.01 | 0.42 |
| 1:A:404:ASP:OD1 | 1:A:408:TYR:N | 2.33 | 0.42 |
| 2:N:458:LEU:HB2 | 2:N:462:ALA:O | 2.19 | 0.42 |
| 8:U:16:LEU:HD12 | 8:U:17:LEU:N | 2.35 | 0.42 |
| 2:B:28:SER:OG | 1:M:180:ASP:HB3 | 2.19 | 0.42 |
| 2:B:434:TRP:HZ3 | 5:R:32:ILE:HG13 | 1.85 | 0.42 |
| 3:C:134:ALA:O | 3:C:137:GLN:HG3 | 2.19 | 0.42 |
| 3:C:263:ILE:HD11 | 7:T:120:PHE:HZ | 1.84 | 0.42 |
| 5:F:102:PHE:HZ | 5:F:410:THR:HG23 | 1.85 | 0.42 |
| 13:F:602:HEA:HBC1 | 13:F:602:HEA:CMC | 2.48 | 0.42 |
| 2:N:26:HIS:O | 2:N:26:HIS:ND1 | 2.50 | 0.42 |
| 9:V:17:PRO:HG2 | 9:V:20:TRP:CG | 2.54 | 0.42 |
| 2:B:122:ALA:O | 2:B:125:ILE:HG22 | 2.19 | 0.42 |
| 5:F:268:TYR:CD2 | 5:F:307:SER:HB2 | 2.55 | 0.42 |
| 5:F:359:MET:SD | 5:F:360:LEU:HD22 | 2.60 | 0.42 |
| 5:R:509:ASP:HB2 | 5:R:519:TRP:HB3 | 2.01 | 0.42 |
| 13:R:601:HEA:HHA | 13:R:601:HEA:HBA1 | 2.01 | 0.42 |
| 8:U:70:THR:OG1 | 9:V:112:SER:HB3 | 2.20 | 0.42 |
| 1:A:314:GLY:HA3 | 1:A:317:ASN:OD1 | 2.19 | 0.42 |
| 2:B:90:MET:HE3 | 2:B:90:MET:HB2 | 1.87 | 0.42 |
| 2:B:168:ASP:OD1 | 2:B:168:ASP:N | 2.50 | 0.42 |
| 2:B:209:ILE:HD13 | 2:B:209:ILE:HA | 1.91 | 0.42 |
| 5:F:155:THR:HG22 | 5:F:255:TRP:CD1 | 2.55 | 0.42 |
| 1:M:236:PRO:HA | 1:M:241:LYS:HG2 | 2.02 | 0.42 |
| 4:Q:85:PRO:O | 4:Q:87:GLN:HG2 | 2.20 | 0.42 |
| 6:S:195:LEU:O | 6:S:199:ILE:HG22 | 2.20 | 0.42 |
| 2:B:14:LEU:HD11 | 2:B:16:ARG:NH2 | 2.35 | 0.42 |
| 2:B:22:ASP:OD2 | 1:M:181:ARG:NH1 | 2.40 | 0.42 |
| 2:B:159:GLU:OE2 | 2:B:216:HIS:ND1 | 2.52 | 0.42 |
| 2:B:418:ILE:O | 2:B:422:ILE:HG12 | 2.20 | 0.42 |
| 5:F:18:PRO:HG2 | 5:F:504:VAL:HG11 | 2.01 | 0.42 |
| 5:F:330:THR:O | 5:F:333:ILE:HG22 | 2.20 | 0.42 |
| 4:Q:136:PHE:CZ | 4:Q:139:ASN:HB3 | 2.55 | 0.42 |
| 5:R:281:ILE:HD12 | 5:R:281:ILE:HA | 1.92 | 0.42 |
| 6:S:61:PRO:O | 6:S:63:THR:N | 2.52 | 0.42 |
| 2:B:273:ILE:HA | 2:B:276:VAL:HG12 | 2.02 | 0.41 |
| 2:B:306:PRO:HD2 | 2:B:314:GLU:HG3 | 2.02 | 0.41 |
| 2:B:333:PRO:HB2 | 2:B:335:PRO:HD2 | 2.01 | 0.41 |
| 5:F:118:PHE:HB3 | 5:F:121:LEU:HD23 | 2.02 | 0.41 |
| 3:O:102:GLN:OE1 | 3:O:107:ARG:HG3 | 2.20 | 0.41 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:O:228:LYS:O | 3:O:232:ILE:HG12 | 2.20 | 0.41 |
| 4:Q:106:ILE:HG13 | 4:Q:107:SER:N | 2.35 | 0.41 |
| 4:Q:330:THR:C | 4:Q:332:ARG:H | 2.28 | 0.41 |
| 6:S:24:MET:SD | 6:S:25:VAL:HG23 | 2.60 | 0.41 |
| 8:U:44:HIS:NE2 | 9:V:40:HIS:O | 2.49 | 0.41 |
| 9:V:33:GLU:HB3 | 9:V:36:GLU:OE1 | 2.19 | 0.41 |
| 2:B:74:VAL:HG11 | 2:N:74:VAL:HB | 2.01 | 0.41 |
| 5:F:54:ILE:O | 5:F:57:LEU:HG | 2.20 | 0.41 |
| 8:I:78:THR:HG22 | 8:I:78:THR:O | 2.20 | 0.41 |
| 2:N:381:ILE:O | 2:N:384:MET:HB3 | 2.19 | 0.41 |
| 4:Q:88:PHE:HB2 | 5:R:561:GLY:H | 1.84 | 0.41 |
| 6:S:25:VAL:HG12 | 6:S:180:VAL:HG11 | 2.02 | 0.41 |
| 6:S:65:LEU:HB3 | 6:S:200:TYR:CE1 | 2.55 | 0.41 |
| 5:F:30:LYS:O | 5:F:34:THR:HB | 2.20 | 0.41 |
| 5:F:107:LEU:HD12 | 5:F:213:ILE:HG21 | 2.01 | 0.41 |
| 5:F:261:PHE:HD1 | 5:F:311:TRP:CD2 | 2.38 | 0.41 |
| 5:F:337:THR:CG2 | 13:F:601:HEA:H263 | 2.49 | 0.41 |
| 6:G:72:PRO:O | 6:G:76:VAL:HG23 | 2.20 | 0.41 |
| 1:M:129:ASP:OD1 | 3:O:242:ARG:NH2 | 2.36 | 0.41 |
| 2:N:55:PHE:O | 2:N:59:LEU:HD23 | 2.20 | 0.41 |
| 2:N:417:ARG:HA | 2:N:420:MET:HE1 | 2.01 | 0.41 |
| 5:R:98:ILE:HD12 | 5:R:98:ILE:HA | 1.98 | 0.41 |
| 6:S:32:TRP:O | 6:S:36:GLU:HG2 | 2.21 | 0.41 |
| 1:A:253:ARG:HB2 | 1:A:257:GLU:OE2 | 2.20 | 0.41 |
| 3:C:266:MET:O | 3:C:270:ILE:HG12 | 2.19 | 0.41 |
| 4:E:149:PHE:CE2 | 4:E:154:LEU:HD12 | 2.56 | 0.41 |
| 5:F:101:GLY:O | 5:F:105:LEU:HD23 | 2.19 | 0.41 |
| 5:F:342:PHE:HA | 5:F:345:ILE:HG22 | 2.01 | 0.41 |
| 7:H:111:PRO:O | 7:H:114:ILE:HG12 | 2.20 | 0.41 |
| 4:Q:144:TYR:OH | 4:Q:214:VAL:O | 2.30 | 0.41 |
| 5:R:155:THR:HG22 | 5:R:255:TRP:CD1 | 2.56 | 0.41 |
| 5:R:210:THR:O | 5:R:213:ILE:HG22 | 2.21 | 0.41 |
| 1:A:91:ARG:NE | 2:B:506:SER:HB3 | 2.34 | 0.41 |
| 2:B:329:HIS:O | 2:B:329:HIS:ND1 | 2.54 | 0.41 |
| 3:C:201:GLU:HG2 | 3:C:202:GLN:N | 2.35 | 0.41 |
| 3:C:260:ALA:HA | 3:C:263:ILE:HG22 | 2.02 | 0.41 |
| 4:E:28:SER:O | 4:E:32:GLY:N | 2.53 | 0.41 |
| 2:N:349:LEU:HB3 | 2:N:350:PRO:HD3 | 2.01 | 0.41 |
| 4:Q:235:TRP:CD1 | 4:Q:242:LYS:HE2 | 2.56 | 0.41 |
| 6:S:34:SER:HB3 | 7:T:48:MET:CG | 2.51 | 0.41 |
| 2:B:78:TYR:HB2 | 2:B:90:MET:SD | 2.61 | 0.41 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:C:162:ASP:OD1 | 3:C:163:LEU:N | 2.54 | 0.41 |
| 6:G:24:MET:SD | 6:G:25:VAL:HG23 | 2.60 | 0.41 |
| 9:J:17:PRO:HA | 9:J:18:PRO:HD2 | 1.87 | 0.41 |
| 1:M:356:LEU:HD22 | 2:N:182:SER:CB | 2.51 | 0.41 |
| 1:M:402:THR:OG1 | 1:M:403:ILE:N | 2.54 | 0.41 |
| 4:Q:39:ILE:HD13 | 4:Q:238:GLU:HB3 | 2.02 | 0.41 |
| 8:U:79:TRP:CG | 9:V:104:CYS:HB3 | 2.56 | 0.41 |
| 4:E:273:CYS:HB3 | 4:E:281:HIS:CE1 | 2.55 | 0.41 |
| 4:E:282:SER:HB2 | 5:F:461:TYR:CD1 | 2.56 | 0.41 |
| 5:F:341:PHE:HZ | 5:F:369:PHE:HD2 | 1.68 | 0.41 |
| 2:N:35:LEU:HD23 | 2:N:35:LEU:HA | 1.93 | 0.41 |
| 4:Q:212:VAL:HB | 4:Q:309:ASN:ND2 | 2.35 | 0.41 |
| 5:R:270:ILE:O | 5:R:406:ILE:HD11 | 2.20 | 0.41 |
| 1:A:365:GLN:HE22 | 3:C:215:MET:N | 2.19 | 0.41 |
| 2:B:108:LEU:HA | 2:B:111:ARG:HG2 | 2.01 | 0.41 |
| 2:B:177:ARG:HB2 | 2:B:203:PHE:CZ | 2.55 | 0.41 |
| 2:N:145:ASN:OD1 | 2:N:231:HIS:ND1 | 2.50 | 0.41 |
| 4:Q:241:PHE:HZ | 4:Q:243:ARG:HH21 | 1.68 | 0.41 |
| 5:R:282:PHE:HE2 | 5:R:344:TRP:HB3 | 1.85 | 0.41 |
| 1:A:313:MET:SD | 1:A:313:MET:N | 2.94 | 0.41 |
| 1:A:356:LEU:HD12 | 1:A:375:HIS:CE1 | 2.56 | 0.41 |
| 2:B:26:HIS:O | 2:B:26:HIS:ND1 | 2.51 | 0.41 |
| 2:B:71:PRO:HG3 | 2:B:213:TYR:CD2 | 2.56 | 0.41 |
| 2:B:505:GLY:HA3 | 6:S:97:PHE:HE2 | 1.86 | 0.41 |
| 5:F:224:PHE:HE1 | 5:F:266:GLU:OE2 | 2.04 | 0.41 |
| 5:F:274:PHE:CD1 | 5:F:406:ILE:HA | 2.56 | 0.41 |
| 9:J:78:ALA:HB1 | 9:J:82:ARG:NH1 | 2.36 | 0.41 |
| 1:M:414:ASP:OD1 | 1:M:415:PHE:N | 2.50 | 0.41 |
| 2:N:167:PRO:O | 2:N:169:ASP:N | 2.52 | 0.41 |
| 2:N:213:TYR:CZ | 2:N:217:ILE:HD13 | 2.56 | 0.41 |
| 3:O:109:PRO:HG3 | 12:O:301:HEC:HHC | 2.02 | 0.41 |
| 5:R:102:PHE:O | 5:R:106:VAL:HG22 | 2.21 | 0.41 |
| 5:R:359:MET:SD | 5:R:359:MET:C | 3.04 | 0.41 |
| 5:R:397:HIS:O | 5:R:401:VAL:HG22 | 2.21 | 0.41 |
| 5:R:550:MET:O | 5:R:550:MET:HG3 | 2.21 | 0.41 |
| 9:V:19:GLY:CA | 9:V:31:VAL:HG22 | 2.51 | 0.41 |
| 9:V:144:ILE:O | 9:V:147:ILE:HG22 | 2.21 | 0.41 |
| 2:B:458:LEU:HB2 | 2:B:462:ALA:O | 2.21 | 0.41 |
| 4:E:142:PHE:CE2 | 4:E:213:LEU:HB2 | 2.56 | 0.41 |
| 4:E:235:TRP:CE2 | 4:E:242:LYS:HE2 | 2.55 | 0.41 |
| 5:F:173:MET:SD | 7:H:106:ILE:HG23 | 2.61 | 0.41 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 8:I:6:ILE:HD12 | 8:I:6:ILE:H | 1.85 | 0.41 |
| 2:N:100:ILE:HD12 | 2:N:100:ILE:HA | 1.93 | 0.41 |
| 1:A:51:GLU:CD | 1:M:179:ILE:HD12 | 2.46 | 0.40 |
| 3:C:226:GLU:H | 3:C:226:GLU:CD | 2.25 | 0.40 |
| 5:F:208:ILE:N | 5:F:280:GLU:OE2 | 2.54 | 0.40 |
| 7:H:27:SER:O | 7:H:28:MET:HE2 | 2.21 | 0.40 |
| 2:N:129:LEU:HD12 | 11:N:601:HEM:HMC2 | 2.03 | 0.40 |
| 2:N:250:GLU:CD | 2:N:367:ASN:H | 2.28 | 0.40 |
| 2:N:301:SER:OG | 3:O:175:ALA:O | 2.23 | 0.40 |
| 2:N:316:LEU:HG | 2:N:338:VAL:HG22 | 2.03 | 0.40 |
| 1:A:110:LEU:HA | 1:A:113:ILE:HG22 | 2.02 | 0.40 |
| 2:B:92:ARG:NH1 | 2:B:95:GLN:OE1 | 2.53 | 0.40 |
| 11:B:602:HEM:O1D | 11:B:602:HEM:HHA | 2.22 | 0.40 |
| 5:F:403:PHE:CE2 | 5:F:407:VAL:HG21 | 2.57 | 0.40 |
| 5:F:405:THR:HG23 | 5:F:406:ILE:N | 2.36 | 0.40 |
| 5:F:440:ILE:O | 5:F:444:THR:OG1 | 2.32 | 0.40 |
| 5:F:508:ASP:OD2 | 9:J:27:ARG:NH2 | 2.55 | 0.40 |
| 13:F:602:HEA:HBA1 | 13:F:602:HEA:CHA | 2.51 | 0.40 |
| 2:N:119:LEU:HD22 | 2:N:308:PHE:CE1 | 2.56 | 0.40 |
| 2:N:316:LEU:HA | 2:N:319:ILE:HG12 | 2.03 | 0.40 |
| 4:Q:60:VAL:O | 4:Q:64:VAL:HG23 | 2.21 | 0.40 |
| 4:Q:139:ASN:OD1 | 4:Q:140:TRP:N | 2.51 | 0.40 |
| 7:T:27:SER:O | 7:T:28:MET:HE2 | 2.21 | 0.40 |
| 7:T:111:PRO:O | 7:T:114:ILE:HG12 | 2.22 | 0.40 |
| 1:A:384:PHE:CE1 | 1:A:386:LYS:HB2 | 2.57 | 0.40 |
| 5:F:20:ARG:NH2 | 9:J:53:ASP:OD1 | 2.54 | 0.40 |
| 5:F:102:PHE:O | 5:F:106:VAL:HG22 | 2.21 | 0.40 |
| 1:M:149:SER:HA | 1:M:152:ILE:HG12 | 2.03 | 0.40 |
| 2:N:169:ASP:OD2 | 2:N:292:LEU:HD22 | 2.22 | 0.40 |
| 4:Q:39:ILE:HD11 | 4:Q:239:PHE:HD1 | 1.86 | 0.40 |
| 2:B:142:ARG:NH2 | 2:B:239:LYS:O | 2.51 | 0.40 |
| 4:E:160:ASP:HB2 | 4:E:199:ASP:HA | 2.04 | 0.40 |
| 5:F:279:SER:O | 5:F:283:PRO:HD3 | 2.20 | 0.40 |
| 6:G:34:SER:HB3 | 7:H:48:MET:CG | 2.51 | 0.40 |
| 3:O:201:GLU:OE1 | 3:O:201:GLU:N | 2.38 | 0.40 |
| 6:S:21:ARG:HB2 | 7:T:66:ARG:HD3 | 2.03 | 0.40 |
| 6:S:61:PRO:C | 6:S:63:THR:N | 2.73 | 0.40 |
| 9:V:88:VAL:HG12 | 9:V:90:THR:H | 1.87 | 0.40 |
| 2:B:154:ILE:HG13 | 2:B:346:PHE:CD2 | 2.57 | 0.40 |
| 4:E:238:GLU:HG3 | 4:E:269:PHE:CD1 | 2.57 | 0.40 |
| 4:E:298:ALA:HA | 4:E:301:GLN:NE2 | 2.36 | 0.40 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 5:F:39:MET:HE3 | 5:F:43:MET:HE3 | 2.04 | 0.40 |
| 6:G:20:ASN:OD1 | 6:G:20:ASN:N | 2.53 | 0.40 |
| 2:N:122:ALA:O | 2:N:125:ILE:HG22 | 2.22 | 0.40 |
| 4:Q:273:CYS:HB3 | 4:Q:281:HIS:CE1 | 2.57 | 0.40 |
| 5:R:146:ALA:HA | 5:R:167:GLY:HA3 | 2.04 | 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 | A | 376/429 (88%) | 345 (92%) | 31 (8%) | 0 | 100 | 100 |
| 1 | M | 366/429 (85%) | 338 (92%) | 28 (8%) | 0 | 100 | 100 |
| 2 | B | 522/573 (91%) | 477 (91%) | 45 (9%) | 0 | 100 | 100 |
| 2 | N | 522/573 (91%) | 482 (92%) | 40 (8%) | 0 | 100 | 100 |
| 3 | C | 214/280 (76%) | 198 (92%) | 16 (8%) | 0 | 100 | 100 |
| 3 | O | 207/280 (74%) | 192 (93%) | 15 (7%) | 0 | 100 | 100 |
| 4 | E | 272/363 (75%) | 256 (94%) | 16 (6%) | 0 | 100 | 100 |
| 4 | Q | 279/363 (77%) | 260 (93%) | 18 (6%) | 1 (0%) | 30 | 68 |
| 5 | F | 550/573 (96%) | 528 (96%) | 22 (4%) | 0 | 100 | 100 |
| 5 | R | 550/573 (96%) | 528 (96%) | 22 (4%) | 0 | 100 | 100 |
| 6 | G | 184/203 (91%) | 179 (97%) | 5 (3%) | 0 | 100 | 100 |
| 6 | S | 183/203 (90%) | 177 (97%) | 5 (3%) | 1 (0%) | 25 | 64 |
| 7 | H | 137/139 (99%) | 132 (96%) | 5 (4%) | 0 | 100 | 100 |
| 7 | T | 137/139 (99%) | 133 (97%) | 4 (3%) | 0 | 100 | 100 |
| 8 | I | 63/79 (80%) | 58 (92%) | 5 (8%) | 0 | 100 | 100 |
| 8 | U | 63/79 (80%) | 62 (98%) | 1 (2%) | 0 | 100 | 100 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles |
|---|---|---|---|---|---|---|
| 9 | J | 141/155 (91%) | 135 (96%) | 5 (4%) | 1 (1%) | 19 56 |
| 9 | V | 141/155 (91%) | 137 (97%) | 4 (3%) | 0 | 100 100 |
| All | All | 4907/5588 (88%) | 4617 (94%) | 287 (6%) | 3 (0%) | 50 83 |

