Full wwPDB NMR Structure Validation Report (i)

Jun 3, 2023 – 08:40 PM EDT

PDB ID	:	2N6G
BMRB ID	:	25763
Title	:	Solution structure of an MbtH-like protein from Mycobacterium avium, Seattle Structural Genomics Center for Infectious Disease target MyavA.01649.c
Authors	:	Buchko, G.W.; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on	:	2015-08-20

This is a Full wwPDB NMR Structure 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/NMRValidationReportHelp
with specific help available everywhere you see the (i) 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 (1)) were used in the production of this report:

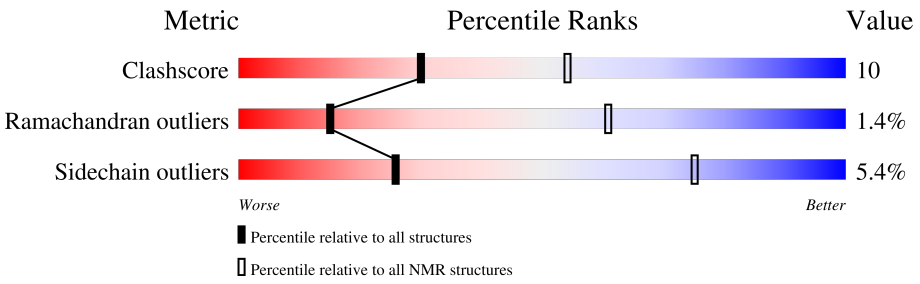
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
BMRB Restraints Analysis	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.33

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment is 70%.

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)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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	80	44% 9% • 46%

2 Ensemble composition and analysis (i)

This entry contains 20 models. Model 13 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	**Residue range (total)**	**Backbone RMSD (Å)**	**Medoid model**
1	A:17-A:59 (43)	1.37	13

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 4 clusters and 1 single-model cluster was found.

Cluster number	Models
1	1, 3, 4, 7, 9, 16
2	5, 8, 12, 14, 18
3	2, 10, 13, 17
4	6, 11, 15, 19
Single-model clusters	20

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 1220 atoms, of which 584 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called MbtH-like protein.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	80	1220	400	584	111	123	2	0

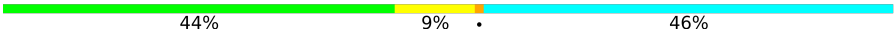
4 Residue-property plots (i)

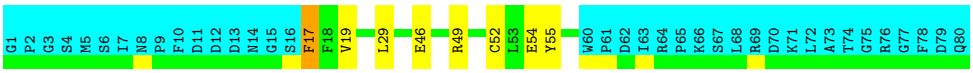
4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

• Molecule 1: MbtH-like protein

Chain A:





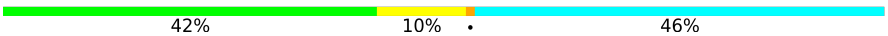
4.2 Scores per residue for each member of the ensemble

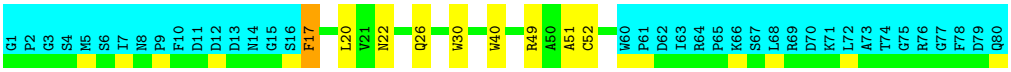
Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

• Molecule 1: MbtH-like protein

Chain A:





4.2.2 Score per residue for model 2

• Molecule 1: MbtH-like protein

Chain A:

4.2.3 Score per residue for model 3

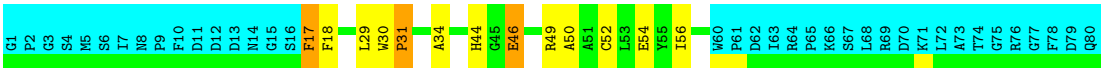
- Molecule 1: MbtH-like protein

Chain A: 40% 10% • 46%

4.2.4 Score per residue for model 4

- Molecule 1: MbtH-like protein

Chain A: 38% 12% • 46%



4.2.5 Score per residue for model 5

- Molecule 1: MbtH-like protein

Chain A: 41% 12% 46%

4.2.6 Score per residue for model 6

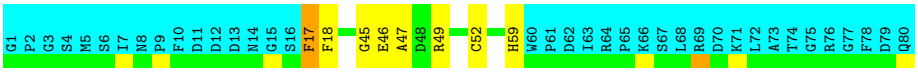
- Molecule 1: MbtH-like protein

Chain A: 44% 9% • 46%

4.2.7 Score per residue for model 7

- Molecule 1: MbtH-like protein

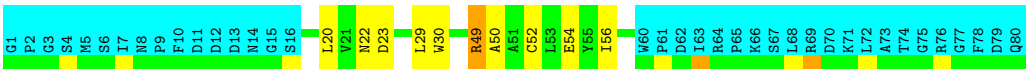
Chain A: 44% 9% • 46%



4.2.8 Score per residue for model 8

- Molecule 1: MbtH-like protein

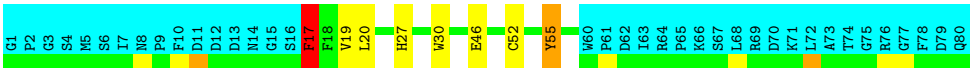
Chain A: 41% 11% • 46%



4.2.9 Score per residue for model 9

- Molecule 1: MbtH-like protein

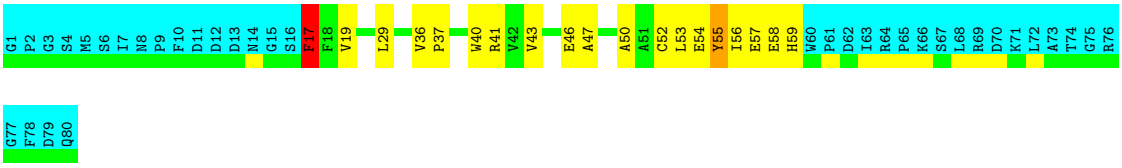
Chain A: 44% 8% •• 46%



4.2.10 Score per residue for model 10

- Molecule 1: MbtH-like protein

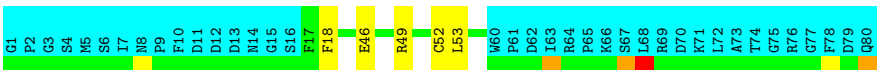
Chain A: 30% 21% •• 46%



4.2.11 Score per residue for model 11

- Molecule 1: MbtH-like protein

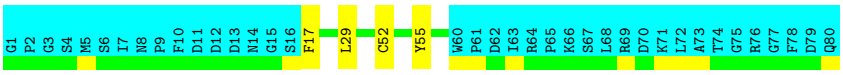
Chain A: 48% 6% 46%



4.2.12 Score per residue for model 12

- Molecule 1: MbtH-like protein

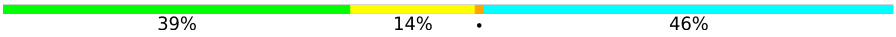
Chain A: 49% 5% 46%

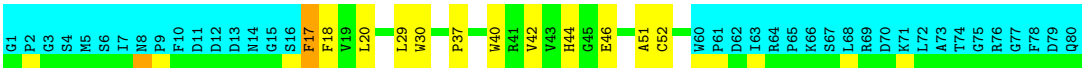


4.2.13 Score per residue for model 13 (medoid)

- Molecule 1: MbtH-like protein

Chain A:

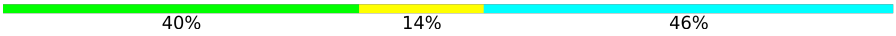




4.2.14 Score per residue for model 14

- Molecule 1: MbtH-like protein

Chain A:



4.2.15 Score per residue for model 15

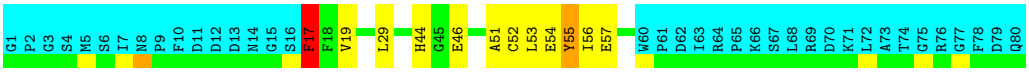
- Molecule 1: MbtH-like protein

Chain A:

4.2.16 Score per residue for model 16

- Molecule 1: MbtH-like protein

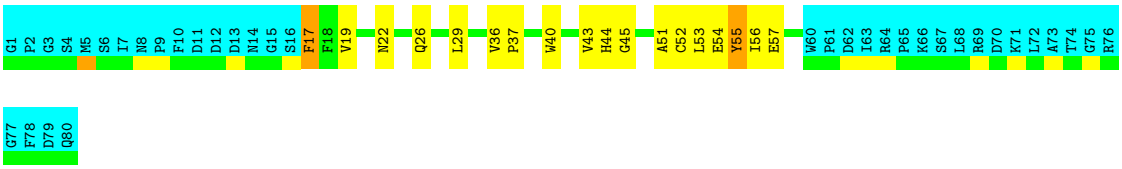
Chain A:



4.2.17 Score per residue for model 17

- Molecule 1: MbtH-like protein

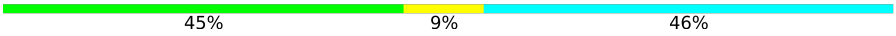
Chain A:



4.2.18 Score per residue for model 18

- Molecule 1: MbtH-like protein

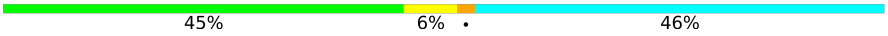
Chain A:

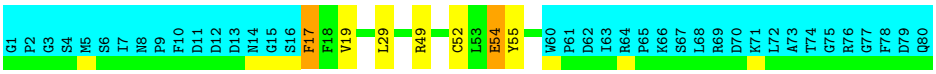


4.2.19 Score per residue for model 19

- Molecule 1: MbtH-like protein

Chain A:





4.2.20 Score per residue for model 20

- Molecule 1: MbtH-like protein

Chain A:

5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *molecular dynamics*.

