Stability, and electronic and optical properties of ternary nitride phases of MgSnN$_2$: A first-principles study

B. B. Dumre[a], D. Gall[b], S. V. Khare[a,*]

[a]Department of Physics and Astronomy, The University of Toledo, Toledo, OH 43606, USA

[b]Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, Troy, NY 12180, USA

*Corresponding Author: sanjay.khare@utoledo.edu

Supplementary Material

Table S1: Sample POSCARs for $MgSnN_{2-x}O_x$, with x = 0.0, 0.5, 1.0, 1.5, 2.0 in disordered-rocksalt crystal structure.

Material	POSCAR
$MgSnN_2$	title 　1.00000000000000 　　4.5616871552735890　　0.0000000000000000　　0.0000000000000000 　　0.0000000000000000　　4.5616871552735890　　0.0000000000000000 　　0.0000000000000000　　0.0000000000000000　　4.5616871552735890 　Mg　Sn　N 　　2　　2　　4 Direct 　0.0000000000000000　0.0000000000000000　0.0000000000000000 　0.5000000000000000　0.0000000000000000　0.5000000000000000 　0.0000000000000000　0.5000000000000000　0.5000000000000000 　0.5000000000000000　0.5000000000000000　0.0000000000000000 　0.5000000000000000　0.5000000000000000　0.5000000000000000 　0.5000000000000000　0.0000000000000000　0.0000000000000000 　0.0000000000000000　0.5000000000000000　0.0000000000000000 　0.0000000000000000　0.0000000000000000　0.5000000000000000
$MgSnN_{1.5}O_{0.5}$	title 　1.00000000000000 　　4.6344318813688090　　0.0000000000000000　　0.0000000000000000 　　0.0000000000000000　　4.6344318813688090　　0.0000000000000000 　　0.0000000000000000　　0.0000000000000000　　4.6344318813688090 　Mg　Sn　N　O 　　2　　2　　3　　1 Direct 　0.000000000　　0.000000000　　0.000000000 　0.000000000　　0.500000000　　0.500000000 　0.500000000　　0.500000000　　0.000000000 　0.500000000　　0.000000000　　0.500000000 　0.500000000　　0.000000000　　0.000000000 　0.000000000　　0.500000000　　0.000000000 　0.000000000　　0.000000000　　0.500000000 　0.500000000　　0.500000000　　0.500000000
MgSnNO	title 　1.00000000000000 　　4.7137237676654580　　0.0000000000000000　　0.0000000000000000 　　0.0000000000000000　　4.7137237676654580　　0.0000000000000000 　　0.0000000000000000　　0.0000000000000000　　4.7137237676654580 　Sn　Mg　N　O 　　2　　2　　2　　2 Direct

	0.0000000000000000 0.0000000000000000 0.0000000000000000 0.0000000000000000 0.5000000000000000 0.5000000000000000 0.5000000000000000 0.0000000000000000 0.5000000000000000 0.5000000000000000 0.5000000000000000 0.0000000000000000 0.5000000000000000 0.5000000000000000 0.5000000000000000 0.5000000000000000 0.0000000000000000 0.0000000000000000 0.0000000000000000 0.5000000000000000 0.0000000000000000 0.0000000000000000 0.0000000000000000 0.5000000000000000

$MgSnN_{0.5}O_{1.5}$	title
	  1.00000000000000
	   4.7674977257628260 0.0000000000000000 0.0000000000000000
	   0.0000000000000000 4.7674977257628260 0.0000000000000000
	   0.0000000000000000 0.0000000000000000 4.7674977257628260
	  Sn Mg N O
	   2 2 1 3
	Direct
	 0.0000000000000000 0.0000000000000000 0.0000000000000000
	 0.0000000000000000 0.5000000000000000 0.5000000000000000
	 0.5000000000000000 0.0000000000000000 0.5000000000000000
	 0.5000000000000000 0.5000000000000000 0.0000000000000000
	 0.5000000000000000 0.5000000000000000 0.5000000000000000
	 0.5000000000000000 0.0000000000000000 0.0000000000000000
	 0.0000000000000000 0.5000000000000000 0.0000000000000000
	 0.0000000000000000 0.0000000000000000 0.5000000000000000