All (3) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 9 | J | 18 | PRO |
| 4 | Q | 33 | ILE |
| 6 | S | 62 | PRO |

### 5.3.2 Protein sidechains (i)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 1 | A | 296/343 (86%) | 296 (100%) | 0 | 100 100 |
| 1 | M | 294/343 (86%) | 294 (100%) | 0 | 100 100 |
| 2 | B | 422/466 (91%) | 422 (100%) | 0 | 100 100 |
| 2 | N | 419/466 (90%) | 419 (100%) | 0 | 100 100 |
| 3 | C | 131/207 (63%) | 131 (100%) | 0 | 100 100 |
| 3 | O | 128/207 (62%) | 128 (100%) | 0 | 100 100 |
| 4 | E | 236/306 (77%) | 236 (100%) | 0 | 100 100 |
| 4 | Q | 238/306 (78%) | 238 (100%) | 0 | 100 100 |
| 5 | F | 449/466 (96%) | 449 (100%) | 0 | 100 100 |
| 5 | R | 449/466 (96%) | 449 (100%) | 0 | 100 100 |
| 6 | G | 153/166 (92%) | 153 (100%) | 0 | 100 100 |
| 6 | S | 152/166 (92%) | 152 (100%) | 0 | 100 100 |
| 7 | H | 100/101 (99%) | 100 (100%) | 0 | 100 100 |
| 7 | T | 99/101 (98%) | 99 (100%) | 0 | 100 100 |
| 8 | I | 54/62 (87%) | 54 (100%) | 0 | 100 100 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 8 | U | 53/62 (86%) | 53 (100%) | 0 | 100 100 |
| 9 | J | 103/115 (90%) | 103 (100%) | 0 | 100 100 |
| 9 | V | 105/115 (91%) | 104 (99%) | 1 (1%) | 73 81 |
| All | All | 3881/4464 (87%) | 3880 (100%) | 1 (0%) | 100 100 |

All (1) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 9 | V | 16 | LEU |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 172 | HIS |
| 1 | A | 317 | ASN |
| 2 | B | 112 | GLN |
| 3 | C | 173 | ASN |
| 3 | C | 213 | GLN |
| 4 | E | 91 | ASN |
| 5 | F | 104 | ASN |
| 5 | F | 474 | ASN |
| 5 | F | 529 | ASN |
| 5 | F | 559 | HIS |
| 6 | G | 174 | GLN |
| 7 | H | 139 | HIS |
| 2 | N | 238 | GLN |
| 2 | N | 448 | HIS |
| 3 | O | 161 | ASN |
| 3 | O | 179 | ASN |
| 4 | Q | 197 | ASN |
| 4 | Q | 302 | GLN |
| 5 | R | 434 | HIS |
| 5 | R | 559 | HIS |
| 6 | S | 23 | ASN |
| 6 | S | 85 | GLN |

### 5.3.3 RNA

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry (i)

14 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 | $\#\|Z\| > 2$ |
| 13 | HEA | F | 602 | - | 57,67,67 | 2.03 | 14 (24%) | 61,103,103 | 2.33 | 24 (39%) |
| 13 | HEA | R | 602 | 5 | 57,67,67 | 1.98 | 14 (24%) | 61,103,103 | 2.38 | 23 (37%) |
| 12 | HEC | C | 301 | - | 32,50,50 | 2.25 | 4 (12%) | 24,82,82 | 1.27 | 2 (8%) |
| 10 | FES | A | 501 | 1 | 0,4,4 | - | - | - | | |
| 11 | HEM | N | 602 | 2 | 41,50,50 | 1.47 | 3 (7%) | 45,82,82 | 1.43 | 7 (15%) |
| 12 | HEC | O | 301 | 3 | 32,50,50 | 2.22 | 3 (9%) | 24,82,82 | 1.33 | 2 (8%) |
| 13 | HEA | F | 601 | 5 | 57,67,67 | 1.99 | 14 (24%) | 61,103,103 | 2.43 | 26 (42%) |
| 12 | HEC | O | 302 | 3 | 32,50,50 | 2.38 | 12 (37%) | 24,82,82 | 2.11 | 6 (25%) |
| 12 | HEC | C | 302 | 3 | 32,50,50 | 2.24 | 3 (9%) | 24,82,82 | 1.37 | 2 (8%) |
| 11 | HEM | B | 602 | 2 | 41,50,50 | 1.33 | 5 (12%) | 45,82,82 | 1.76 | 8 (17%) |
| 11 | HEM | N | 601 | 2 | 41,49,50 | 1.28 | 3 (7%) | 46,81,82 | 1.21 | 3 (6%) |
| 10 | FES | M | 501 | 1 | 0,4,4 | - | - | - | | |
| 13 | HEA | R | 601 | 5 | 57,67,67 | 1.99 | 14 (24%) | 61,103,103 | 2.43 | 24 (39%) |
| 11 | HEM | B | 601 | 2 | 41,49,50 | 1.27 | 3 (7%) | 46,81,82 | 1.21 | 3 (6%) |

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 |
|---|---|---|---|---|---|---|---|
| 13 | HEA | F | 602 | - | - | 19/32/76/76 | - |
| 13 | HEA | R | 602 | 5 | - | 17/32/76/76 | - |
| 12 | HEC | C | 301 | - | - | 3/10/54/54 | - |
| 10 | FES | A | 501 | 1 | - | - | 0/1/1/1 |
| 11 | HEM | N | 602 | 2 | - | 2/12/54/54 | - |
| 12 | HEC | O | 301 | 3 | - | 3/10/54/54 | - |
| 13 | HEA | F | 601 | 5 | - | 15/32/76/76 | - |
| 12 | HEC | O | 302 | 3 | - | 1/10/54/54 | - |
| 12 | HEC | C | 302 | 3 | - | 0/10/54/54 | - |
| 11 | HEM | B | 602 | 2 | - | 4/12/54/54 | - |
| 11 | HEM | N | 601 | 2 | - | 0/12/52/54 | - |
| 10 | FES | M | 501 | 1 | - | - | 0/1/1/1 |
| 13 | HEA | R | 601 | 5 | - | 11/32/76/76 | - |
| 11 | HEM | B | 601 | 2 | - | 0/12/52/54 | - |