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *target function*.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	**Classification**	**Version**
CYANA	structure solution	2.1
CNS	refinement	1.1

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	619
Number of shifts mapped to atoms	619
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	70%

6 Model quality (i)

6.1 Standard geometry (i)

There are no covalent bond-length or bond-angle outliers.

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	Chirality	Planarity
1	A	0.0±0.0	0.1±0.3
All	All	0	2

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

All unique planar outliers are listed below.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	17	PHE	Peptide	2

6.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	351	317	314	7±3
All	All	7020	6340	6280	133

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 10.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:49:ARG:HA	1:A:52:CYS:SG	0.80	2.16	5	5
1:A:17:PHE:HB2	1:A:52:CYS:HA	0.69	1.64	1	6

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:17:PHE:CD1	1:A:55:TYR:HB2	0.65	2.27	9	3
1:A:18:PHE:HB3	1:A:46:GLU:HA	0.64	1.70	4	1
1:A:17:PHE:HA	1:A:55:TYR:HB2	0.64	1.68	18	7
1:A:49:ARG:HD3	1:A:52:CYS:SG	0.63	2.34	7	1
1:A:17:PHE:HB3	1:A:52:CYS:HA	0.62	1.69	16	4
1:A:50:ALA:O	1:A:54:GLU:HG2	0.59	1.97	10	2
1:A:29:LEU:H	1:A:29:LEU:HD23	0.59	1.57	14	10
1:A:20:LEU:HB2	1:A:30:TRP:HB3	0.59	1.74	8	1
1:A:19:VAL:HG23	1:A:43:VAL:HG13	0.58	1.75	5	1
1:A:53:LEU:O	1:A:56:ILE:HG22	0.57	1.99	10	3
1:A:17:PHE:O	1:A:44:HIS:HB3	0.56	2.00	16	3
1:A:22:ASN:HB3	1:A:26:GLN:HB2	0.55	1.77	3	2
1:A:17:PHE:CD1	1:A:52:CYS:SG	0.54	3.01	1	2
1:A:18:PHE:HB2	1:A:30:TRP:CH2	0.53	2.38	13	2
1:A:31:PRO:HB2	1:A:34:ALA:HB3	0.53	1.78	4	2
1:A:20:LEU:HD22	1:A:30:TRP:HB3	0.53	1.80	1	2
1:A:49:ARG:O	1:A:52:CYS:SG	0.53	2.64	15	4
1:A:20:LEU:HB2	1:A:30:TRP:CE3	0.53	2.39	13	1
1:A:36:VAL:HG22	1:A:40:TRP:NE1	0.52	2.19	20	2
1:A:18:PHE:CE2	1:A:51:ALA:HB1	0.52	2.39	20	1
1:A:29:LEU:H	1:A:29:LEU:HD13	0.52	1.65	15	2
1:A:17:PHE:CD2	1:A:55:TYR:HB2	0.52	2.39	17	1
1:A:37:PRO:O	1:A:40:TRP:NE1	0.51	2.44	20	1
1:A:17:PHE:CE1	1:A:55:TYR:HB2	0.51	2.40	10	3
1:A:22:ASN:HB2	1:A:26:GLN:HB3	0.50	1.82	5	1
1:A:19:VAL:HG23	1:A:43:VAL:HG23	0.50	1.83	3	2
1:A:52:CYS:O	1:A:55:TYR:HB3	0.50	2.06	20	2
1:A:19:VAL:HB	1:A:43:VAL:HB	0.49	1.84	10	1
1:A:22:ASN:HB2	1:A:26:GLN:HB2	0.49	1.83	18	1
1:A:19:VAL:HG22	1:A:55:TYR:CE1	0.49	2.41	19	1
1:A:18:PHE:CD2	1:A:51:ALA:HB1	0.49	2.43	20	1
1:A:52:CYS:O	1:A:56:ILE:HG22	0.48	2.08	18	1
1:A:22:ASN:HB3	1:A:26:GLN:HB3	0.48	1.84	17	1
1:A:46:GLU:CD	1:A:46:GLU:H	0.48	2.12	9	1
1:A:17:PHE:HA	1:A:47:ALA:HB3	0.47	1.85	2	3
1:A:20:LEU:HB2	1:A:30:TRP:CD1	0.47	2.44	15	1
1:A:37:PRO:O	1:A:40:TRP:CD1	0.46	2.69	10	6
1:A:56:ILE:HG23	1:A:57:GLU:N	0.46	2.25	17	3
1:A:17:PHE:HB2	1:A:51:ALA:O	0.46	2.11	14	1
1:A:18:PHE:CD1	1:A:45:GLY:O	0.46	2.68	20	1
1:A:18:PHE:HB3	1:A:45:GLY:O	0.46	2.10	3	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:17:PHE:CD1	1:A:17:PHE:N	0.45	2.84	17	1
1:A:17:PHE:O	1:A:44:HIS:ND1	0.45	2.50	4	2
1:A:17:PHE:HB3	1:A:52:CYS:CA	0.45	2.40	10	1
1:A:49:ARG:O	1:A:52:CYS:HB3	0.44	2.11	18	3
1:A:29:LEU:H	1:A:29:LEU:CD1	0.44	2.25	3	1
1:A:30:TRP:CH2	1:A:42:VAL:HG23	0.43	2.48	13	1
1:A:17:PHE:H	1:A:55:TYR:HB2	0.43	1.73	2	1
1:A:21:VAL:HG12	1:A:41:ARG:O	0.43	2.14	15	1
1:A:17:PHE:O	1:A:18:PHE:CG	0.42	2.72	20	1
1:A:58:GLU:O	1:A:59:HIS:HB3	0.42	2.14	5	1
1:A:22:ASN:OD1	1:A:23:ASP:N	0.42	2.53	8	1
1:A:19:VAL:O	1:A:43:VAL:HG12	0.42	2.15	17	1
1:A:36:VAL:HG12	1:A:40:TRP:NE1	0.42	2.30	2	3
1:A:17:PHE:CB	1:A:52:CYS:HA	0.41	2.46	17	1
1:A:18:PHE:CD2	1:A:47:ALA:HB3	0.41	2.49	20	1
1:A:50:ALA:O	1:A:54:GLU:HB2	0.41	2.15	6	1
1:A:22:ASN:HB2	1:A:40:TRP:CE3	0.41	2.51	1	1
1:A:49:ARG:NH1	1:A:53:LEU:HD11	0.41	2.31	2	1
1:A:21:VAL:HA	1:A:26:GLN:O	0.41	2.16	6	1
1:A:50:ALA:O	1:A:54:GLU:HG3	0.41	2.16	14	2
1:A:49:ARG:O	1:A:53:LEU:HG	0.41	2.16	11	1
1:A:48:ASP:CG	1:A:49:ARG:N	0.40	2.74	5	1
1:A:17:PHE:CE2	1:A:19:VAL:CG2	0.40	3.04	17	1
1:A:56:ILE:CG2	1:A:57:GLU:N	0.40	2.85	17	1
1:A:17:PHE:CA	1:A:55:TYR:HB2	0.40	2.44	18	1

6.3 Torsion angles (i)

6.3.1 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 NMR 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	43/80 (54%)	38±2 (89±4%)	4±2 (10±4%)	1±1 (1±2%)	15	61
All	All	860/1600 (54%)	763 (89%)	85 (10%)	12 (1%)	15	61

All 3 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	17	PHE	9
1	A	59	HIS	2
1	A	31	PRO	1

6.3.2 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 NMR 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	35/66 (53%)	33±2 (95±5%)	2±2 (5±5%)	26 75
All	All	700/1320 (53%)	662 (95%)	38 (5%)	26 75

All 11 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	46	GLU	9
1	A	55	TYR	7
1	A	19	VAL	5
1	A	17	PHE	5
1	A	54	GLU	4
1	A	29	LEU	2
1	A	18	PHE	2
1	A	56	ILE	1
1	A	49	ARG	1
1	A	27	HIS	1
1	A	44	HIS	1

6.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates (i)

There are no monosaccharides in this entry.