$MgSnO_2$	title
	  1.00000000000000
	   4.8551440735301590 0.0000000000000000 0.0000000000000000
	   0.0000000000000000 4.8551440735301590 0.0000000000000000
	   0.0000000000000000 0.0000000000000000 4.8551440735301590
	  Sn Mg O
	   2 2 4
	Direct
	 0.0000000000000000 0.0000000000000000 0.0000000000000000
	 0.0000000000000000 0.5000000000000000 0.5000000000000000
	 0.5000000000000000 0.0000000000000000 0.5000000000000000
	 0.5000000000000000 0.5000000000000000 0.0000000000000000
	 0.5000000000000000 0.5000000000000000 0.5000000000000000
	 0.5000000000000000 0.0000000000000000 0.0000000000000000
	 0.0000000000000000 0.5000000000000000 0.0000000000000000
	 0.0000000000000000 0.0000000000000000 0.5000000000000000

Table S2: Permutations in cationic sublattice (4a Wyckoff positions) of disordered-rocksalt crystal structure in $MgSnN_{2-x}O_x$, for any allowed value of x (0.0, 0.5, 1.0, 1.5, 2.0).

S.N.	Permutations of cationic positions (4a Wyckoff positions)			Atom Type
1.	0.0	0.0	0.0	Mg
	0.0	0.5	0.5	Mg
	0.5	0.0	0.5	Sn
	0.5	0.5	0.0	Sn
2.	0.0	0.0	0.0	Mg
	0.5	0.0	0.5	Mg
	0.5	0.5	0.0	Sn
	0.0	0.5	0.5	Sn
3.	0.0	0.0	0.0	Mg
	0.5	0.5	0.0	Mg
	0.0	0.5	0.5	Sn
	0.5	0.0	0.5	Sn
4.	0.5	0.0	0.5	Mg
	0.5	0.5	0.0	Mg
	0.0	0.0	0.0	Sn
	0.0	0.5	0.5	Sn
5.	0.5	0.0	0.5	Mg
	0.0	0.5	0.5	Mg
	0.0	0.0	0.0	Sn
	0.5	0.5	0.0	Sn
6.	0.0	0.5	0.5	Mg
	0.5	0.5	0.0	Mg
	0.0	0.0	0.0	Sn
	0.5	0.0	0.5	Sn

Table S3: Anionic sublattice (4b Wyckoff positions) of disordered-rocksalt crystal structure in MgSnA$_2$; A = N (x = 0.0) or O (x = 2.0).

Anionic positions (4b Wyckoff positions)			Atom Type
0.5	0.5	0.5	A
0.5	0.0	0.0	A
0.0	0.5	0.0	A
0.0	0.0	0.5	A

Table S4: Permutations in anionic sublattice (4b Wyckoff positions) of disordered-rocksalt crystal structure in $MgSnA_{2-x}Y_x$; where A = N and Y = O for x = 0.5, A = O and Y = N for x = 1.5.

S.N.	Permutations of anionic positions (4b Wyckoff positions)			Atom Type
1.	0.5	0.5	0.5	A
	0.5	0.0	0.0	A
	0.0	0.5	0.0	A
	0.0	0.0	0.5	Y
2.	0.5	0.5	0.5	A
	0.5	0.0	0.0	A
	0.0	0.0	0.5	A
	0.0	0.5	0.0	Y
3.	0.5	0.5	0.5	A
	0.0	0.0	0.5	A
	0.0	0.5	0.0	A
	0.5	0.0	0.0	Y
4.	0.0	0.0	0.5	A
	0.5	0.0	0.0	A
	0.0	0.5	0.0	A
	0.5	0.5	0.5	Y

Table S5: Permutations in anionic sublattice (4b Wyckoff positions) of disordered-rocksalt crystal structure in MgSnNO.

S.N.	Permutations of cationic positions (4a Wyckoff positions)			Atom Type
1.	0.5	0.5	0.5	N
	0.5	0.0	0.0	N
	0.0	0.5	0.0	O
	0.0	0.0	0.5	O
2.	0.5	0.5	0.5	N
	0.0	0.5	0.0	N
	0.0	0.0	0.5	O
	0.5	0.0	0.0	O
3.	0.5	0.5	0.5	N
	0.0	0.0	0.5	N
	0.5	0.0	0.0	O
	0.0	0.5	0.0	O
4.	0.0	0.5	0.0	N
	0.0	0.0	0.5	N
	0.5	0.5	0.5	O
	0.5	0.0	0.0	O
5.	0.0	0.5	0.0	N
	0.5	0.0	0.0	N
	0.5	0.5	0.5	O
	0.0	0.0	0.5	O
6.	0.5	0.0	0.0	N
	0.0	0.0	0.5	N
	0.5	0.5	0.5	O
	0.0	0.5	0.0	O

Table S6: Permutations in cationic sublattice (2a Wyckoff positions) of disordered-wurtzite crystal structure in $MgSnN_2$ shown through their POSCARs.