All (92) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 12 | O | 302 | HEC | C2B-C3B | 7.01 | 1.48 | 1.40 |
| 12 | C | 301 | HEC | C3C-C2C | -6.61 | 1.33 | 1.40 |
| 12 | C | 302 | HEC | C3C-C2C | -6.57 | 1.33 | 1.40 |
| 12 | C | 301 | HEC | C2B-C3B | -6.56 | 1.33 | 1.40 |
| 12 | O | 301 | HEC | C2B-C3B | -6.56 | 1.33 | 1.40 |
| 12 | C | 302 | HEC | C2B-C3B | -6.51 | 1.34 | 1.40 |
| 12 | O | 301 | HEC | C3C-C2C | -6.38 | 1.34 | 1.40 |
| 12 | O | 302 | HEC | C3C-C2C | 6.31 | 1.47 | 1.40 |
| 12 | C | 302 | HEC | C3D-C2D | 5.43 | 1.53 | 1.37 |
| 12 | O | 301 | HEC | C3D-C2D | 5.39 | 1.53 | 1.37 |
| 12 | C | 301 | HEC | C3D-C2D | 5.38 | 1.53 | 1.37 |
| 13 | F | 602 | HEA | C3B-C2B | 5.31 | 1.46 | 1.34 |
| 13 | R | 602 | HEA | C3B-C2B | 5.31 | 1.46 | 1.34 |
| 13 | R | 601 | HEA | C3B-C2B | 5.27 | 1.46 | 1.34 |
| 13 | F | 601 | HEA | C3B-C2B | 5.26 | 1.46 | 1.34 |
| 13 | F | 601 | HEA | CHC-C4B | 4.98 | 1.47 | 1.35 |
| 13 | R | 601 | HEA | CHC-C4B | 4.97 | 1.47 | 1.35 |
| 13 | F | 602 | HEA | C3D-C2D | 4.90 | 1.47 | 1.36 |
| 13 | R | 602 | HEA | CHC-C4B | 4.90 | 1.47 | 1.35 |
| 13 | F | 602 | HEA | CHC-C4B | 4.89 | 1.47 | 1.35 |
| 13 | R | 601 | HEA | C3D-C2D | 4.80 | 1.46 | 1.36 |
| 13 | F | 601 | HEA | C3D-C2D | 4.80 | 1.46 | 1.36 |
| 13 | F | 602 | HEA | C3A-C2A | 4.73 | 1.46 | 1.40 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 13 | R | 602 | HEA | C3D-C2D | 4.66 | 1.46 | 1.36 |
| 13 | F | 602 | HEA | CHD-C1D | 4.55 | 1.46 | 1.35 |
| 13 | R | 601 | HEA | C3A-C2A | 4.51 | 1.46 | 1.40 |
| 13 | F | 601 | HEA | C3A-C2A | 4.48 | 1.46 | 1.40 |
| 13 | R | 602 | HEA | C3A-C2A | 4.47 | 1.46 | 1.40 |
| 13 | R | 601 | HEA | CHD-C1D | 4.42 | 1.46 | 1.35 |
| 13 | F | 601 | HEA | CHD-C1D | 4.42 | 1.46 | 1.35 |
| 13 | R | 602 | HEA | CHD-C1D | 4.40 | 1.46 | 1.35 |
| 13 | F | 601 | HEA | C3C-C2C | 4.38 | 1.46 | 1.40 |
| 13 | F | 602 | HEA | C3C-C2C | 4.37 | 1.46 | 1.40 |
| 13 | R | 601 | HEA | C3C-C2C | 4.33 | 1.46 | 1.40 |
| 13 | R | 602 | HEA | C3C-C2C | 4.29 | 1.46 | 1.40 |
| 11 | N | 602 | HEM | C3C-C2C | -4.00 | 1.34 | 1.40 |
| 11 | N | 602 | HEM | C3C-CAC | 3.64 | 1.55 | 1.47 |
| 12 | O | 302 | HEC | C2A-C3A | 3.45 | 1.47 | 1.37 |
| 11 | B | 602 | HEM | C1B-NB | -3.35 | 1.34 | 1.40 |
| 11 | B | 602 | HEM | C4D-ND | -3.35 | 1.34 | 1.40 |
| 13 | F | 602 | HEA | C1D-ND | -3.34 | 1.34 | 1.40 |
| 13 | R | 602 | HEA | C1D-ND | -3.32 | 1.34 | 1.40 |
| 12 | O | 302 | HEC | C3D-C2D | 3.32 | 1.47 | 1.37 |
| 13 | F | 601 | HEA | C1D-ND | -3.28 | 1.34 | 1.40 |
| 13 | R | 601 | HEA | C1D-ND | -3.28 | 1.34 | 1.40 |
| 12 | O | 302 | HEC | C3C-C4C | 3.22 | 1.48 | 1.43 |
| 11 | N | 602 | HEM | CAB-C3B | 2.99 | 1.55 | 1.47 |
| 13 | R | 601 | HEA | FE-NB | 2.99 | 2.11 | 1.96 |
| 13 | F | 602 | HEA | C4B-NB | -2.99 | 1.35 | 1.40 |
| 13 | R | 602 | HEA | FE-NB | 2.97 | 2.11 | 1.96 |
| 13 | F | 601 | HEA | FE-NB | 2.97 | 2.11 | 1.96 |
| 13 | F | 602 | HEA | FE-NB | 2.97 | 2.11 | 1.96 |
| 11 | N | 601 | HEM | CAB-C3B | 2.94 | 1.55 | 1.47 |
| 13 | R | 602 | HEA | C4B-NB | -2.89 | 1.35 | 1.40 |
| 11 | B | 601 | HEM | CAB-C3B | 2.89 | 1.55 | 1.47 |
| 12 | O | 302 | HEC | C2A-C1A | 2.87 | 1.49 | 1.42 |
| 13 | F | 601 | HEA | C4B-NB | -2.86 | 1.35 | 1.40 |
| 12 | O | 302 | HEC | C3A-C4A | 2.84 | 1.49 | 1.42 |
| 13 | F | 601 | HEA | FE-ND | 2.81 | 2.10 | 1.96 |
| 12 | O | 302 | HEC | C4D-CHA | 2.81 | 1.48 | 1.41 |
| 11 | B | 602 | HEM | FE-NB | 2.81 | 2.10 | 1.96 |
| 12 | O | 302 | HEC | C1B-CHB | 2.80 | 1.48 | 1.41 |
| 13 | R | 601 | HEA | FE-ND | 2.80 | 2.10 | 1.96 |
| 13 | R | 601 | HEA | C4B-NB | -2.78 | 1.35 | 1.40 |
| 13 | R | 602 | HEA | FE-ND | 2.75 | 2.10 | 1.96 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 13 | F | 602 | HEA | FE-ND | 2.74 | 2.10 | 1.96 |
| 12 | O | 302 | HEC | C4B-C3B | 2.71 | 1.48 | 1.43 |
| 13 | F | 602 | HEA | C2A-C1A | 2.71 | 1.48 | 1.42 |
| 13 | F | 601 | HEA | C4B-C3B | 2.70 | 1.49 | 1.44 |
| 13 | R | 601 | HEA | C4B-C3B | 2.66 | 1.49 | 1.44 |
| 13 | R | 602 | HEA | C4B-C3B | 2.51 | 1.48 | 1.44 |
| 13 | R | 602 | HEA | C2A-C1A | 2.51 | 1.48 | 1.42 |
| 13 | F | 602 | HEA | C4B-C3B | 2.50 | 1.48 | 1.44 |
| 13 | F | 601 | HEA | C2A-C1A | 2.47 | 1.48 | 1.42 |
| 13 | R | 601 | HEA | C2A-C1A | 2.46 | 1.48 | 1.42 |
| 13 | F | 601 | HEA | C1C-CHC | 2.42 | 1.47 | 1.41 |
| 13 | R | 601 | HEA | C1C-CHC | 2.42 | 1.47 | 1.41 |
| 11 | N | 601 | HEM | C2C-C3C | -2.40 | 1.33 | 1.41 |
| 13 | F | 602 | HEA | C1C-CHC | 2.39 | 1.47 | 1.41 |
| 11 | B | 601 | HEM | C2C-C3C | -2.39 | 1.33 | 1.41 |
| 13 | R | 602 | HEA | C1C-CHC | 2.36 | 1.47 | 1.41 |
| 12 | O | 302 | HEC | C1D-CHD | 2.33 | 1.47 | 1.41 |
| 12 | O | 302 | HEC | C1C-CHC | 2.29 | 1.47 | 1.41 |
| 11 | B | 602 | HEM | CHB-C1B | 2.19 | 1.40 | 1.35 |
| 13 | F | 602 | HEA | C4C-CHD | 2.16 | 1.47 | 1.41 |
| 11 | N | 601 | HEM | CAA-C2A | 2.08 | 1.55 | 1.52 |
| 12 | C | 301 | HEC | CAD-C3D | 2.06 | 1.55 | 1.52 |
| 13 | R | 601 | HEA | C4C-CHD | 2.06 | 1.46 | 1.41 |
| 13 | F | 601 | HEA | C4C-CHD | 2.05 | 1.46 | 1.41 |
| 11 | B | 601 | HEM | CAA-C2A | 2.05 | 1.55 | 1.52 |
| 11 | B | 602 | HEM | C1D-ND | -2.05 | 1.34 | 1.38 |
| 13 | R | 602 | HEA | C4C-CHD | 2.02 | 1.46 | 1.41 |

All (130) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 13 | R | 601 | HEA | C3D-C4D-ND | 6.46 | 116.61 | 110.36 |
| 13 | F | 601 | HEA | C3D-C4D-ND | 6.46 | 116.61 | 110.36 |
| 12 | O | 302 | HEC | C1D-C2D-C3D | -6.43 | 102.52 | 107.00 |
| 13 | F | 602 | HEA | C3D-C4D-ND | 6.05 | 116.22 | 110.36 |
| 13 | R | 602 | HEA | C3D-C4D-ND | 6.03 | 116.20 | 110.36 |
| 13 | R | 601 | HEA | C2D-C1D-ND | 5.71 | 116.60 | 109.84 |
| 13 | F | 601 | HEA | C2D-C1D-ND | 5.66 | 116.55 | 109.84 |
| 13 | R | 602 | HEA | C2D-C1D-ND | 5.52 | 116.38 | 109.84 |
| 13 | R | 602 | HEA | C2B-C1B-NB | 5.40 | 116.34 | 109.88 |
| 13 | F | 601 | HEA | C2B-C1B-NB | 5.39 | 116.34 | 109.88 |
| 13 | R | 601 | HEA | C2B-C1B-NB | 5.39 | 116.33 | 109.88 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 13 | F | 602 | HEA | C2B-C1B-NB | 5.32 | 116.26 | 109.88 |
| 13 | F | 602 | HEA | C2D-C1D-ND | 5.27 | 116.08 | 109.84 |
| 13 | R | 602 | HEA | C3B-C4B-NB | 5.25 | 116.06 | 109.84 |
| 13 | F | 602 | HEA | C3B-C4B-NB | 5.25 | 116.06 | 109.84 |
| 13 | R | 601 | HEA | C3B-C4B-NB | 5.04 | 115.82 | 109.84 |
| 13 | F | 601 | HEA | C3B-C4B-NB | 5.02 | 115.78 | 109.84 |
| 11 | B | 602 | HEM | CHC-C4B-NB | 4.81 | 129.66 | 124.43 |
| 13 | F | 601 | HEA | C1D-C2D-C3D | -4.56 | 102.16 | 106.96 |
| 13 | R | 602 | HEA | C1D-C2D-C3D | -4.56 | 102.17 | 106.96 |
| 13 | R | 601 | HEA | C1D-C2D-C3D | -4.54 | 102.18 | 106.96 |
| 11 | B | 602 | HEM | C1B-NB-C4B | 4.48 | 109.70 | 105.07 |
| 13 | F | 602 | HEA | C1D-C2D-C3D | -4.36 | 102.38 | 106.96 |
| 13 | R | 602 | HEA | C3C-C4C-NC | 3.91 | 114.26 | 109.21 |
| 11 | B | 602 | HEM | CHD-C1D-ND | 3.88 | 128.64 | 124.43 |
| 13 | F | 601 | HEA | C3C-C4C-NC | 3.87 | 114.21 | 109.21 |
| 13 | R | 601 | HEA | C3C-C4C-NC | 3.86 | 114.20 | 109.21 |
| 12 | O | 302 | HEC | CMB-C2B-C3B | 3.74 | 130.21 | 125.82 |
| 13 | F | 601 | HEA | CHA-C4D-C3D | -3.67 | 119.44 | 124.84 |
| 13 | R | 601 | HEA | CHA-C4D-C3D | -3.65 | 119.48 | 124.84 |
| 13 | F | 602 | HEA | C3C-C4C-NC | 3.60 | 113.87 | 109.21 |
| 12 | O | 302 | HEC | CMC-C2C-C3C | 3.46 | 129.89 | 125.82 |
| 13 | R | 602 | HEA | CAD-CBD-CGD | -3.46 | 106.16 | 113.60 |
| 13 | R | 602 | HEA | CHA-C4D-C3D | -3.38 | 119.87 | 124.84 |
| 13 | F | 602 | HEA | C1B-C2B-C3B | -3.30 | 102.85 | 106.80 |
| 13 | R | 602 | HEA | C1B-C2B-C3B | -3.30 | 102.85 | 106.80 |
| 13 | F | 601 | HEA | C1B-C2B-C3B | -3.26 | 102.90 | 106.80 |
| 13 | R | 601 | HEA | C1B-C2B-C3B | -3.24 | 102.92 | 106.80 |
| 13 | F | 602 | HEA | CMC-C2C-C3C | 3.24 | 130.74 | 124.68 |
| 13 | R | 602 | HEA | CMC-C2C-C3C | 3.18 | 130.63 | 124.68 |
| 13 | F | 601 | HEA | CMC-C2C-C3C | 3.18 | 130.62 | 124.68 |
| 13 | F | 601 | HEA | CAD-CBD-CGD | -3.17 | 106.77 | 113.60 |
| 13 | R | 601 | HEA | CAD-CBD-CGD | -3.16 | 106.79 | 113.60 |
| 13 | R | 601 | HEA | CMC-C2C-C3C | 3.16 | 130.59 | 124.68 |
| 13 | R | 601 | HEA | C4D-C3D-C2D | -3.08 | 102.41 | 106.90 |
| 13 | F | 602 | HEA | C4B-C3B-C2B | -3.08 | 102.16 | 107.41 |
| 11 | B | 602 | HEM | CHA-C4D-ND | 3.07 | 128.17 | 124.38 |
| 13 | F | 602 | HEA | C4D-C3D-C2D | -3.06 | 102.43 | 106.90 |
| 13 | F | 601 | HEA | C4D-C3D-C2D | -3.06 | 102.44 | 106.90 |
| 13 | R | 602 | HEA | C4B-C3B-C2B | -3.06 | 102.19 | 107.41 |
| 13 | R | 601 | HEA | CHB-C1B-C2B | -3.05 | 120.21 | 124.98 |
| 13 | R | 602 | HEA | CHB-C1B-C2B | -3.04 | 120.23 | 124.98 |
| 13 | F | 601 | HEA | CHB-C1B-C2B | -3.04 | 120.23 | 124.98 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 13 | R | 601 | HEA | C4B-C3B-C2B | -3.01 | 102.27 | 107.41 |
| 13 | F | 601 | HEA | C4B-C3B-C2B | -3.01 | 102.27 | 107.41 |
| 13 | F | 602 | HEA | CHA-C4D-C3D | -3.00 | 120.42 | 124.84 |
| 13 | F | 602 | HEA | CAD-CBD-CGD | -2.98 | 107.18 | 113.60 |
| 13 | F | 602 | HEA | C27-C19-C20 | 2.95 | 120.23 | 115.27 |
| 11 | B | 602 | HEM | C4D-ND-C1D | 2.93 | 108.10 | 105.07 |
| 13 | R | 601 | HEA | C27-C19-C20 | 2.89 | 120.13 | 115.27 |
| 13 | R | 602 | HEA | C4D-C3D-C2D | -2.88 | 102.70 | 106.90 |
| 13 | F | 602 | HEA | CHB-C1B-C2B | -2.87 | 120.50 | 124.98 |
| 11 | B | 602 | HEM | CHB-C1B-NB | 2.83 | 127.88 | 124.38 |
| 13 | R | 601 | HEA | C1D-ND-C4D | -2.78 | 102.20 | 105.07 |
| 13 | R | 601 | HEA | C17-C18-C19 | -2.78 | 120.98 | 127.66 |
| 11 | N | 602 | HEM | C4B-CHC-C1C | 2.74 | 126.18 | 122.56 |
| 13 | F | 601 | HEA | C17-C18-C19 | -2.74 | 121.06 | 127.66 |
| 13 | F | 601 | HEA | C1D-ND-C4D | -2.74 | 102.25 | 105.07 |
| 13 | R | 602 | HEA | C27-C19-C20 | 2.72 | 119.84 | 115.27 |
| 13 | R | 602 | HEA | C17-C18-C19 | -2.69 | 121.18 | 127.66 |
| 13 | F | 601 | HEA | C27-C19-C20 | 2.67 | 119.76 | 115.27 |
| 11 | N | 602 | HEM | C3B-C2B-C1B | 2.62 | 108.43 | 106.49 |
| 13 | F | 602 | HEA | C17-C18-C19 | -2.62 | 121.34 | 127.66 |
| 11 | N | 602 | HEM | C4D-ND-C1D | 2.61 | 107.76 | 105.07 |
| 11 | N | 601 | HEM | C4D-ND-C1D | 2.59 | 107.75 | 105.07 |
| 13 | R | 601 | HEA | CBA-CAA-C2A | -2.58 | 108.26 | 112.60 |
| 11 | N | 602 | HEM | C1B-NB-C4B | 2.57 | 107.72 | 105.07 |
| 12 | O | 302 | HEC | CBA-CAA-C2A | -2.57 | 108.28 | 112.60 |
| 13 | F | 601 | HEA | CAD-C3D-C2D | 2.56 | 132.64 | 127.88 |
| 13 | R | 601 | HEA | CAD-C3D-C2D | 2.55 | 132.63 | 127.88 |
| 13 | F | 601 | HEA | CBA-CAA-C2A | -2.51 | 108.37 | 112.60 |
| 11 | B | 601 | HEM | C4D-ND-C1D | 2.51 | 107.67 | 105.07 |
| 13 | R | 601 | HEA | OMA-CMA-C3A | -2.49 | 119.48 | 124.91 |
| 11 | N | 602 | HEM | CMC-C2C-C3C | 2.49 | 129.33 | 124.68 |
| 12 | O | 301 | HEC | CMC-C2C-C1C | -2.46 | 124.69 | 128.46 |
| 13 | R | 602 | HEA | C4B-NB-C1B | -2.44 | 102.55 | 105.07 |
| 13 | R | 602 | HEA | C1D-ND-C4D | -2.44 | 102.55 | 105.07 |
| 11 | B | 601 | HEM | CMA-C3A-C4A | -2.43 | 124.72 | 128.46 |
| 13 | F | 601 | HEA | OMA-CMA-C3A | -2.43 | 119.61 | 124.91 |
| 12 | O | 301 | HEC | C1D-C2D-C3D | -2.42 | 105.31 | 107.00 |
| 11 | N | 601 | HEM | CMA-C3A-C4A | -2.40 | 124.78 | 128.46 |
| 11 | B | 602 | HEM | CBA-CAA-C2A | -2.39 | 108.54 | 112.62 |
| 12 | O | 302 | HEC | CBD-CAD-C3D | -2.39 | 108.54 | 112.62 |
| 12 | C | 301 | HEC | CMB-C2B-C1B | -2.39 | 124.80 | 128.46 |
| 13 | R | 601 | HEA | C4B-NB-C1B | -2.34 | 102.66 | 105.07 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 13 | F | 602 | HEA | CAD-C3D-C2D | 2.33 | 132.22 | 127.88 |
| 13 | F | 602 | HEA | C4B-NB-C1B | -2.32 | 102.67 | 105.07 |
| 12 | C | 301 | HEC | C1D-C2D-C3D | -2.31 | 105.39 | 107.00 |
| 13 | R | 602 | HEA | CBA-CAA-C2A | -2.30 | 108.72 | 112.60 |
| 13 | F | 601 | HEA | C4B-NB-C1B | -2.30 | 102.70 | 105.07 |
| 13 | R | 601 | HEA | C17-C16-C15 | -2.30 | 105.43 | 112.98 |
| 12 | C | 302 | HEC | CMC-C2C-C1C | -2.24 | 125.02 | 128.46 |
| 13 | F | 602 | HEA | CHC-C4B-NB | -2.24 | 121.62 | 124.38 |
| 13 | R | 602 | HEA | CHD-C1D-C2D | -2.23 | 120.56 | 126.72 |
| 11 | N | 601 | HEM | C1B-NB-C4B | 2.22 | 107.36 | 105.07 |
| 12 | O | 302 | HEC | CMD-C2D-C3D | 2.22 | 129.12 | 124.94 |
| 13 | F | 601 | HEA | C17-C16-C15 | -2.21 | 105.69 | 112.98 |
| 13 | R | 601 | HEA | CHD-C1D-C2D | -2.20 | 120.63 | 126.72 |
| 13 | R | 602 | HEA | C17-C16-C15 | -2.19 | 105.78 | 112.98 |
| 11 | N | 602 | HEM | CBA-CAA-C2A | -2.18 | 108.90 | 112.62 |
| 13 | F | 601 | HEA | CHD-C1D-C2D | -2.16 | 120.75 | 126.72 |
| 11 | B | 601 | HEM | C1B-NB-C4B | 2.16 | 107.30 | 105.07 |
| 12 | C | 302 | HEC | C1D-C2D-C3D | -2.16 | 105.50 | 107.00 |
| 13 | F | 601 | HEA | C26-C15-C14 | -2.14 | 118.19 | 123.68 |
| 13 | F | 602 | HEA | C1D-ND-C4D | -2.11 | 102.89 | 105.07 |
| 13 | F | 602 | HEA | C17-C16-C15 | -2.11 | 106.03 | 112.98 |
| 11 | N | 602 | HEM | CMA-C3A-C4A | -2.11 | 125.22 | 128.46 |
| 13 | F | 601 | HEA | C12-C13-C14 | -2.10 | 106.68 | 112.23 |
| 13 | R | 602 | HEA | CMB-C2B-C1B | 2.08 | 128.21 | 125.04 |
| 11 | B | 602 | HEM | CHD-C1D-C2D | -2.08 | 121.74 | 124.98 |
| 13 | F | 602 | HEA | CMB-C2B-C1B | 2.05 | 128.17 | 125.04 |
| 13 | F | 601 | HEA | CMB-C2B-C1B | 2.05 | 128.16 | 125.04 |
| 13 | R | 602 | HEA | CMD-C2D-C1D | 2.05 | 128.16 | 125.04 |
| 13 | F | 602 | HEA | C26-C15-C14 | -2.05 | 118.43 | 123.68 |
| 13 | R | 602 | HEA | CAD-C3D-C2D | 2.04 | 131.68 | 127.88 |
| 13 | F | 602 | HEA | CHD-C1D-C2D | -2.04 | 121.09 | 126.72 |
| 13 | F | 601 | HEA | C25-C23-C24 | 2.02 | 119.07 | 114.60 |
| 13 | R | 601 | HEA | CMB-C2B-C1B | 2.02 | 128.11 | 125.04 |
| 13 | F | 602 | HEA | CBA-CAA-C2A | -2.01 | 109.22 | 112.60 |
| 13 | R | 601 | HEA | C25-C23-C24 | 2.01 | 119.03 | 114.60 |