6.6 Ligand geometry (i)

There are no ligands in this entry.

6.7 Other polymers (i)

There are no such molecules in this entry.

6.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

7 Chemical shift validation (i)

The completeness of assignment taking into account all chemical shift lists is 70% for the well-defined parts and 59% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_chem_shift_list_1*

7.1.1 Bookkeeping (i)

The following table shows the results of parsing the chemical shift list and reports the number of nuclei with statistically unusual chemical shifts.

Total number of shifts	619
Number of shifts mapped to atoms	619
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	2

7.1.2 Chemical shift referencing (i)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	64	-0.07 ± 0.25	None needed (< 0.5 ppm)
$^{13}C_{\beta}$	53	0.44 ± 0.26	None needed (< 0.5 ppm)
$^{13}C'$	53	-0.04 ± 0.37	None needed (< 0.5 ppm)
^{15}N	57	0.37 ± 0.47	None needed (< 0.5 ppm)

7.1.3 Completeness of resonance assignments (i)

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 70%, i.e. 407 atoms were assigned a chemical shift out of a possible 584. 0 out of 8 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	187/213 (88%)	72/86 (84%)	77/86 (90%)	38/41 (93%)
Sidechain	193/284 (68%)	131/185 (71%)	62/91 (68%)	0/8 (0%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	27/87 (31%)	14/43 (33%)	11/36 (31%)	2/8 (25%)
Overall	407/584 (70%)	217/314 (69%)	150/213 (70%)	40/57 (70%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 59%, i.e. 619 atoms were assigned a chemical shift out of a possible 1055. 0 out of 10 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	282/395 (71%)	108/161 (67%)	117/160 (73%)	57/74 (77%)
Sidechain	300/541 (55%)	195/348 (56%)	103/171 (60%)	2/22 (9%)
Aromatic	37/119 (31%)	19/59 (32%)	15/51 (29%)	3/9 (33%)
Overall	619/1055 (59%)	322/568 (57%)	235/382 (62%)	62/105 (59%)

7.1.4 Statistically unusual chemical shifts (i)

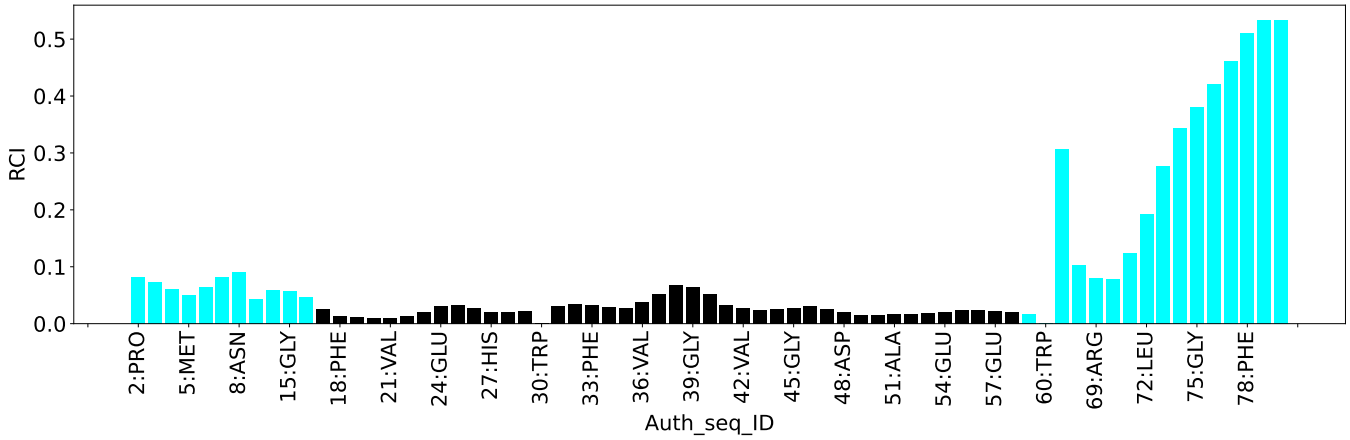
The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

List Id	Chain	Res	Type	Atom	Shift, *ppm*	Expected range, *ppm*	Z-score
1	A	5	MET	CG	20.50	25.46 – 38.60	-8.8
1	A	2	PRO	CA	53.50	55.85 – 70.84	-6.6

7.1.5 Random Coil Index (RCI) plots (i)

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition.If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:


RCI
0.0
0.1
0.2
0.3
0.4
0.5
2:PRO
5:MET
8:ASN
15:GLY
18:PHE
21:VAL
24:GLU
27:HIS
30:TRP
33:PHE
36:VAL
39:GLY
42:VAL
45:GLY
48:ASP
51:ALA
54:GLU
57:GLU
60:TRP
69:ARG
72:LEU
75:GLY
78:PHE
Auth_seq_ID

8 NMR restraints analysis (i)

8.1 Conformationally restricting restraints (i)

The following table provides the summary of experimentally observed NMR restraints in different categories. Restraints are classified into different categories based on the sequence separation of the atoms involved.

Description	Value
Total distance restraints	381
Intra-residue (|i-j|=0)	130
Sequential (|i-j|=1)	123
Medium range (|i-j|>1 and |i-j|<5)	45
Long range (|i-j|≥5)	59
Inter-chain	0
Hydrogen bond restraints	24
Disulfide bond restraints	0
Total dihedral-angle restraints	72
Number of unmapped restraints	0
Number of restraints per residue	5.7
Number of long range restraints per residue[1]	0.9

[1]Long range hydrogen bonds and disulfide bonds are counted as long range restraints while calculating the number of long range restraints per residue

8.2 Residual restraint violations (i)

This section provides the overview of the restraint violations analysis. The violations are binned as small, medium and large violations based on its absolute value. Average number of violations per model is calculated by dividing the total number of violations in each bin by the size of the ensemble.

8.2.1 Average number of distance violations per model (i)

Distance violations less than 0.1 Å are not included in the calculation.

Bins (Å)	Average number of violations per model	Max (Å)
0.1-0.2 (Small)	0.1	0.18
0.2-0.5 (Medium)	0.1	0.35
>0.5 (Large)	1.4	2.54

8.2.2 Average number of dihedral-angle violations per model (i)

Dihedral-angle violations less than 1° are not included in the calculation.

Bins (°)	Average number of violations per model	Max (°)
1.0-10.0 (Small)	2.8	8.4
10.0-20.0 (Medium)	None	None
>20.0 (Large)	None	None

9 Distance violation analysis (i)

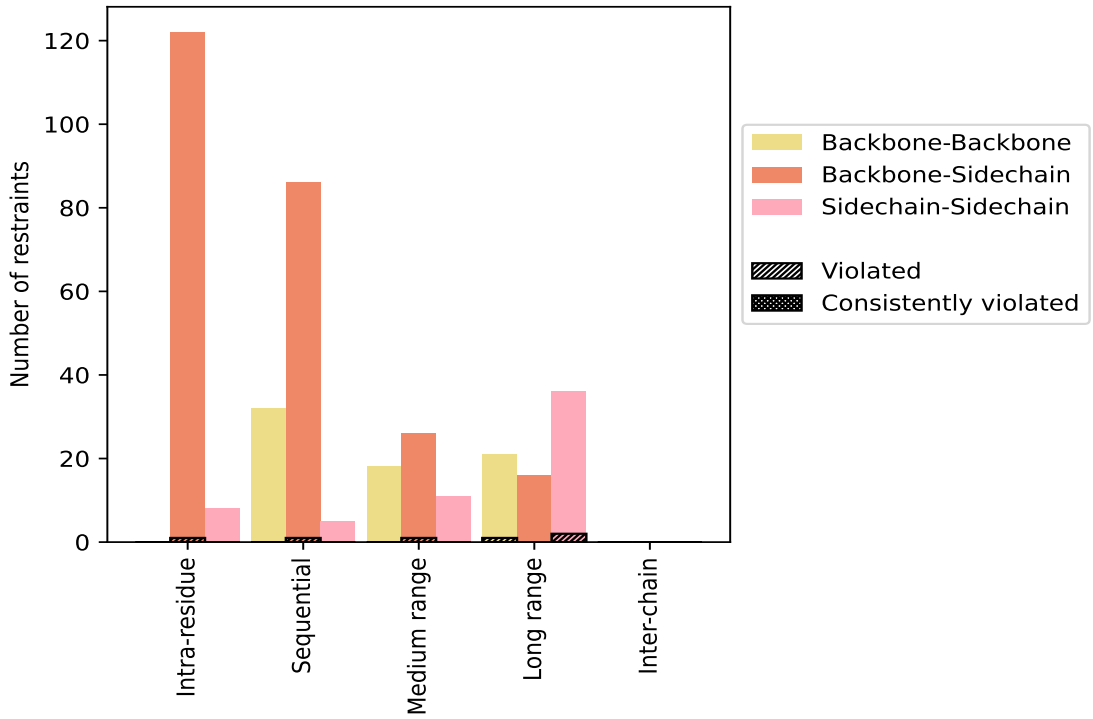
9.1 Summary of distance violations (i)

The following table shows the summary of distance violations in different restraint categories based on the sequence separation of the atoms involved. Each category is further sub-divided into three sub-categories based on the atoms involved. Violations less than 0.1 Å are not included in the statistics.