S.N.	POSCAR
1.	title 1.00000000000000 3.4415806610544926 -0.0000001161784879 -0.0000000000000000 -1.7207900637882771 2.9804962078242108 -0.0000000000000000 0.0000000000000000 0.0000000000000000 5.5805896960220940 Mg Sn N 1 1 2 Direct 0.3333330000000032 0.6666669999999968 0.9842351676912005 0.6666669999999968 0.3333330000000032 0.5179084482545074 0.3333330000000032 0.6666669999999968 0.3701249849894381 0.6666669999999968 0.3333330000000032 0.8777313990648470
2.	title 1.00000000000000 3.4415806610544926 -0.0000001161784879 -0.0000000000000000 -1.7207900637882771 2.9804962078242108 -0.0000000000000000 0.0000000000000000 0.0000000000000000 5.5805896960220940 Sn Mg N 1 1 2 Direct 0.3333330000000032 0.6666669999999968 0.9842351676912005 0.6666669999999968 0.3333330000000032 0.5179084482545074 0.3333330000000032 0.6666669999999968 0.3701249849894381 0.6666669999999968 0.3333330000000032 0.8777313990648470

Table S7: POSCAR for ordered orthorhombic crystal structure.

POSCAR
Mg4 Sn4 N8
1.0
5.534733 0.000000 0.000000
0.000000 5.966133 0.000000
0.000000 0.000000 6.939890
Mg Sn N
4 4 8
direct
0.993279 0.583325 0.875390 Mg
0.493279 0.416675 0.124610 Mg
0.493279 0.916675 0.375390 Mg
0.993279 0.083325 0.624610 Mg
0.995880 0.583420 0.374371 Sn
0.495880 0.416580 0.625629 Sn
0.495880 0.916580 0.874371 Sn
0.995880 0.083420 0.125629 Sn
0.375312 0.579163 0.377262 N
0.875312 0.420837 0.622738 N
0.875312 0.920837 0.877262 N
0.375312 0.079163 0.122738 N
0.376530 0.584671 0.873130 N
0.876530 0.415329 0.126870 N
0.876530 0.915329 0.373130 N
0.376530 0.084671 0.626870 N

Table S8: Average value of bond lengths up to the first nearest neighbors around an element in the crystal structure. The values are given in Å.

Crystal Structure	Element			Average of all bond lengths
	Mg	Sn	N	
Disordered Rocksalt	2.28	2.28	2.28	2.28
Orthorhombic	2.12	2.09	2.10	2.10
Disordered Wurtzite	2.09	2.12	2.10	2.10

Table S9: Elastic parameters of $MgSnN_2$ in different crystal structures, computed using GGA functional. Values are in GPa.

Elastic Parameters	Disordered Rocksalt	Orthorhombic	Disordered Wurtzite
C_{11}	228.86	205.43, 223.5[a]	208.93
C_{22}	262.08	215.97, 210.7[a]	$= C_{11}$
C_{33}	$= C_{22}$	202.84, 210.2[a]	196.79
C_{12}	73.11	73.92, 98.9[a]	89.11
C_{13}	$= C_{12}$	74.29, 79.0[a]	66.89
C_{23}	105.60	92.83, 80.8[a]	$= C_{13}$
C_{44}	138.49	55.09, 61.0[a]	59.91
C_{55}	91.40	62.88, 56.2[a]	47.70
C_{66}	$= C_{44}$	59.44, 64.2[a]	$= C_{55}$
Mechanical Stability*	Yes	Yes	Yes
Bulk Modulus (B_V)	139.63	122.92, 129.1[a]	117.83
Bulk Modulus (B_R)	137.83	122.58, 128.7[a]	117.21
Bulk Modulus (B)	138.73	122.75, 128.9[a]	117.52
Shear Modulus (G_V)	107.09	61.03, 62.0[a]	57.18
Shear Modulus (G_R)	100.87	60.60, 61.6[a]	55.85
Shear Modulus (G)	103.98	60.81, 61.8[a]	56.52
Pugh's Ratio (κ)	0.75	0.49	0.49
Vicker's hardness (H_V)	17.76	7.59	6.97

[a]Theory, Ref. [1]

*The common stability conditions [2] for disordered- rocksalt and wurtzite structures, that turned out to be on tetragonal and hexagonal crystal families respectively, are:

$$C_{11} > |C_{12}|, \quad 2C_{13}^2 < C_{33}(C_{11} + C_{12}), \quad C_{44} > 0, \quad \text{and} \quad C_{66} > 0. \tag{1}$$