There are no chirality outliers.

All (75) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 12 | O | 301 | HEC | C2A-CAA-CBA-CGA |
| 13 | F | 601 | HEA | C4D-C3D-CAD-CBD |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 13 | F | 601 | HEA | C13-C14-C15-C16 |
| 13 | F | 601 | HEA | C13-C14-C15-C26 |
| 13 | F | 601 | HEA | C14-C15-C16-C17 |
| 13 | F | 601 | HEA | C17-C18-C19-C27 |
| 13 | F | 601 | HEA | C21-C22-C23-C24 |
| 13 | F | 601 | HEA | C21-C22-C23-C25 |
| 13 | F | 602 | HEA | C1A-C2A-CAA-CBA |
| 13 | F | 602 | HEA | C3A-C2A-CAA-CBA |
| 13 | F | 602 | HEA | C2A-CAA-CBA-CGA |
| 13 | F | 602 | HEA | C4D-C3D-CAD-CBD |
| 13 | F | 602 | HEA | C13-C14-C15-C26 |
| 13 | F | 602 | HEA | C14-C15-C16-C17 |
| 13 | F | 602 | HEA | C15-C16-C17-C18 |
| 13 | F | 602 | HEA | C17-C18-C19-C20 |
| 13 | F | 602 | HEA | C17-C18-C19-C27 |
| 13 | R | 601 | HEA | C4D-C3D-CAD-CBD |
| 13 | R | 601 | HEA | C3B-C11-C12-C13 |
| 13 | R | 601 | HEA | O11-C11-C12-C13 |
| 13 | R | 601 | HEA | C13-C14-C15-C16 |
| 13 | R | 601 | HEA | C13-C14-C15-C26 |
| 13 | R | 601 | HEA | C21-C22-C23-C25 |
| 13 | R | 602 | HEA | C2D-C3D-CAD-CBD |
| 13 | R | 602 | HEA | C4D-C3D-CAD-CBD |
| 13 | R | 602 | HEA | C13-C14-C15-C26 |
| 13 | R | 602 | HEA | C14-C15-C16-C17 |
| 13 | R | 602 | HEA | C15-C16-C17-C18 |
| 13 | R | 602 | HEA | C17-C18-C19-C27 |
| 13 | R | 602 | HEA | C27-C19-C20-C21 |
| 13 | R | 602 | HEA | C21-C22-C23-C25 |
| 13 | R | 601 | HEA | C21-C22-C23-C24 |
| 13 | R | 602 | HEA | C21-C22-C23-C24 |
| 13 | F | 601 | HEA | C2D-C3D-CAD-CBD |
| 13 | F | 602 | HEA | C2D-C3D-CAD-CBD |
| 13 | R | 601 | HEA | C2D-C3D-CAD-CBD |
| 13 | F | 602 | HEA | C27-C19-C20-C21 |
| 13 | F | 602 | HEA | C21-C22-C23-C24 |
| 13 | F | 602 | HEA | C21-C22-C23-C25 |
| 13 | F | 601 | HEA | C17-C18-C19-C20 |
| 13 | R | 602 | HEA | C17-C18-C19-C20 |
| 11 | B | 602 | HEM | C3D-CAD-CBD-CGD |
| 13 | R | 602 | HEA | C18-C19-C20-C21 |
| 13 | F | 602 | HEA | C19-C20-C21-C22 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 13 | R | 602 | HEA | C19-C20-C21-C22 |
| 12 | C | 301 | HEC | C3D-CAD-CBD-CGD |
| 12 | O | 302 | HEC | C2A-CAA-CBA-CGA |
| 13 | F | 601 | HEA | C19-C20-C21-C22 |
| 11 | N | 602 | HEM | C3D-CAD-CBD-CGD |
| 11 | B | 602 | HEM | C2B-C3B-CAB-CBB |
| 11 | B | 602 | HEM | C4B-C3B-CAB-CBB |
| 13 | F | 601 | HEA | C11-C12-C13-C14 |
| 11 | N | 602 | HEM | C4B-C3B-CAB-CBB |
| 12 | O | 301 | HEC | C1A-C2A-CAA-CBA |
| 12 | O | 301 | HEC | C3A-C2A-CAA-CBA |
| 13 | R | 602 | HEA | C1A-C2A-CAA-CBA |
| 13 | R | 602 | HEA | C3A-C2A-CAA-CBA |
| 13 | F | 601 | HEA | CAA-CBA-CGA-O1A |
| 13 | R | 602 | HEA | CAA-CBA-CGA-O1A |
| 13 | F | 602 | HEA | CAA-CBA-CGA-O1A |
| 13 | F | 601 | HEA | CAA-CBA-CGA-O2A |
| 13 | R | 601 | HEA | CAA-CBA-CGA-O1A |
| 12 | C | 301 | HEC | CAA-CBA-CGA-O2A |
| 12 | C | 301 | HEC | CAA-CBA-CGA-O1A |
| 13 | R | 601 | HEA | CAA-CBA-CGA-O2A |
| 13 | F | 601 | HEA | CAD-CBD-CGD-O2D |
| 13 | R | 601 | HEA | CAD-CBD-CGD-O2D |
| 11 | B | 602 | HEM | C4D-C3D-CAD-CBD |
| 13 | F | 602 | HEA | CAA-CBA-CGA-O2A |
| 13 | F | 602 | HEA | CAD-CBD-CGD-O2D |
| 13 | R | 602 | HEA | CAD-CBD-CGD-O2D |
| 13 | F | 602 | HEA | CAD-CBD-CGD-O1D |
| 13 | F | 601 | HEA | C3B-C11-C12-C13 |
| 13 | F | 602 | HEA | C3B-C11-C12-C13 |
| 13 | R | 602 | HEA | CAA-CBA-CGA-O2A |

There are no ring outliers.

12 monomers are involved in 76 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 13 | F | 602 | HEA | 11 | 0 |
| 13 | R | 602 | HEA | 10 | 0 |
| 12 | C | 301 | HEC | 4 | 0 |
| 11 | N | 602 | HEM | 5 | 0 |
| 12 | O | 301 | HEC | 4 | 0 |
| 13 | F | 601 | HEA | 11 | 0 |

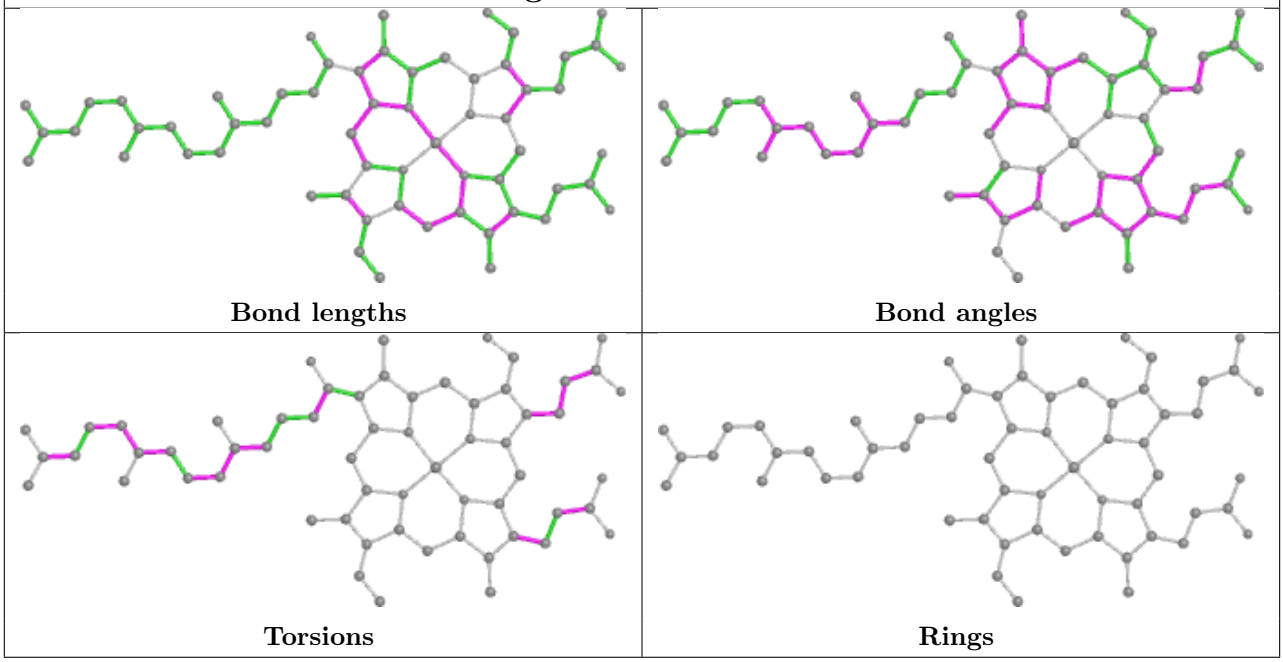
*Continued on next page...*

*Continued from previous page...*

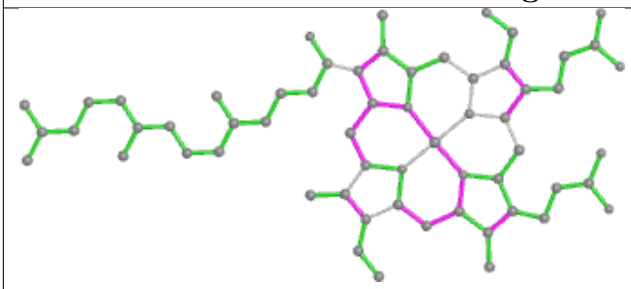
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 12 | O | 302 | HEC | 12 | 0 |
| 12 | C | 302 | HEC | 3 | 0 |
| 11 | B | 602 | HEM | 6 | 0 |
| 11 | N | 601 | HEM | 2 | 0 |
| 13 | R | 601 | HEA | 6 | 0 |
| 11 | B | 601 | HEM | 2 | 0 |