Restraints type	Count	%[1]	Violated[3]			Consistently Violated[4]		
			Count	%[2]	%[1]	Count	%[2]	%[1]
Intra-residue (|i-j|=0)	130	34.1	1	0.8	0.3	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	122	32.0	1	0.8	0.3	0	0.0	0.0
Sidechain-Sidechain	8	2.1	0	0.0	0.0	0	0.0	0.0
Sequential (|i-j|=1)	123	32.3	1	0.8	0.3	0	0.0	0.0
Backbone-Backbone	32	8.4	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	86	22.6	1	1.2	0.3	0	0.0	0.0
Sidechain-Sidechain	5	1.3	0	0.0	0.0	0	0.0	0.0
Medium range (|i-j|>1 & |i-j|<5)	45	11.8	1	2.2	0.3	0	0.0	0.0
Backbone-Backbone	8	2.1	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	26	6.8	1	3.8	0.3	0	0.0	0.0
Sidechain-Sidechain	11	2.9	0	0.0	0.0	0	0.0	0.0
Long range (|i-j|≥5)	59	15.5	2	3.4	0.5	0	0.0	0.0
Backbone-Backbone	7	1.8	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	16	4.2	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	36	9.4	2	5.6	0.5	0	0.0	0.0
Inter-chain	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Hydrogen bond	24	6.3	1	4.2	0.3	0	0.0	0.0
Disulfide bond	0	0.0	0	0.0	0.0	0	0.0	0.0
Total	381	100.0	6	1.6	1.6	0	0.0	0.0
Backbone-Backbone	71	18.6	1	1.4	0.3	0	0.0	0.0
Backbone-Sidechain	250	65.6	3	1.2	0.8	0	0.0	0.0
Sidechain-Sidechain	60	15.7	2	3.3	0.5	0	0.0	0.0

[1] percentage calculated with respect to the total number of distance restraints, [2] percentage calculated with respect to the number of restraints in a particular restraint category, [3] violated in at least one model, [4] violated in all the models

9.1.1 Bar chart : Distribution of distance restraints and violations (i)



Violated and consistently violated restraints are shown using different hatch patterns in their respective categories. The hydrogen bonds and disulfied bonds are counted in their appropriate category on the x-axis

9.2 Distance violation statistics for each model (i)

The following table provides the distance violation statistics for each model in the ensemble. Violations less than 0.1 Å are not included in the statistics.

Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
1	0	1	0	1	0	2	1.42	1.56	0.14	1.42
2	0	1	0	1	0	2	1.42	1.57	0.15	1.42
3	0	1	0	1	0	2	1.48	1.61	0.12	1.48
4	0	1	0	1	0	2	1.51	1.78	0.27	1.51
5	0	0	0	0	0	0	0.0	0.0	0.0	0.0
6	0	0	0	0	0	0	0.0	0.0	0.0	0.0
7	0	1	0	1	0	2	1.54	1.73	0.19	1.54
8	0	1	0	1	0	2	1.61	1.85	0.24	1.61
9	0	0	0	0	0	0	0.0	0.0	0.0	0.0
10	1	0	1	1	0	3	1.46	2.54	0.89	1.49
11	0	1	0	1	0	2	1.62	2.07	0.45	1.62

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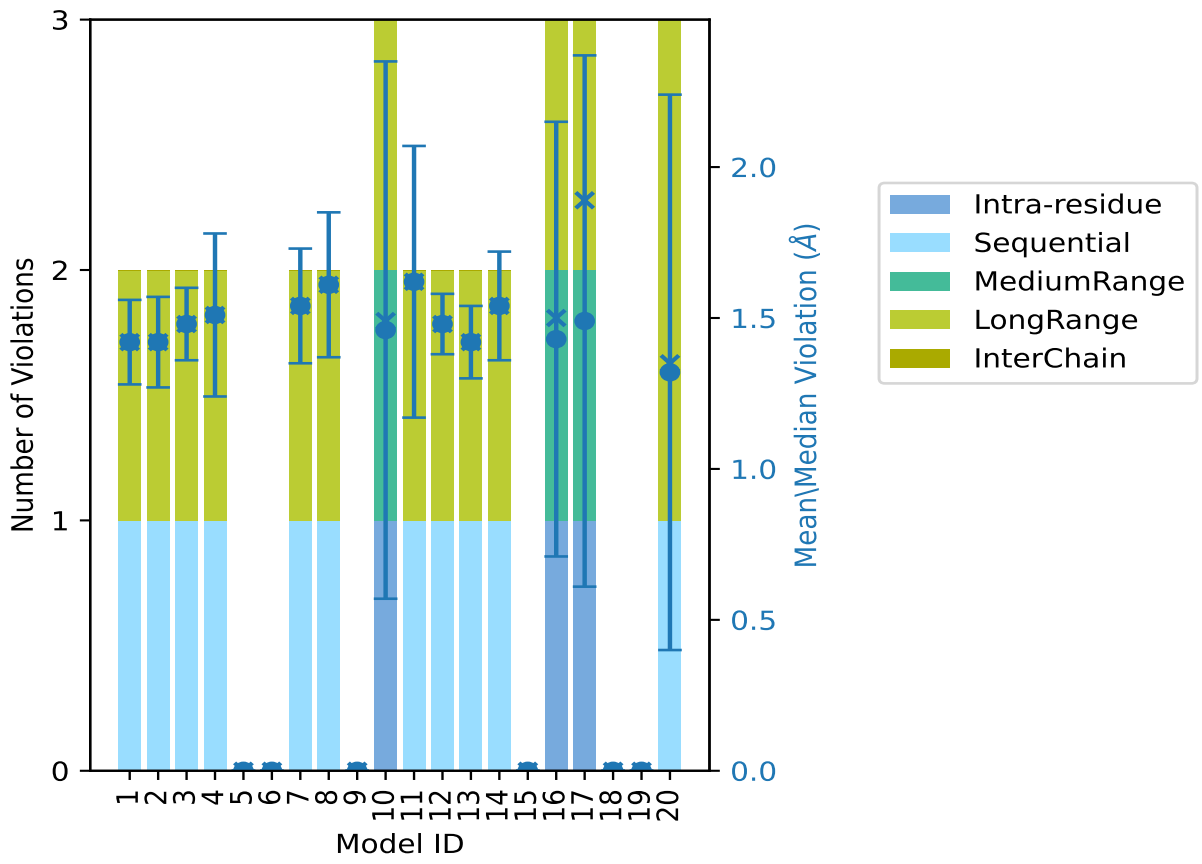
Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
12	0	1	0	1	0	2	1.48	1.58	0.1	1.48
13	0	1	0	1	0	2	1.42	1.54	0.12	1.42
14	0	1	0	1	0	2	1.54	1.72	0.18	1.54
15	0	0	0	0	0	0	0.0	0.0	0.0	0.0
16	1	0	1	1	0	3	1.43	2.27	0.72	1.5
17	1	0	1	1	0	3	1.49	2.3	0.88	1.89
18	0	0	0	0	0	0	0.0	0.0	0.0	0.0
19	0	0	0	0	0	0	0.0	0.0	0.0	0.0
20	0	1	0	2	0	3	1.32	2.44	0.92	1.35

[1]Intra-residue restraints, [2]Sequential restraints, [3]Medium range restraints, [4]Long range restraints, [5]Inter-chain restraints, [6]Standard deviation

9.2.1 Bar graph : Distance Violation statistics for each model (i)



The mean(dot),median(x) and the standard deviation are shown in blue with respect to the y axis on the right