Similarly, for orthorhombic crystal structure, the stability conditions [2] are:

$$C_{11} > 0, \quad C_{11}C_{22} > C_{12}^2, \quad C_{11}C_{22}C_{33} + 2C_{12}C_{13}C_{23} - C_{11}C_{23}^2 - C_{22}C_{13}^2 - C_{33}C_{12}^2 > 0, \quad C_{44} > 0, \quad C_{55} > 0, \quad \text{and} \quad C_{66} > 0. \tag{2}$$

Table S10: Charge transfer (in elementary charge units e) from Mg and Sn to N in $MgSnN_2$ for different crystal structures calculated using the Bader charge partitioning scheme

Crystal Structure	Mg to N	Sn to N
Disordered Rocksalt	1.66	1.72
Orthorhombic	1.66	1.78
Disordered Wurtzite	1.66	1.70

Table S11: Values of photon energy and corresponding complex dielectric function in all three directions of orthorhombic crystal structure in $MgSnN_2$.

Orthorhombic						
Photon Energy (eV)	x-direction		y-direction		z-direction	
	ε_1	ε_2	ε_1	ε_2	ε_1	ε_2
0	2.1031	0	2.1061	0	2.1005	0
0.0174	2.1031	0.0001	2.1061	0.0001	2.1005	0.0001
0.0348	2.1031	0.0001	2.1061	0.0001	2.1005	0.0001
0.0522	2.1032	0.0002	2.1061	0.0002	2.1005	0.0002
0.0696	2.1032	0.0002	2.1061	0.0002	2.1006	0.0002
0.087	2.1032	0.0003	2.1062	0.0003	2.1006	0.0003
0.1044	2.1033	0.0003	2.1062	0.0003	2.1006	0.0003
0.1217	2.1033	0.0004	2.1063	0.0004	2.1007	0.0004
0.1391	2.1034	0.0004	2.1063	0.0004	2.1008	0.0004
0.1565	2.1035	0.0005	2.1064	0.0005	2.1008	0.0005
0.1739	2.1036	0.0005	2.1065	0.0005	2.1009	0.0005
0.1913	2.1037	0.0006	2.1066	0.0006	2.101	0.0006
0.2087	2.1038	0.0006	2.1067	0.0006	2.1011	0.0006
0.2261	2.1039	0.0007	2.1068	0.0007	2.1012	0.0007
0.2435	2.104	0.0007	2.1069	0.0007	2.1013	0.0007
0.2609	2.1041	0.0008	2.1071	0.0008	2.1015	0.0008
0.2783	2.1043	0.0008	2.1072	0.0008	2.1016	0.0008
0.2957	2.1044	0.0009	2.1073	0.0009	2.1017	0.0009
0.3131	2.1046	0.0009	2.1075	0.0009	2.1019	0.0009
0.3304	2.1048	0.001	2.1077	0.001	2.1021	0.001
0.3478	2.1049	0.001	2.1078	0.001	2.1022	0.001
0.3652	2.1051	0.0011	2.108	0.0011	2.1024	0.0011
0.3826	2.1053	0.0012	2.1082	0.0011	2.1026	0.0011
0.4	2.1055	0.0012	2.1084	0.0012	2.1028	0.0012
0.4174	2.1057	0.0013	2.1086	0.0012	2.103	0.0012
0.4348	2.106	0.0013	2.1088	0.0013	2.1032	0.0013
0.4522	2.1062	0.0014	2.1091	0.0013	2.1034	0.0013
0.4696	2.1064	0.0014	2.1093	0.0014	2.1037	0.0014
0.487	2.1067	0.0015	2.1095	0.0014	2.1039	0.0014
0.5044	2.107	0.0015	2.1098	0.0015	2.1042	0.0015
0.5218	2.1072	0.0016	2.1101	0.0015	2.1044	0.0015
0.5391	2.1075	0.0016	2.1103	0.0016	2.1047	0.0016