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

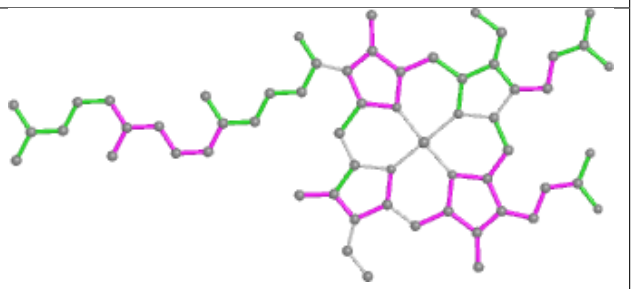
**Ligand HEA F 602**



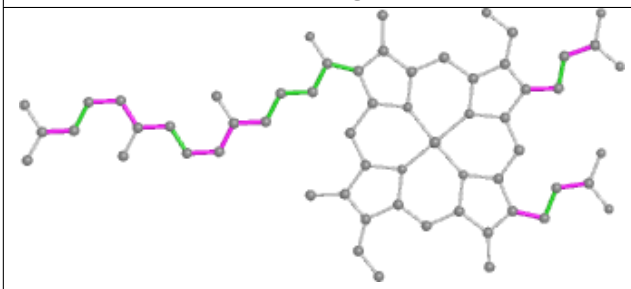
**Ligand HEA R 602**



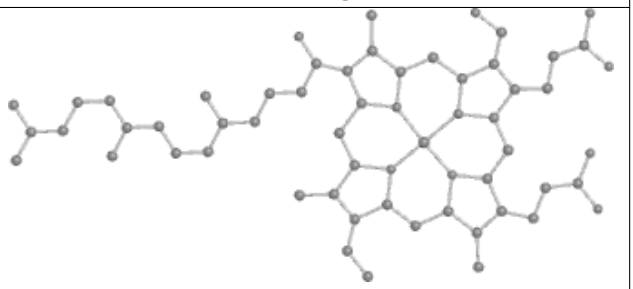
**Bond lengths**



**Bond angles**

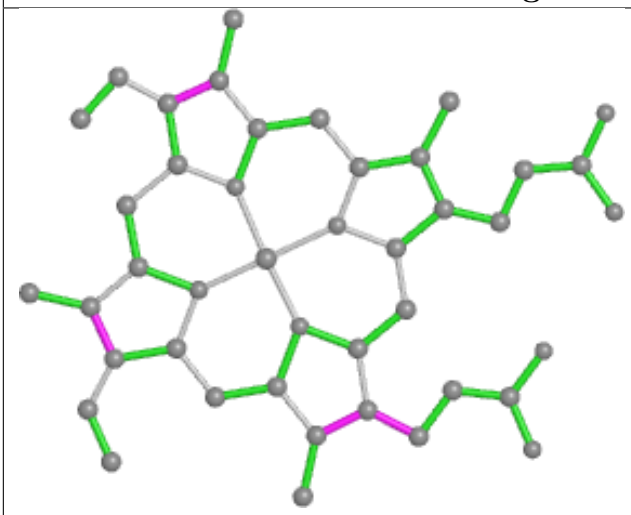


**Torsions**

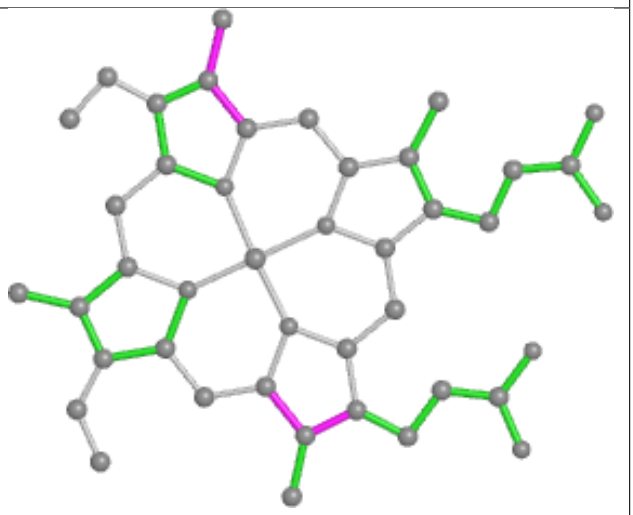


**Rings**

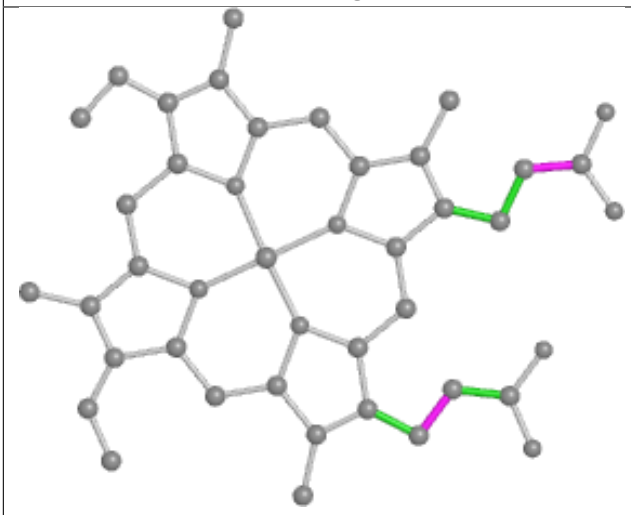
**Ligand HEC C 301**



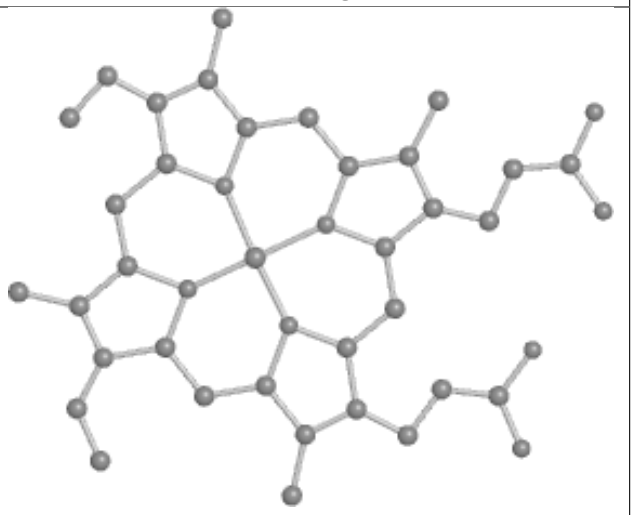
**Bond lengths**



**Bond angles**

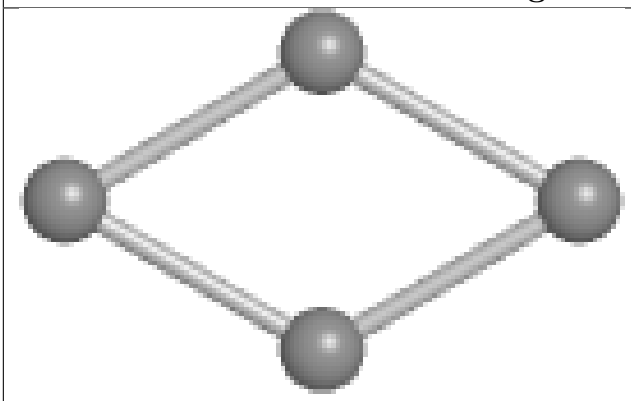


**Torsions**

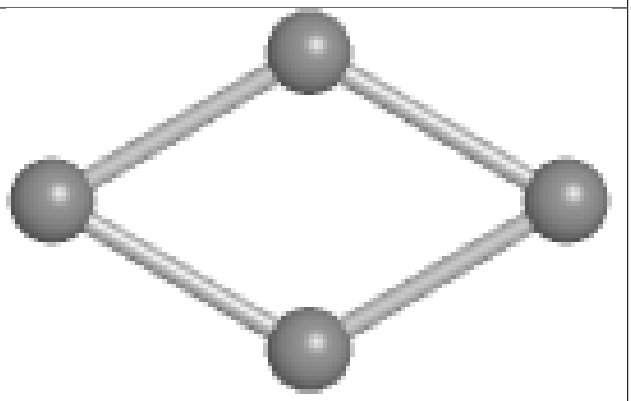


**Rings**

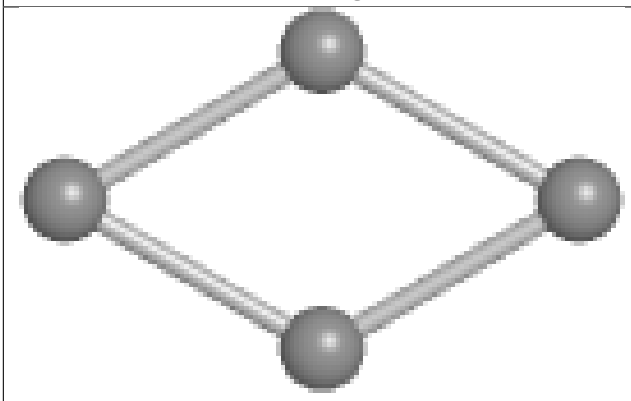
**Ligand FES A 501**



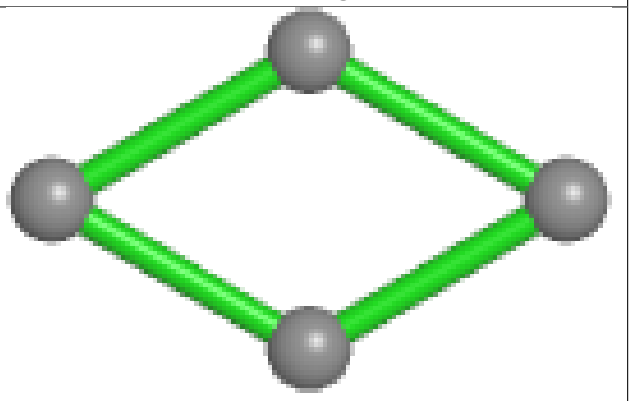
**Bond lengths**



**Bond angles**

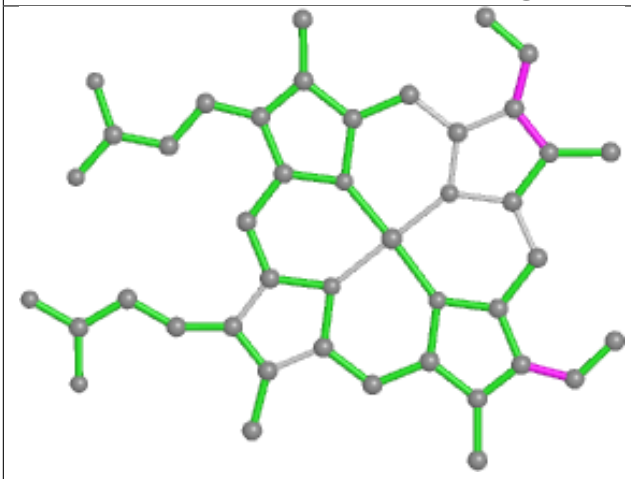


**Torsions**

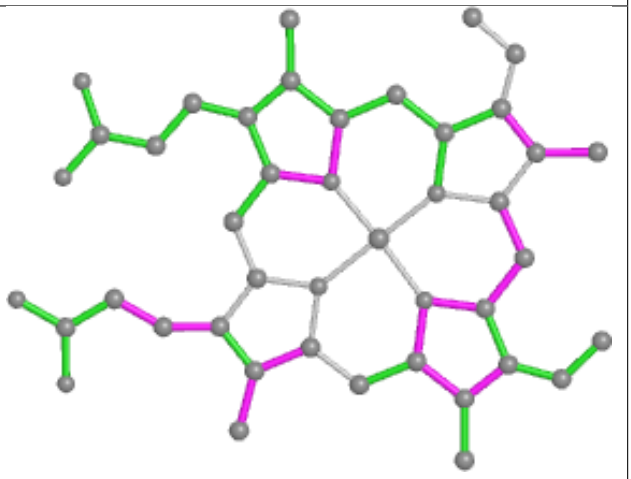


**Rings**

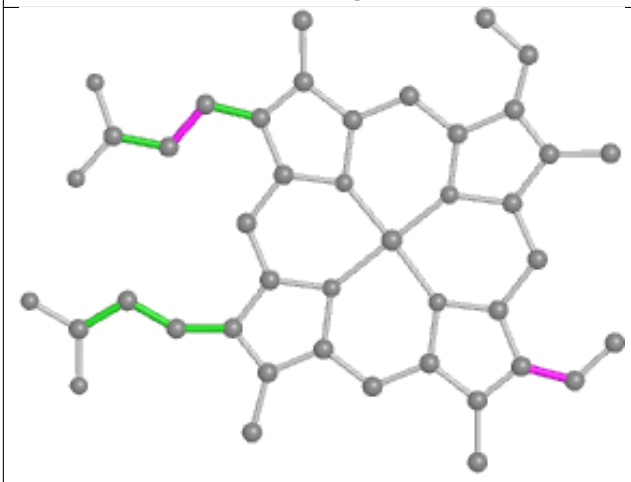
**Ligand HEM N 602**



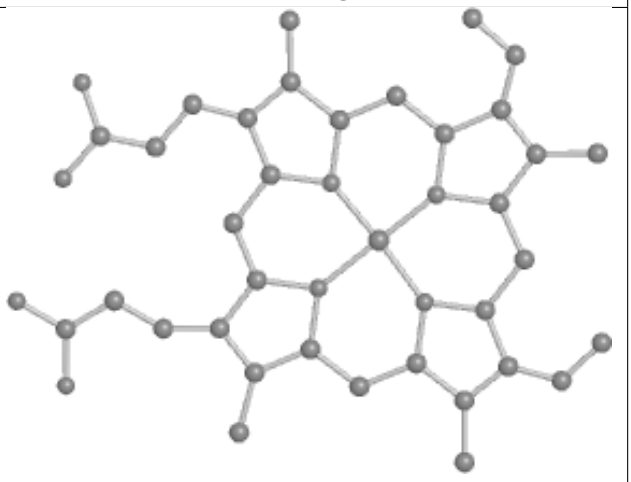
**Bond lengths**



**Bond angles**

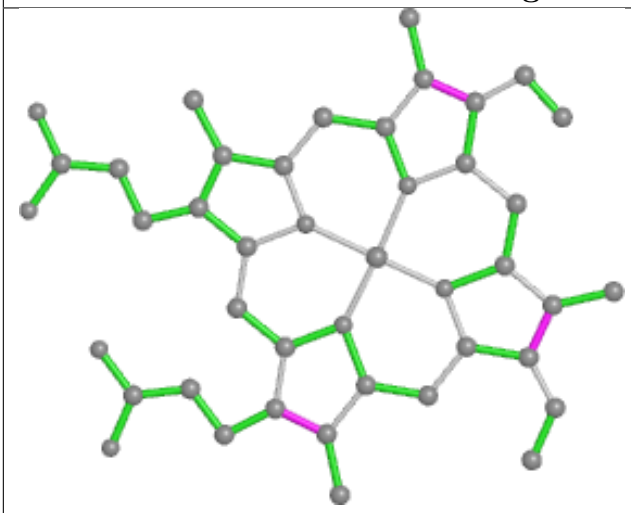


**Torsions**

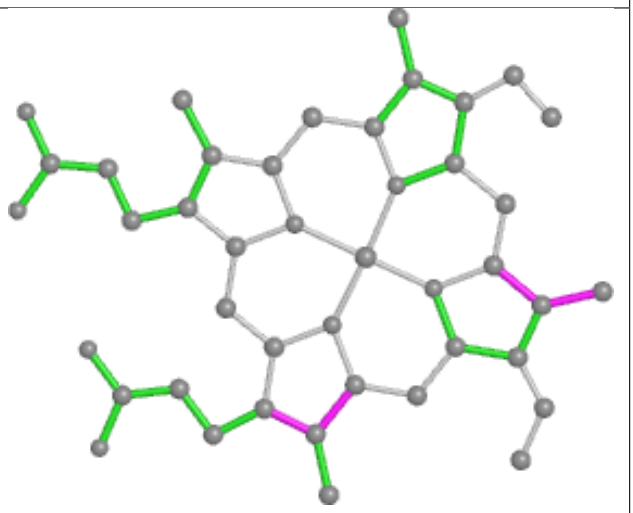


**Rings**

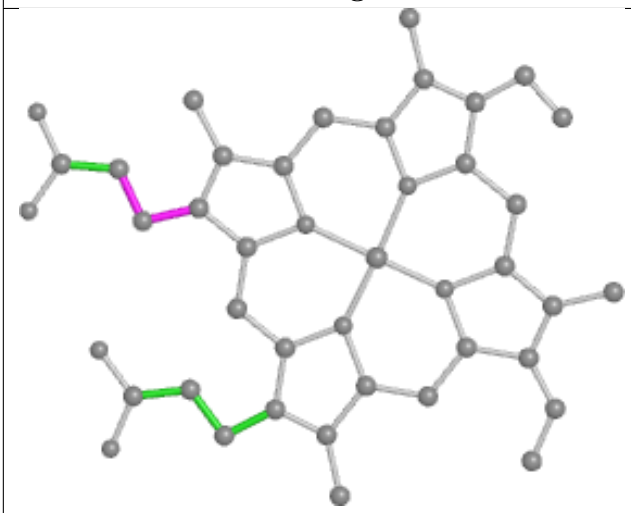