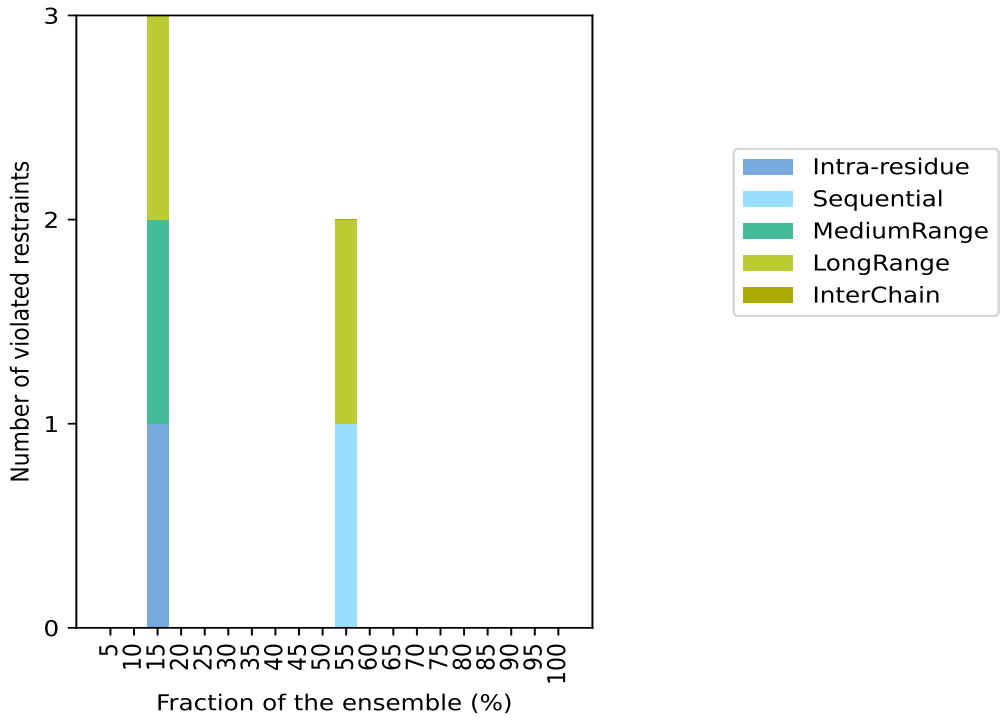
9.3 Distance violation statistics for the ensemble (i)

Violation analysis may find that some restraints are violated in few models and some are violated in most of models. The following table provides this information as number of violated restraints for a given fraction of the ensemble. In total, 352(IR:129, SQ:122, MR:44, LR:57, IC:0) restraints are not violated in the ensemble.

Number of violated restraints						Fraction of the ensemble	
IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total	Count[6]	%
0	0	0	0	0	0	1	5.0
0	0	0	0	0	0	2	10.0
1	0	1	1	0	3	3	15.0
0	0	0	0	0	0	4	20.0
0	0	0	0	0	0	5	25.0
0	0	0	0	0	0	6	30.0
0	0	0	0	0	0	7	35.0
0	0	0	0	0	0	8	40.0
0	0	0	0	0	0	9	45.0
0	0	0	0	0	0	10	50.0
0	1	0	1	0	2	11	55.0
0	0	0	0	0	0	12	60.0
0	0	0	0	0	0	13	65.0
0	0	0	0	0	0	14	70.0
0	0	0	0	0	0	15	75.0
0	0	0	0	0	0	16	80.0
0	0	0	0	0	0	17	85.0
0	0	0	0	0	0	18	90.0
0	0	0	0	0	0	19	95.0
0	0	0	0	0	0	20	100.0

[1]Intra-residue restraints, [2]Sequential restraints, [3]Medium range restraints, [4]Long range restraints, [5]Inter-chain restraints, [6] Number of models with violations

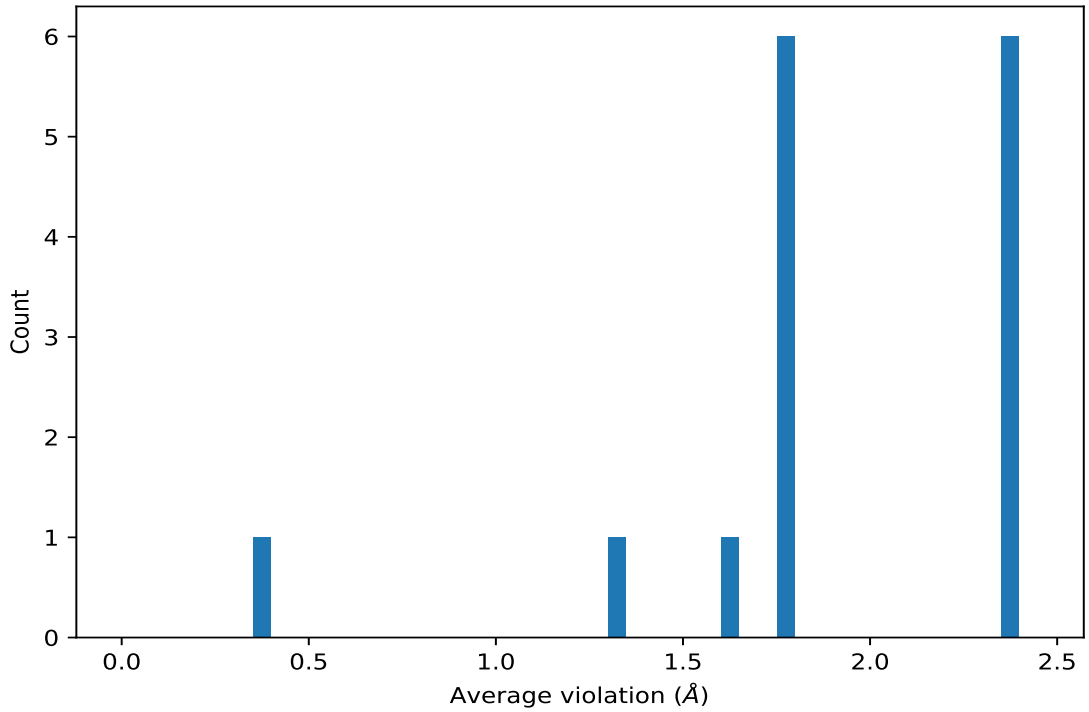
9.3.1 Bar graph : Distance violation statistics for the ensemble (i)



9.4 Most violated distance restraints in the ensemble (i)

9.4.1 Histogram : Distribution of mean distance violations (i)

The following histogram shows the distribution of the average value of the violation. The average is calculated for each restraint that is violated in more than one model over all the violated models in the ensemble



9.4.2 Table: Most violated distance restraints (i)

The following table provides the mean and the standard deviation of the violation for each restraint sorted by number of violated models and the mean value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint. Rows with same key represent combinatorial or ambiguous restraints and are counted as a single restraint.

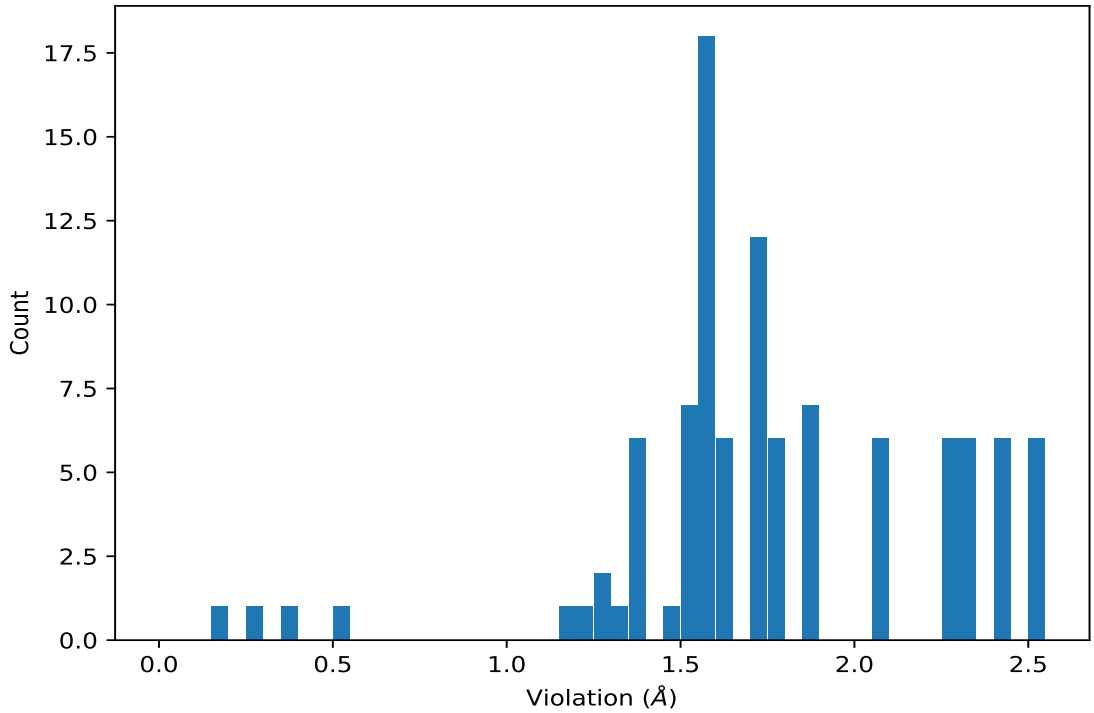
Key	Atom-1	Atom-2	Models[1]	Mean (Å)	SD[1] (Å)	Median (Å)
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	11	1.77	0.26	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	11	1.77	0.26	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	11	1.77	0.26	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	11	1.77	0.26	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	11	1.77	0.26	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	11	1.77	0.26	1.72
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	11	1.31	0.06	1.35
(1,259)	1:A:19:VAL:HG11	1:A:55:TYR:HD1	3	2.37	0.12	2.3
(1,259)	1:A:19:VAL:HG12	1:A:55:TYR:HD1	3	2.37	0.12	2.3
(1,259)	1:A:19:VAL:HG13	1:A:55:TYR:HD1	3	2.37	0.12	2.3
(1,259)	1:A:19:VAL:HG21	1:A:55:TYR:HD1	3	2.37	0.12	2.3
(1,259)	1:A:19:VAL:HG22	1:A:55:TYR:HD1	3	2.37	0.12	2.3
(1,259)	1:A:19:VAL:HG23	1:A:55:TYR:HD1	3	2.37	0.12	2.3
(1,56)	1:A:52:CYS:HA	1:A:55:TYR:HD2	3	1.63	0.19	1.5
(1,117)	1:A:55:TYR:HA	1:A:55:TYR:HD1	3	0.38	0.1	0.35

[1]Number of violated models, [2]Standard deviation

9.5 All violated distance restraints (i)

9.5.1 Histogram : Distribution of distance violations (i)

The following histogram shows the distribution of the absolute value of the violation for all violated restraints in the ensemble.