**Ligand HEC O 301**



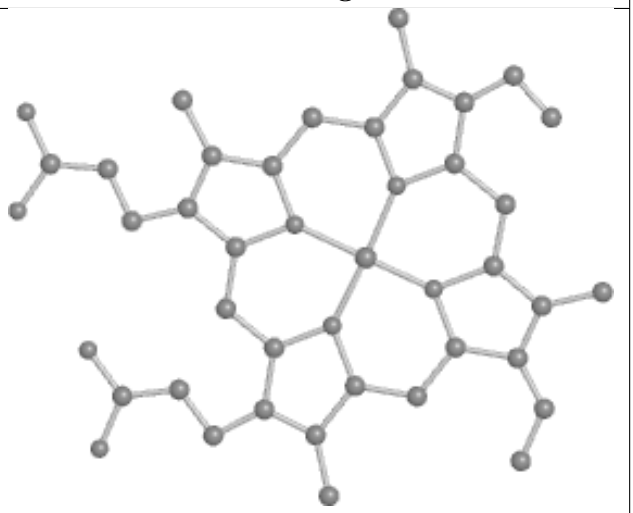
**Bond lengths**



**Bond angles**

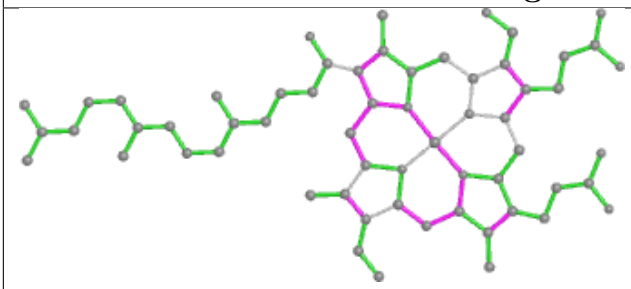


**Torsions**

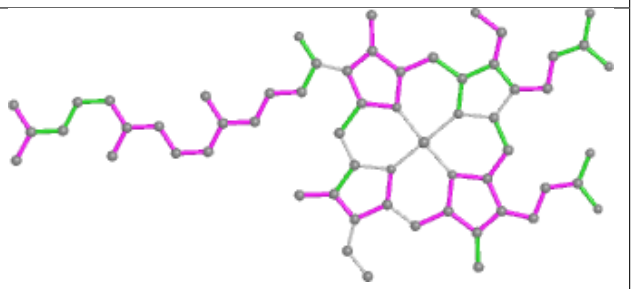


**Rings**

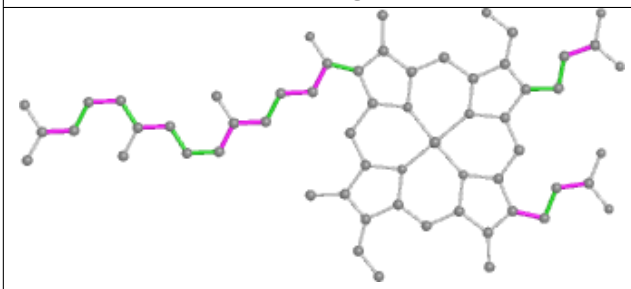
**Ligand HEA F 601**



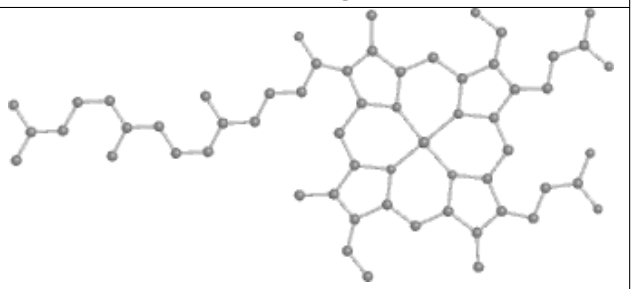
**Bond lengths**



**Bond angles**

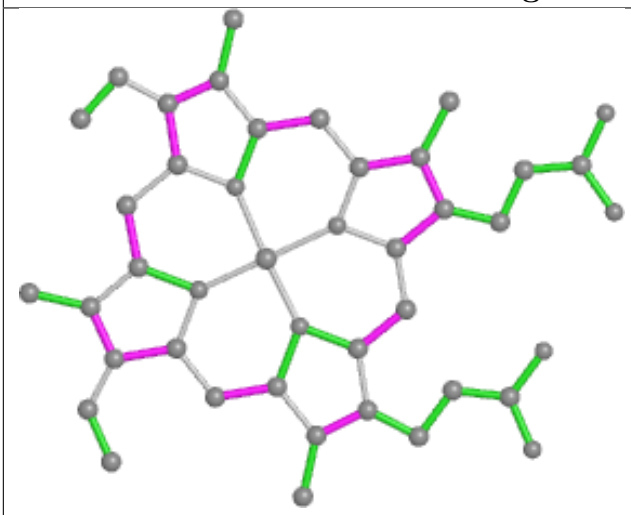


**Torsions**

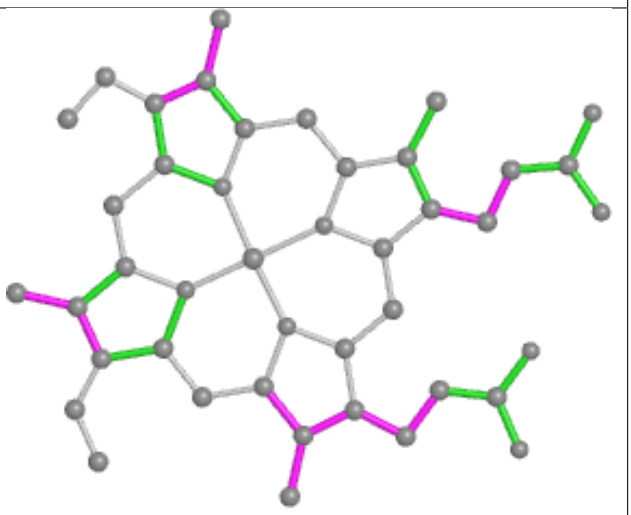


**Rings**

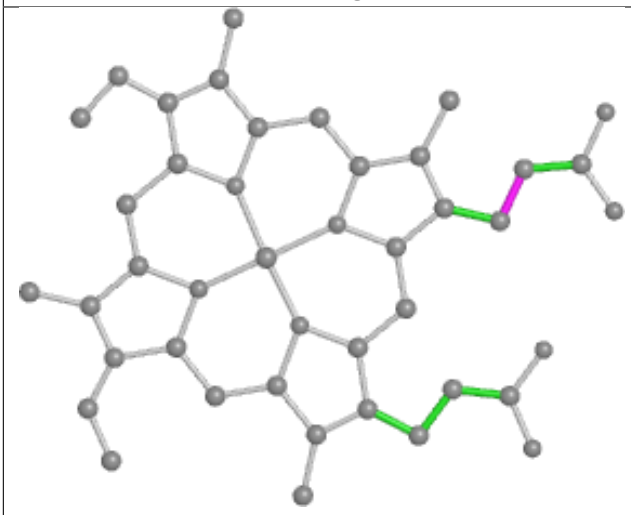
**Ligand HEC O 302**



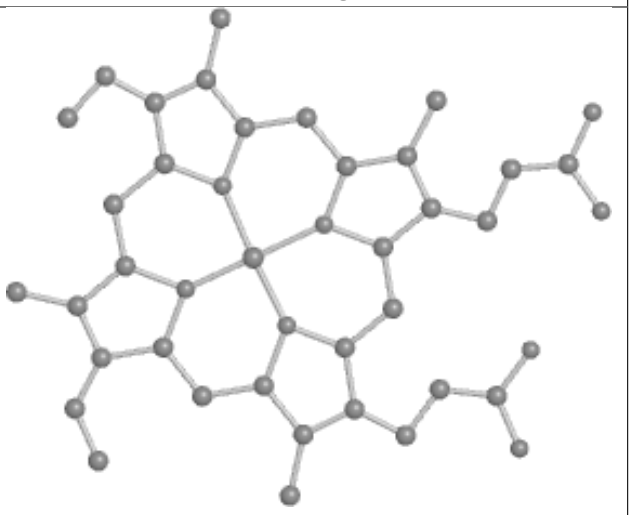
**Bond lengths**



**Bond angles**

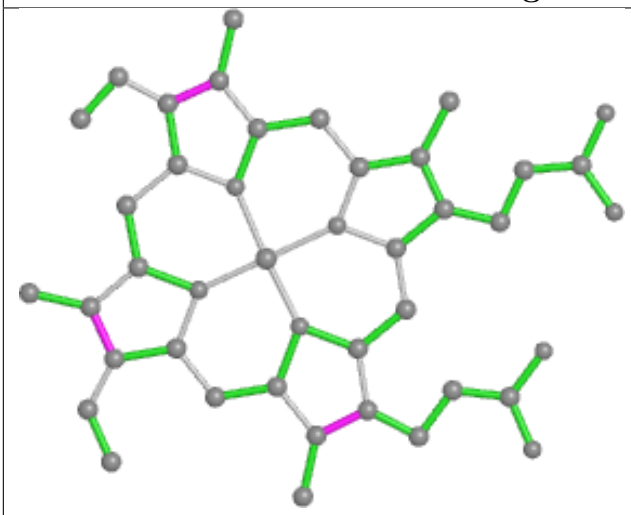


**Torsions**

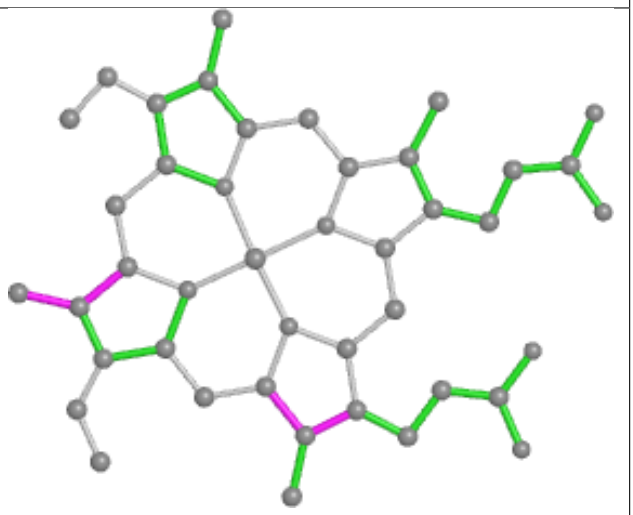


**Rings**

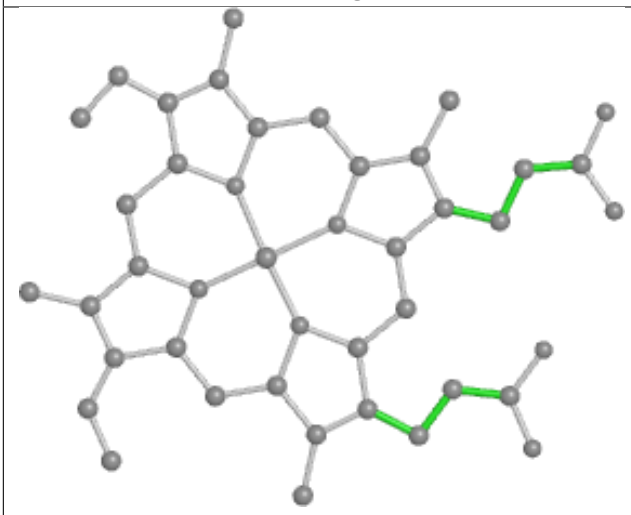
**Ligand HEC C 302**



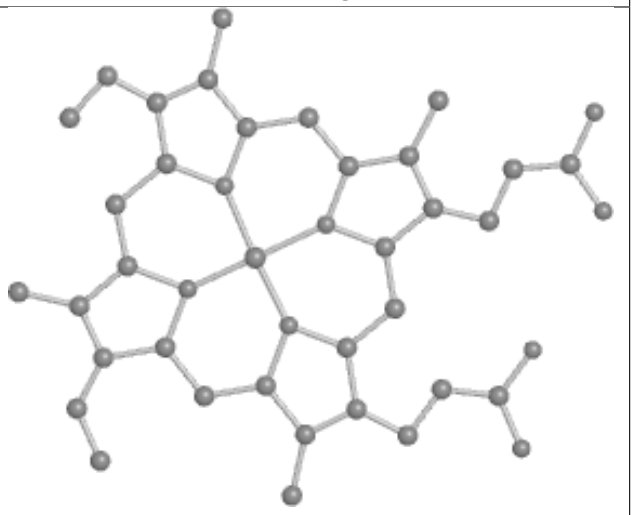
**Bond lengths**



**Bond angles**

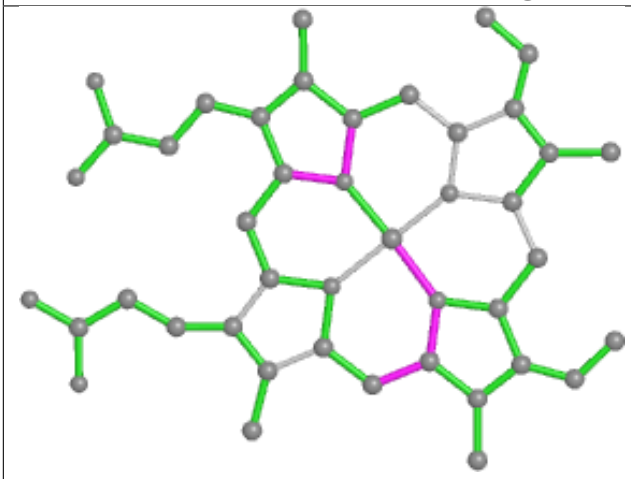


**Torsions**

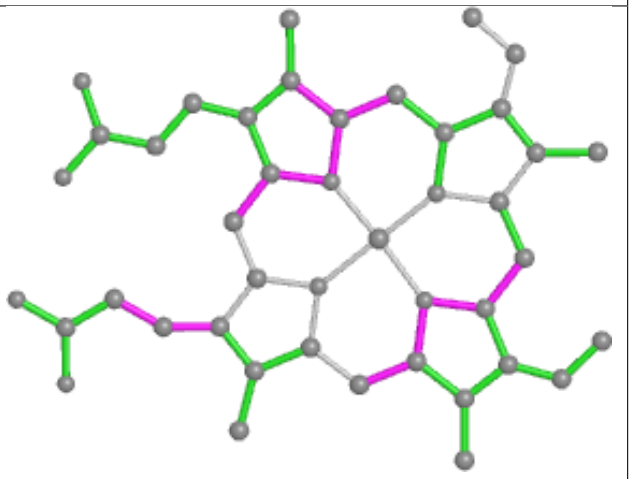


**Rings**

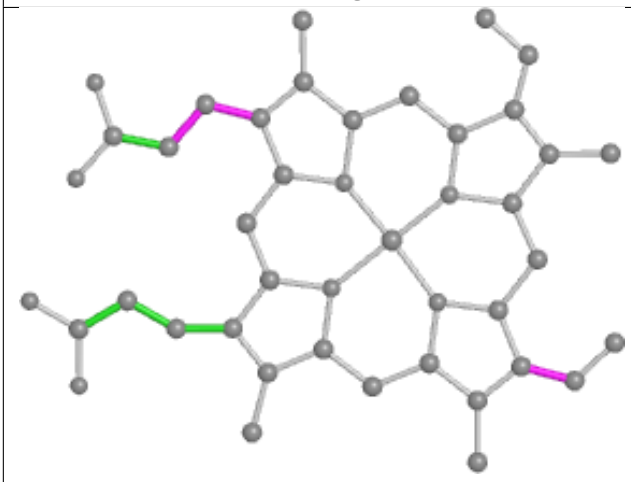
**Ligand HEM B 602**



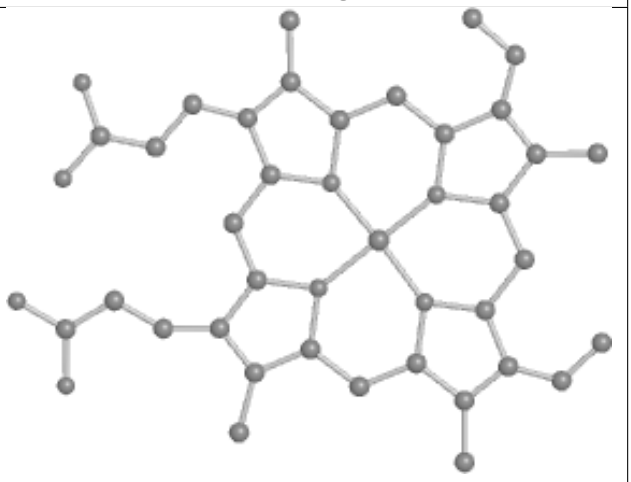
**Bond lengths**



**Bond angles**

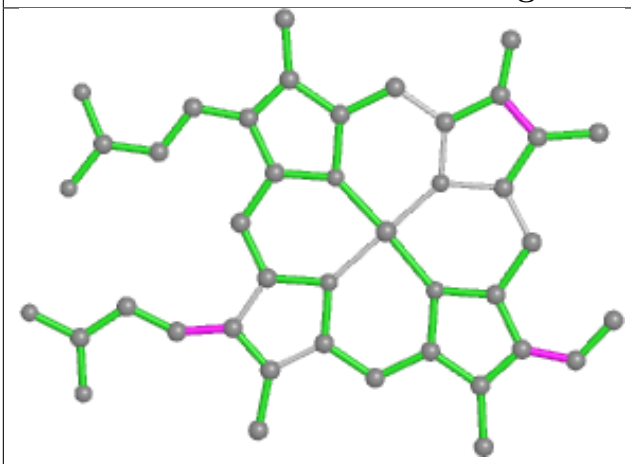


**Torsions**

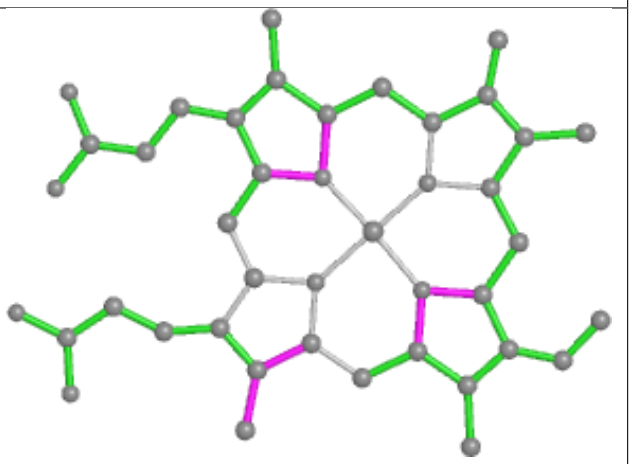


**Rings**

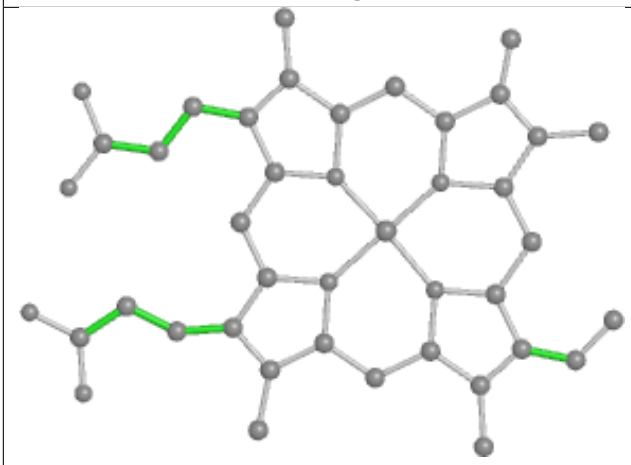
**Ligand HEM N 601**



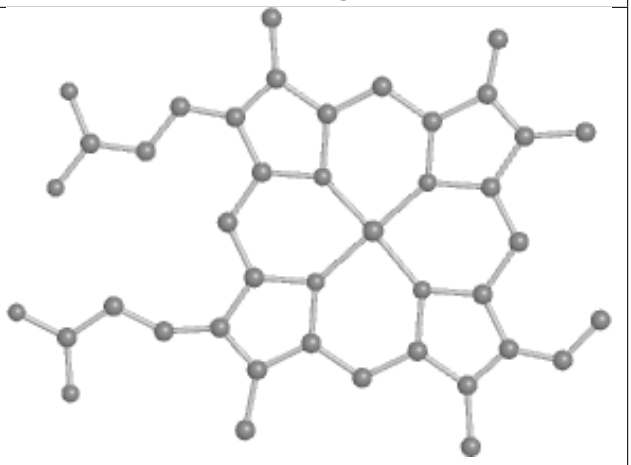
**Bond lengths**



**Bond angles**

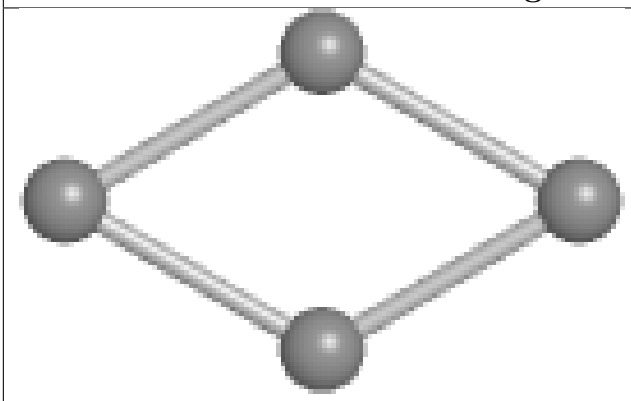


**Torsions**

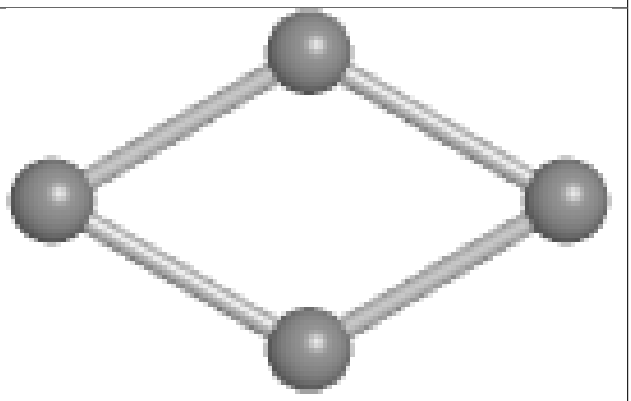


**Rings**

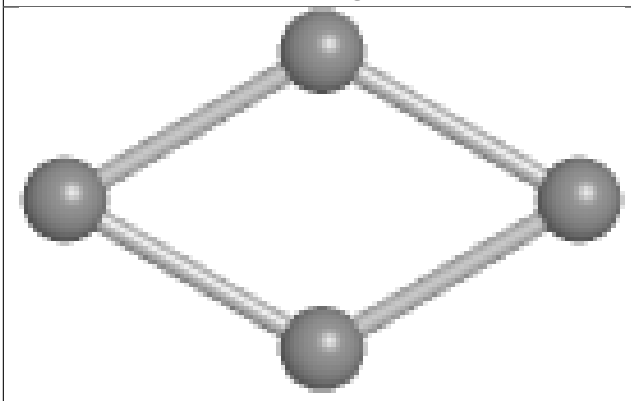
**Ligand FES M 501**



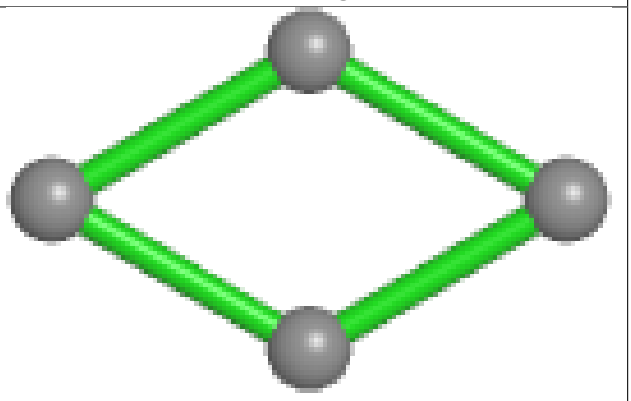
Bond lengths



Bond angles

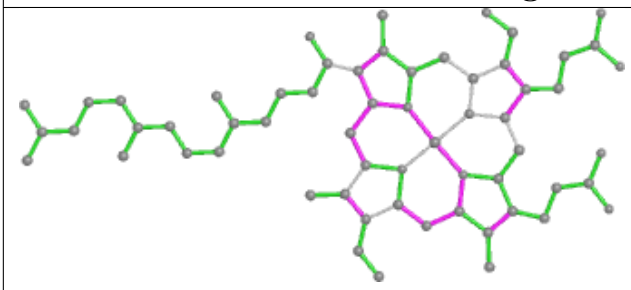


Torsions

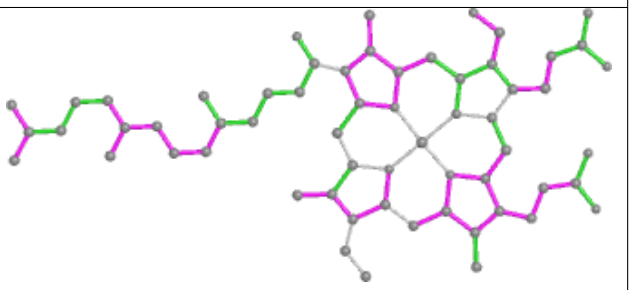


Rings

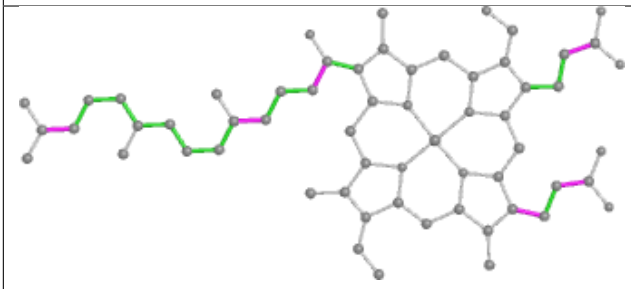
**Ligand HEA R 601**



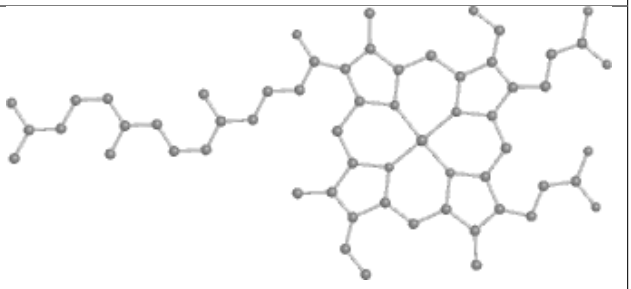
Bond lengths



Bond angles

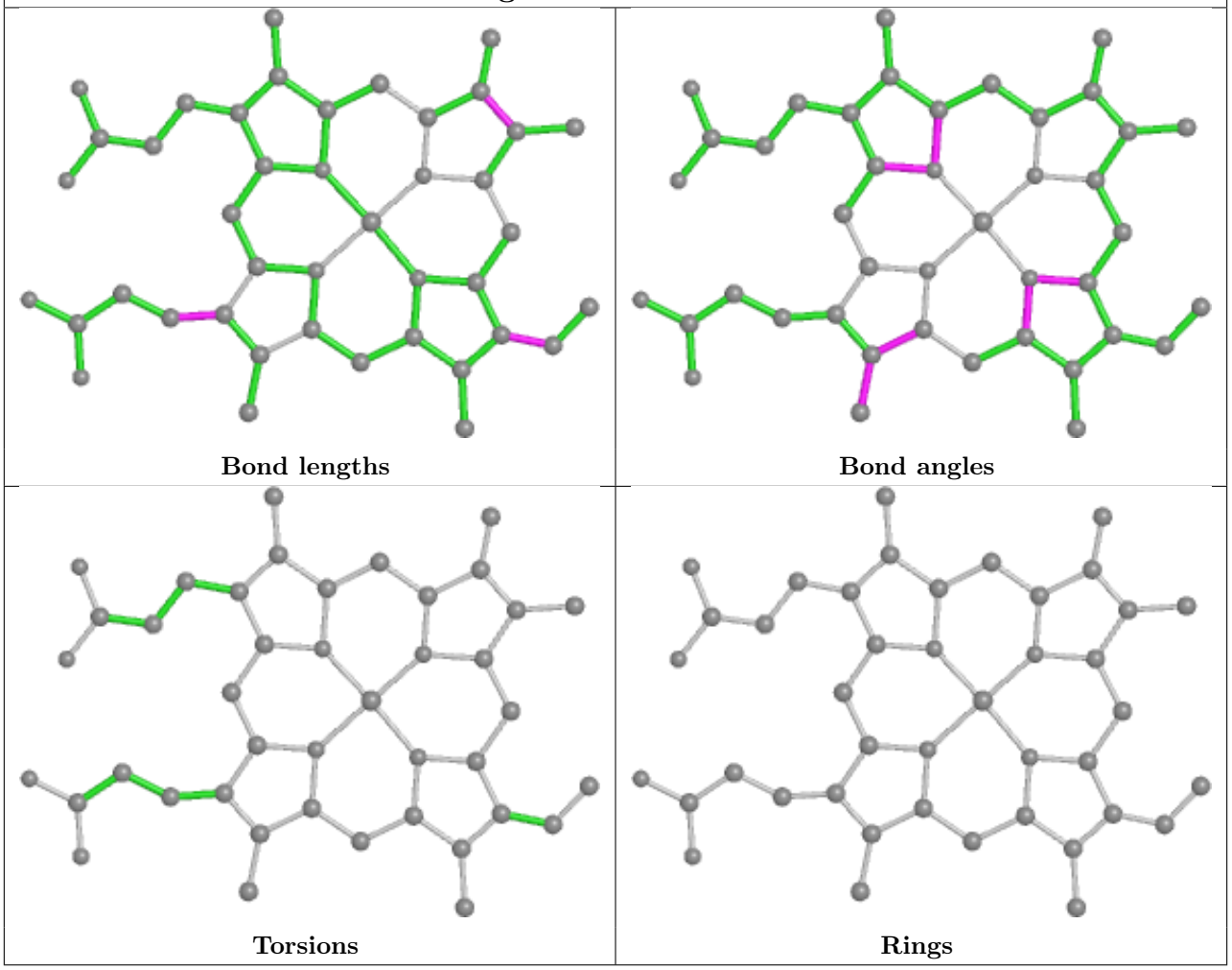


Torsions



Rings

**Ligand HEM B 601**




## 5.7 Other polymers

There are no such residues in this entry.

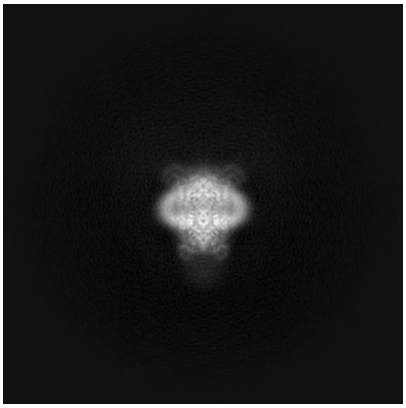
## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

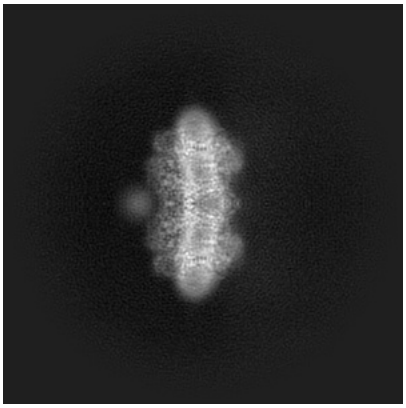
# 6 Tomogram visualisation

This section contains visualisations of the EMDB entry EMD-34664. These allow visual inspection of the internal detail of the tomogram and identification of artifacts.

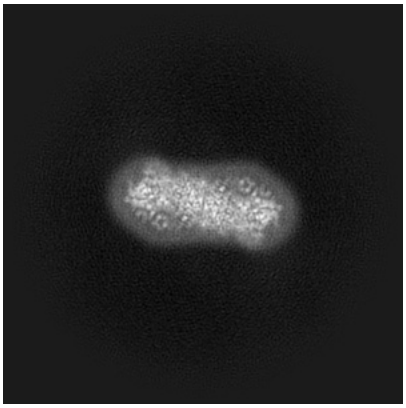
## 6.1 Orthogonal projections



X