9.5.2 Table : All distance violations (i)

The following table lists the absolute value of the violation for each restraint in the ensemble sorted by its value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint. Rows with same key represent combinatorial or ambiguous restraints and are counted as a single restraint.

Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,259)	1:A:19:VAL:HG11	1:A:55:TYR:HD1	10	2.54
(1,259)	1:A:19:VAL:HG12	1:A:55:TYR:HD1	10	2.54
(1,259)	1:A:19:VAL:HG13	1:A:55:TYR:HD1	10	2.54
(1,259)	1:A:19:VAL:HG21	1:A:55:TYR:HD1	10	2.54
(1,259)	1:A:19:VAL:HG22	1:A:55:TYR:HD1	10	2.54
(1,259)	1:A:19:VAL:HG23	1:A:55:TYR:HD1	10	2.54
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	20	2.44

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	20	2.44
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	20	2.44
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	20	2.44
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	20	2.44
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	20	2.44
(1,259)	1:A:19:VAL:HG11	1:A:55:TYR:HD1	17	2.3
(1,259)	1:A:19:VAL:HG12	1:A:55:TYR:HD1	17	2.3
(1,259)	1:A:19:VAL:HG13	1:A:55:TYR:HD1	17	2.3
(1,259)	1:A:19:VAL:HG21	1:A:55:TYR:HD1	17	2.3
(1,259)	1:A:19:VAL:HG22	1:A:55:TYR:HD1	17	2.3
(1,259)	1:A:19:VAL:HG23	1:A:55:TYR:HD1	17	2.3
(1,259)	1:A:19:VAL:HG11	1:A:55:TYR:HD1	16	2.27
(1,259)	1:A:19:VAL:HG12	1:A:55:TYR:HD1	16	2.27
(1,259)	1:A:19:VAL:HG13	1:A:55:TYR:HD1	16	2.27
(1,259)	1:A:19:VAL:HG21	1:A:55:TYR:HD1	16	2.27
(1,259)	1:A:19:VAL:HG22	1:A:55:TYR:HD1	16	2.27
(1,259)	1:A:19:VAL:HG23	1:A:55:TYR:HD1	16	2.27
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	11	2.07
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	11	2.07
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	11	2.07
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	11	2.07
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	11	2.07
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	11	2.07
(1,56)	1:A:52:CYS:HA	1:A:55:TYR:HD2	17	1.89
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	8	1.85
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	8	1.85
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	8	1.85
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	8	1.85
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	8	1.85
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	8	1.85
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	4	1.78
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	4	1.78
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	4	1.78
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	4	1.78
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	4	1.78
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	4	1.78
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	7	1.73
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	7	1.73
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	7	1.73
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	7	1.73
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	7	1.73
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	7	1.73

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	14	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	14	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	14	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	14	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	14	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	14	1.72
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	3	1.61
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	3	1.61
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	3	1.61
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	3	1.61
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	3	1.61
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	3	1.61
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	12	1.58
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	12	1.58
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	12	1.58
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	12	1.58
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	12	1.58
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	12	1.58
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	2	1.57
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	2	1.57
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	2	1.57
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	2	1.57
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	2	1.57
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	2	1.57
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	1	1.56
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	1	1.56
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	1	1.56
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	1	1.56
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	1	1.56
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	1	1.56
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG11	13	1.54
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG12	13	1.54
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG13	13	1.54
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG21	13	1.54
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG22	13	1.54
(1,252)	1:A:18:PHE:HD2	1:A:42:VAL:HG23	13	1.54
(1,56)	1:A:52:CYS:HA	1:A:55:TYR:HD2	16	1.5
(1,56)	1:A:52:CYS:HA	1:A:55:TYR:HD2	10	1.49
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	12	1.38
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	8	1.37
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	3	1.36
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	14	1.36

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	7	1.35
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	20	1.35
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	13	1.31
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	1	1.28
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	2	1.27
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	4	1.24
(1,127)	1:A:18:PHE:HD2	1:A:19:VAL:H	11	1.17
(1,117)	1:A:55:TYR:HA	1:A:55:TYR:HD1	16	0.52
(1,117)	1:A:55:TYR:HA	1:A:55:TYR:HD1	10	0.35
(1,117)	1:A:55:TYR:HA	1:A:55:TYR:HD1	17	0.27
(2,23)	1:A:17:PHE:H	1:A:51:ALA:O	20	0.18

10 Dihedral-angle violation analysis (i)

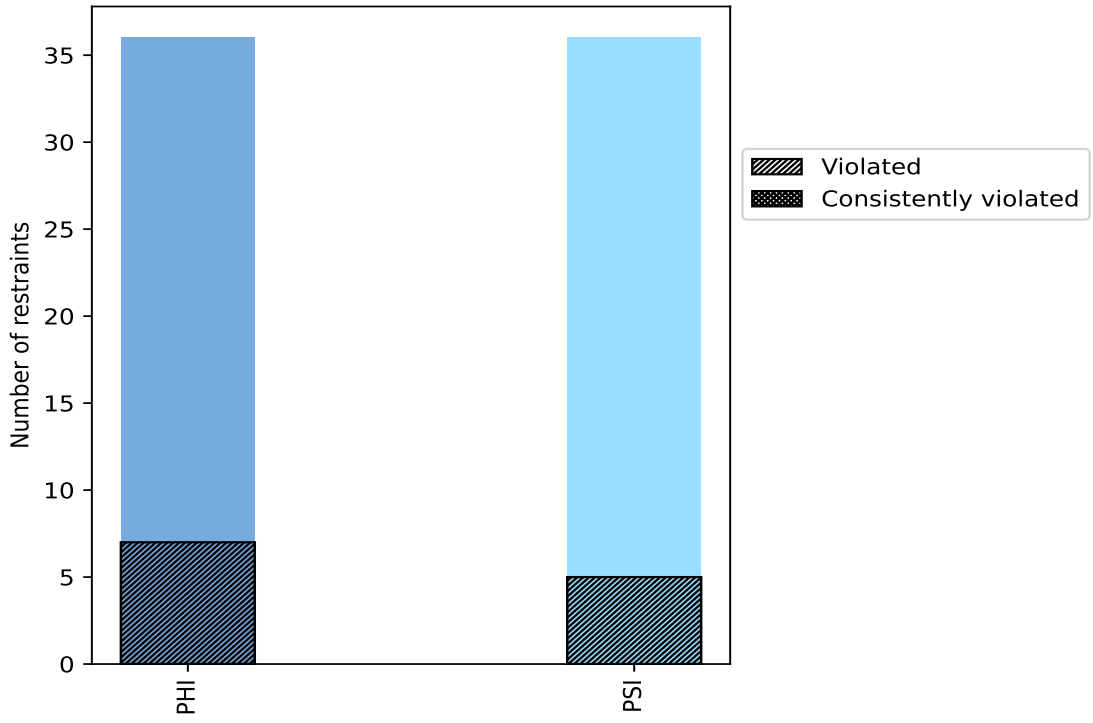
10.1 Summary of dihedral-angle violations (i)

The following table provides the summary of dihedral-angle violations in different dihedral-angle types. Violations less than 1° are not included in the calculation.

Angle type	Count	%[1]	Violated[3]			Consistently Violated[4]		
			Count	%[2]	%[1]	Count	%[2]	%[1]
PHI	36	50.0	7	19.4	9.7	0	0.0	0.0
PSI	36	50.0	5	13.9	6.9	0	0.0	0.0
Total	72	100.0	12	16.7	16.7	0	0.0	0.0

[1] percentage calculated with respect to total number of dihedral-angle restraints, [2] percentage calculated with respect to number of restraints in a particular dihedral-angle type, [3] violated in at least one model, [4] violated in all the models

10.1.1 Bar chart : Distribution of dihedral-angles and violations (i)



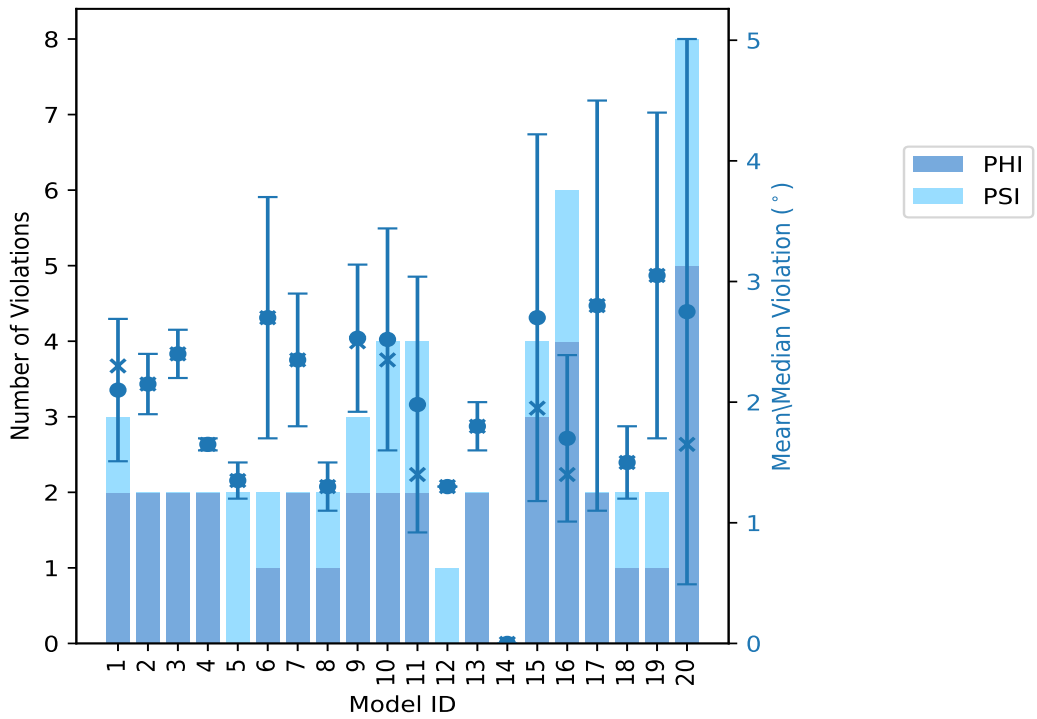
Violated and consistently violated restraints are shown using different hatch patterns in their respective categories

10.2 Dihedral-angle violation statistics for each model (i)

The following table provides the dihedral-angle violation statistics for each model in the ensemble. Violations less than 1° are not included in the statistics.

Model ID	Number of violations			Mean (°)	Max (°)	SD (°)	Median (°)
	PHI	PSI	Total				
1	2	1	3	2.1	2.7	0.59	2.3
2	2	0	2	2.15	2.4	0.25	2.15
3	2	0	2	2.4	2.6	0.2	2.4
4	2	0	2	1.65	1.7	0.05	1.65
5	0	2	2	1.35	1.5	0.15	1.35
6	1	1	2	2.7	3.7	1.0	2.7
7	2	0	2	2.35	2.9	0.55	2.35
8	1	1	2	1.3	1.5	0.2	1.3
9	2	1	3	2.53	3.3	0.61	2.5
10	2	2	4	2.52	3.9	0.92	2.35
11	2	2	4	1.98	3.8	1.06	1.4
12	0	1	1	1.3	1.3	0.0	1.3
13	2	0	2	1.8	2.0	0.2	1.8
14	0	0	0	0.0	0.0	0.0	0.0
15	3	1	4	2.7	5.3	1.52	1.95
16	4	2	6	1.7	2.9	0.69	1.4
17	2	0	2	2.8	4.5	1.7	2.8
18	1	1	2	1.5	1.8	0.3	1.5
19	1	1	2	3.05	4.4	1.35	3.05
20	5	3	8	2.75	8.4	2.26	1.65

10.2.1 Bar graph : Dihedral violation statistics for each model (i)



The mean(dot),median(x) and the standard deviation are shown in blue with respect to the y axis on the right

10.3 Dihedral-angle violation statistics for the ensemble (i)

Violation analysis may find that some restraints are violated in very few models and some are violated in most of models. The following table provides this information as number of violated restraints for a given fraction of ensemble.

Number of violated restraints			Fraction of the ensemble	
PHI	PSI	Total	Count[1]	%
3	2	5	1	5.0
1	0	1	2	10.0
1	1	2	3	15.0
0	0	0	4	20.0
0	0	0	5	25.0
0	1	1	6	30.0
0	0	0	7	35.0
0	1	1	8	40.0
0	0	0	9	45.0
0	0	0	10	50.0
0	0	0	11	55.0

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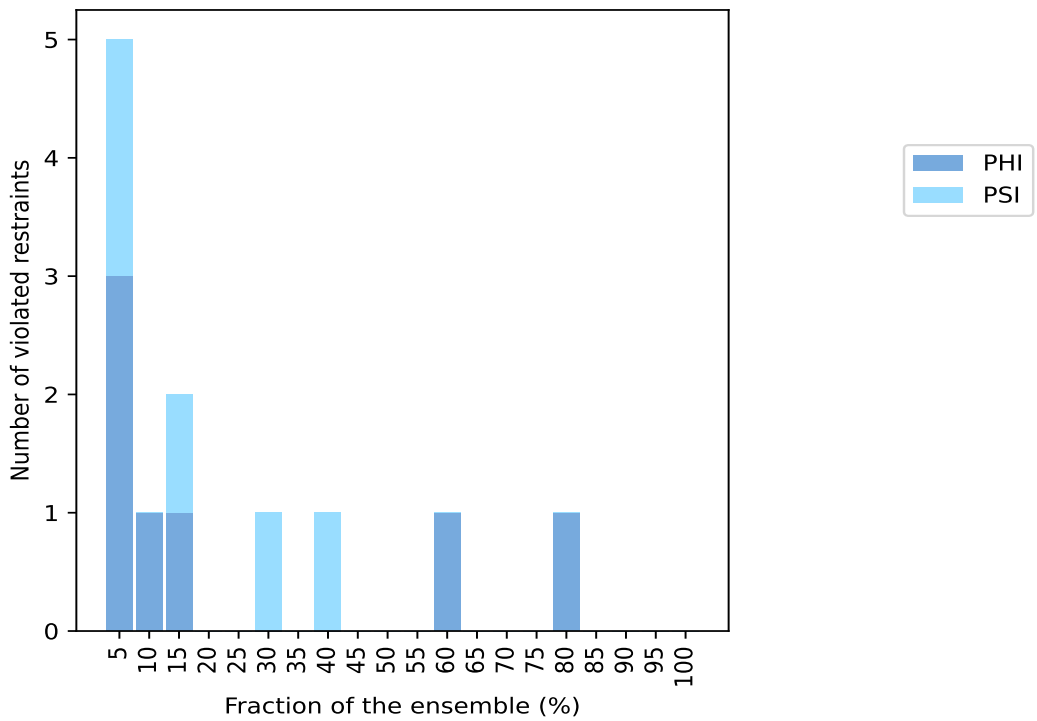
Number of violated restraints			Fraction of the ensemble	
PHI	PSI	Total	Count[1]	%
1	0	1	12	60.0
0	0	0	13	65.0
0	0	0	14	70.0
0	0	0	15	75.0
1	0	1	16	80.0
0	0	0	17	85.0
0	0	0	18	90.0
0	0	0	19	95.0
0	0	0	20	100.0