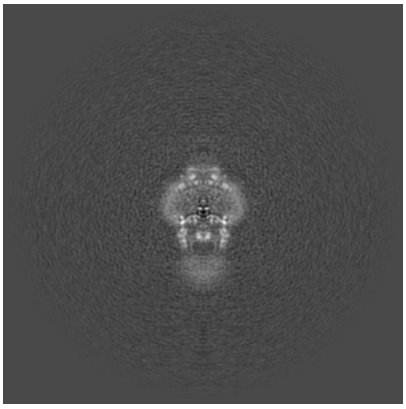
Y



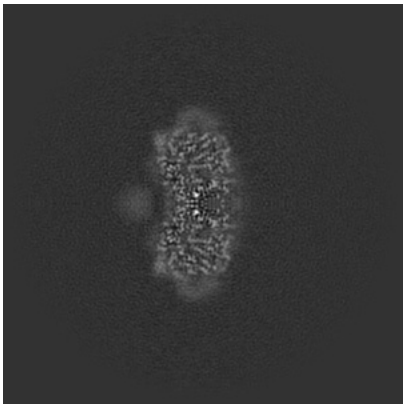
Z

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

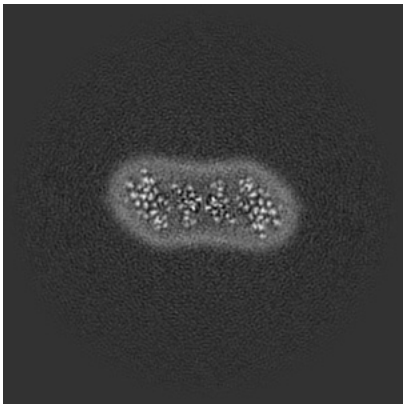
## 6.2 Central slices



X Index: 250



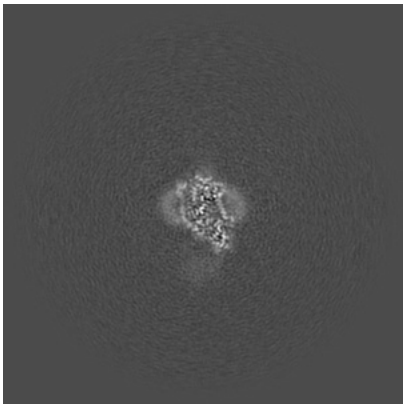
Y Index: 250



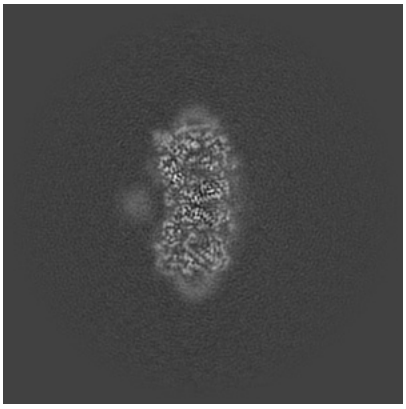
Z Index: 250

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

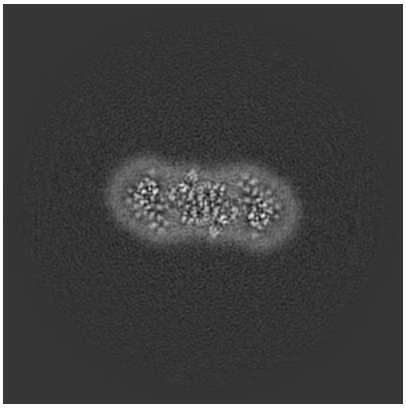
## 6.3 Largest variance slices (i)



X Index: 232



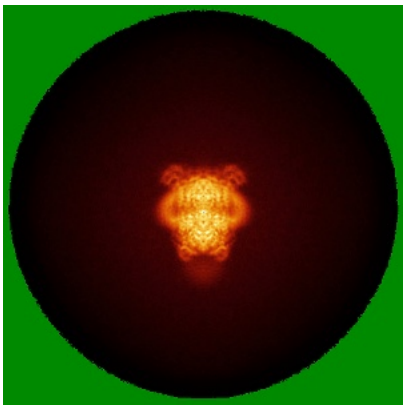
Y Index: 247



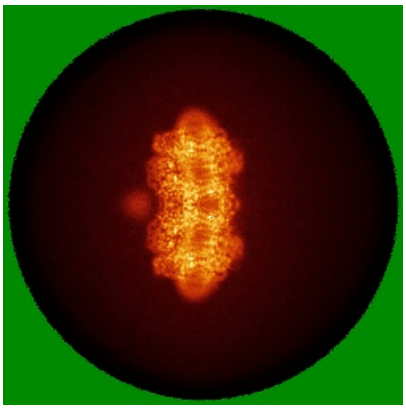
Z Index: 230

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

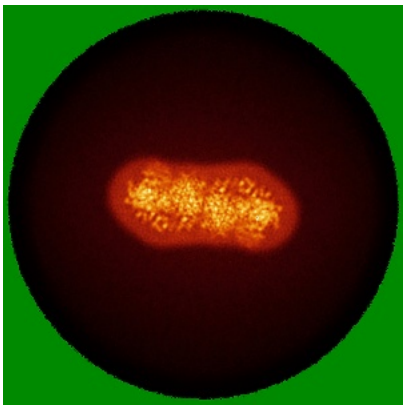
## 6.4 Orthogonal standard-deviation projections (False-color) (i)



X



Y



Z

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

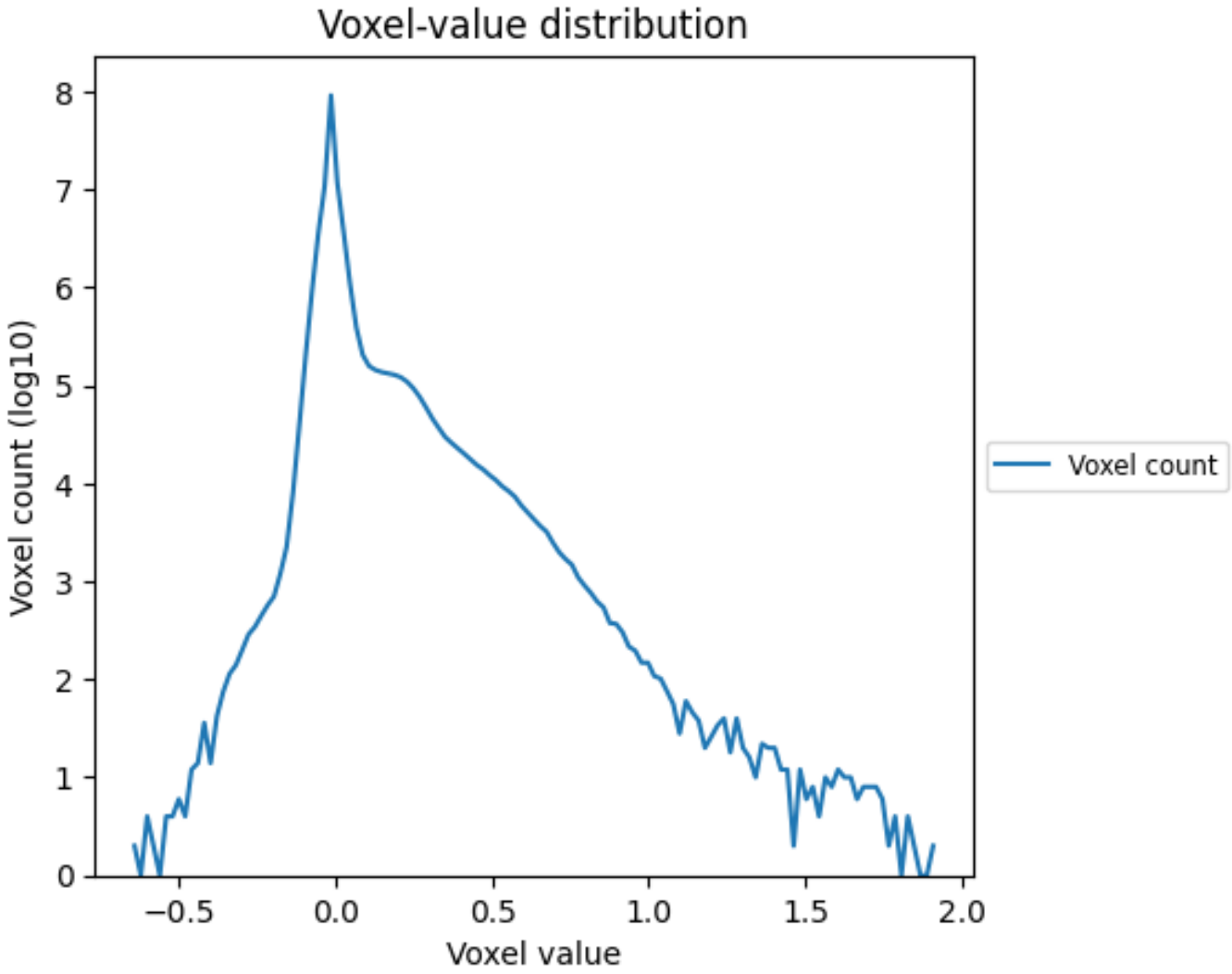
## 6.5 Mask visualisation (i)

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

# 7 Tomogram analysis

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

## 7.1 Voxel-value distribution




The voxel-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic.

# 8 Map-model fit

This section was not generated.