[1] Number of models with violations

10.3.1 Bar graph : Dihedral-angle Violation statistics for the ensemble (i)

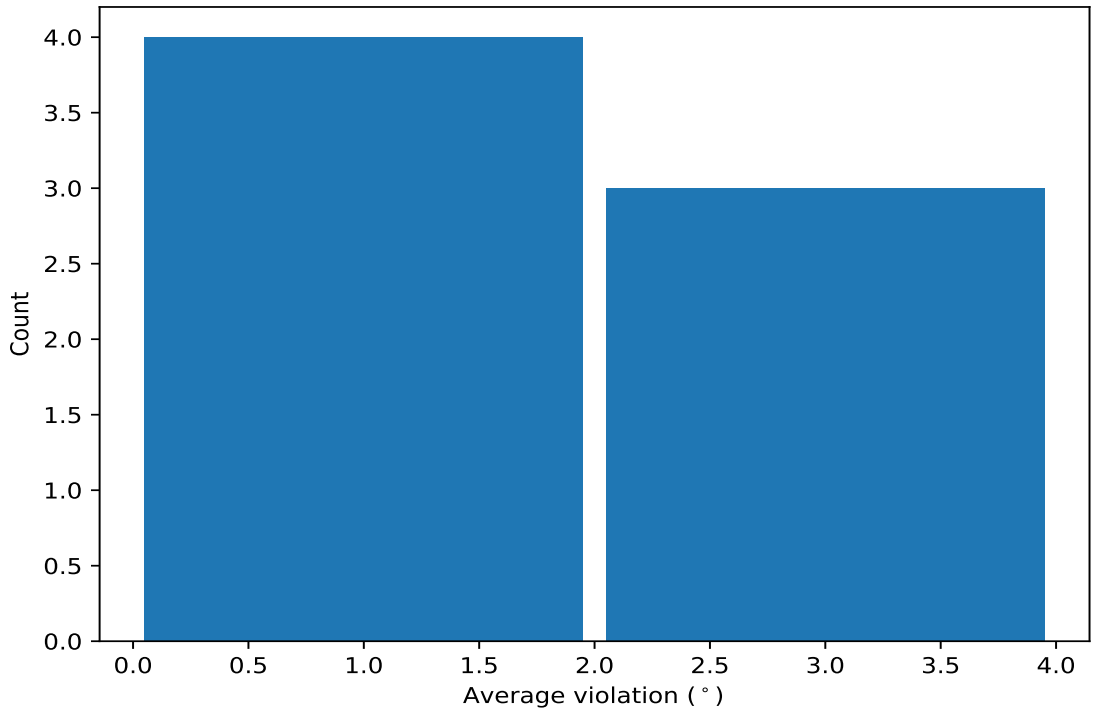


10.4 Most violated dihedral-angle restraints in the ensemble (i)

10.4.1 Histogram : Distribution of mean dihedral-angle violations (i)

The following histogram shows the distribution of the average value of the violation. The average is calculated for each restraint that is violated in more than one model over all the violated models

in the ensemble



10.4.2 Table: Most violated dihedral-angle restraints (i)

The following table provides the mean and the standard deviation of the violation for each restraint sorted by number of violated models and the mean value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint.

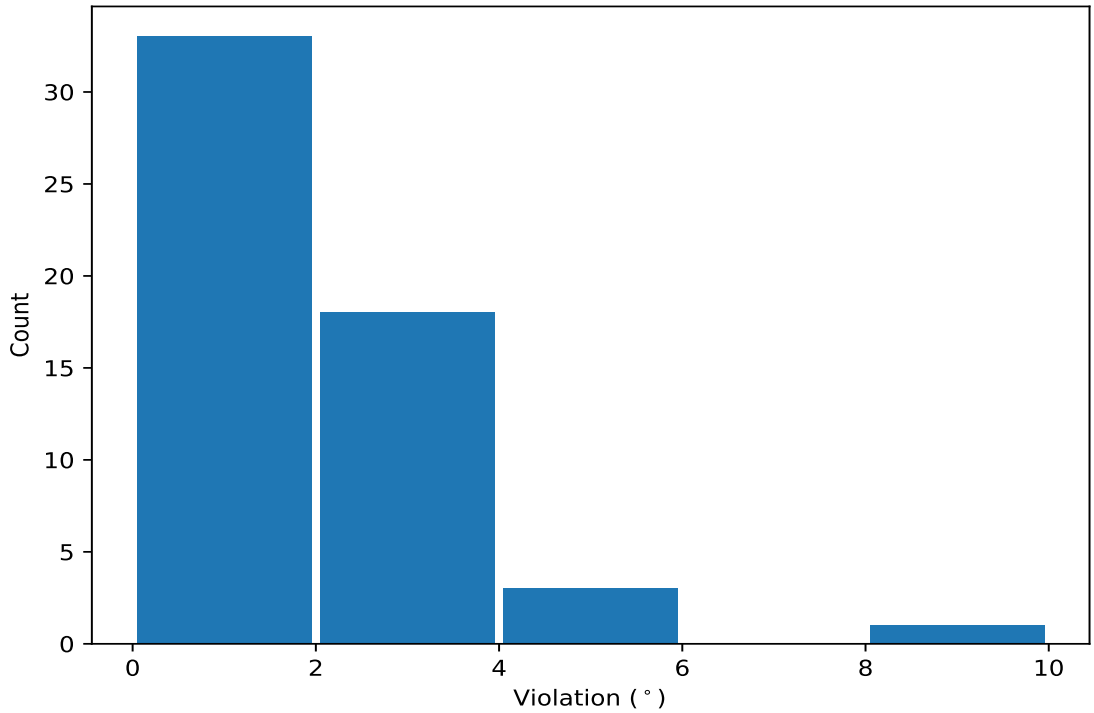
Key	Atom-1	Atom-2	Atom-3	Atom-4	Models[1]	Mean	SD[2]	Median
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	16	3.24	1.76	2.8
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	12	2.19	0.68	2.2
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	8	1.89	0.72	1.65
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	6	1.57	0.18	1.65
(1,65)	1:A:54:GLU:C	1:A:55:TYR:N	1:A:55:TYR:CA	1:A:55:TYR:C	3	1.57	0.52	1.3
(1,42)	1:A:41:ARG:N	1:A:41:ARG:CA	1:A:41:ARG:C	1:A:42:VAL:N	3	1.37	0.09	1.3
(1,13)	1:A:18:PHE:C	1:A:19:VAL:N	1:A:19:VAL:CA	1:A:19:VAL:C	2	2.35	0.65	2.35

[1] Number of violated models, [2]Standard deviation, All angle values are in degree (°)

10.5 All violated dihedral-angle restraints (i)

10.5.1 Histogram : Distribution of violations (i)

The following histogram shows the distribution of the absolute value of the violation for all violated restraints in the ensemble.



10.5.2 Table: All violated dihedral-angle restraints (i)

The following table lists the absolute value of the violation for each restraint in the ensemble sorted by its value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint.

Key	Atom-1	Atom-2	Atom-3	Atom-4	Model ID	Violation (°)
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	20	8.4
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	15	5.3
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	17	4.5
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	19	4.4
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	10	3.9
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	11	3.8
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	6	3.7
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	9	3.3
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	20	3.3
(1,13)	1:A:18:PHE:C	1:A:19:VAL:N	1:A:19:VAL:CA	1:A:19:VAL:C	20	3.0
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	16	2.9
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	7	2.9
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	10	2.8
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1	2.7
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	3	2.6
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	9	2.5
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	2	2.4
(1,65)	1:A:54:GLU:C	1:A:55:TYR:N	1:A:55:TYR:CA	1:A:55:TYR:C	16	2.3
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1	2.3
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	3	2.2
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	15	2.2

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Key	Atom-1	Atom-2	Atom-3	Atom-4	Model ID	Violation (°)
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	13	2.0
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	2	1.9
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	10	1.9
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	7	1.8
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	9	1.8
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	18	1.8
(1,13)	1:A:18:PHE:C	1:A:19:VAL:N	1:A:19:VAL:CA	1:A:19:VAL:C	15	1.7
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	6	1.7
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	19	1.7
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	20	1.7
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	4	1.7
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	16	1.7
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	4	1.6
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	15	1.6
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	13	1.6
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	20	1.6
(1,42)	1:A:41:ARG:N	1:A:41:ARG:CA	1:A:41:ARG:C	1:A:42:VAL:N	10	1.5
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	11	1.5
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	5	1.5
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	8	1.5
(1,50)	1:A:47:ALA:N	1:A:47:ALA:CA	1:A:47:ALA:C	1:A:48:ASP:N	20	1.4
(1,65)	1:A:54:GLU:C	1:A:55:TYR:N	1:A:55:TYR:CA	1:A:55:TYR:C	20	1.3
(1,42)	1:A:41:ARG:N	1:A:41:ARG:CA	1:A:41:ARG:C	1:A:42:VAL:N	1	1.3
(1,42)	1:A:41:ARG:N	1:A:41:ARG:CA	1:A:41:ARG:C	1:A:42:VAL:N	11	1.3
(1,37)	1:A:37:PRO:C	1:A:38:ALA:N	1:A:38:ALA:CA	1:A:38:ALA:C	20	1.3
(1,11)	1:A:17:PHE:C	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	11	1.3
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	12	1.3
(1,43)	1:A:41:ARG:C	1:A:42:VAL:N	1:A:42:VAL:CA	1:A:42:VAL:C	18	1.2
(1,12)	1:A:18:PHE:N	1:A:18:PHE:CA	1:A:18:PHE:C	1:A:19:VAL:N	5	1.2
(1,9)	1:A:16:SER:C	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	8	1.1
(1,69)	1:A:56:ILE:C	1:A:57:GLU:N	1:A:57:GLU:CA	1:A:57:GLU:C	16	1.1
(1,65)	1:A:54:GLU:C	1:A:55:TYR:N	1:A:55:TYR:CA	1:A:55:TYR:C	17	1.1
(1,64)	1:A:54:GLU:N	1:A:54:GLU:CA	1:A:54:GLU:C	1:A:55:TYR:N	16	1.1
(1,10)	1:A:17:PHE:N	1:A:17:PHE:CA	1:A:17:PHE:C	1:A:18:PHE:N	16	1.1