0.5565	2.1078	0.0017	2.1106	0.0017	2.105	0.0016
0.5739	2.1081	0.0017	2.1109	0.0017	2.1053	0.0017
0.5913	2.1084	0.0018	2.1112	0.0018	2.1055	0.0017
0.6087	2.1087	0.0019	2.1115	0.0018	2.1058	0.0018
0.6261	2.109	0.0019	2.1118	0.0019	2.1062	0.0018
0.6435	2.1094	0.002	2.1122	0.0019	2.1065	0.0019
0.6609	2.1097	0.002	2.1125	0.002	2.1068	0.0019
0.6783	2.1101	0.0021	2.1129	0.002	2.1072	0.002
0.6957	2.1104	0.0021	2.1132	0.0021	2.1075	0.002
0.7131	2.1108	0.0022	2.1136	0.0021	2.1079	0.0021
0.7305	2.1112	0.0022	2.1139	0.0022	2.1082	0.0021
0.7479	2.1116	0.0023	2.1143	0.0022	2.1086	0.0022
0.7652	2.112	0.0023	2.1147	0.0023	2.109	0.0022
0.7826	2.1124	0.0024	2.1151	0.0023	2.1094	0.0023
0.8	2.1128	0.0025	2.1155	0.0024	2.1098	0.0024
0.8174	2.1133	0.0025	2.116	0.0025	2.1102	0.0024
0.8348	2.1137	0.0026	2.1164	0.0025	2.1106	0.0025
0.8522	2.1142	0.0026	2.1168	0.0026	2.1111	0.0025
0.8696	2.1146	0.0027	2.1173	0.0026	2.1115	0.0026
0.887	2.1151	0.0027	2.1177	0.0027	2.1119	0.0026
0.9044	2.1156	0.0028	2.1182	0.0027	2.1124	0.0027
0.9218	2.1161	0.0029	2.1187	0.0028	2.1129	0.0027
0.9392	2.1166	0.0029	2.1192	0.0028	2.1134	0.0028
0.9566	2.1171	0.003	2.1197	0.0029	2.1138	0.0028
0.9739	2.1176	0.003	2.1202	0.003	2.1143	0.0029
0.9913	2.1181	0.0031	2.1207	0.003	2.1149	0.0029
1.0087	2.1187	0.0031	2.1212	0.0031	2.1154	0.003
1.0261	2.1192	0.0032	2.1218	0.0031	2.1159	0.0031
1.0435	2.1198	0.0033	2.1223	0.0032	2.1164	0.0031
1.0609	2.1204	0.0033	2.1229	0.0032	2.117	0.0032
1.0783	2.1209	0.0034	2.1234	0.0033	2.1175	0.0032
1.0957	2.1215	0.0034	2.124	0.0034	2.1181	0.0033
1.1131	2.1221	0.0035	2.1246	0.0034	2.1187	0.0033
1.1305	2.1227	0.0036	2.1252	0.0035	2.1193	0.0034
1.1479	2.1234	0.0036	2.1258	0.0035	2.1199	0.0035
1.1653	2.124	0.0037	2.1264	0.0036	2.1205	0.0035
1.1826	2.1246	0.0037	2.1271	0.0036	2.1211	0.0036
1.2	2.1253	0.0038	2.1277	0.0037	2.1217	0.0036

1.2174	2.126	0.0039	2.1284	0.0038	2.1223	0.0037
1.2348	2.1266	0.0039	2.129	0.0038	2.123	0.0037
1.2522	2.1273	0.004	2.1297	0.0039	2.1236	0.0038
1.2696	2.128	0.004	2.1304	0.0039	2.1243	0.0039
1.287	2.1287	0.0041	2.1311	0.004	2.125	0.0039
1.3044	2.1295	0.0042	2.1318	0.0041	2.1257	0.004
1.3218	2.1302	0.0042	2.1325	0.0041	2.1264	0.004
1.3392	2.1309	0.0043	2.1332	0.0042	2.1271	0.0041
1.3566	2.1317	0.0044	2.1339	0.0042	2.1278	0.0042
1.374	2.1324	0.0044	2.1347	0.0043	2.1285	0.0042
1.3914	2.1332	0.0045	2.1354	0.0044	2.1293	0.0043
1.4087	2.134	0.0045	2.1362	0.0044	2.13	0.0043
1.4261	2.1348	0.0046	2.137	0.0045	2.1308	0.0044
1.4435	2.1356	0.0047	2.1377	0.0046	2.1315	0.0045
1.4609	2.1364	0.0047	2.1385	0.0046	2.1323	0.0045
1.4783	2.1372	0.0048	2.1394	0.0047	2.1331	0.0046
1.4957	2.1381	0.0049	2.1402	0.0048	2.1339	0.0047
1.5131	2.1389	0.0049	2.141	0.0048	2.1347	0.0047
1.5305	2.1398	0.005	2.1419	0.0049	2.1356	0.0048
1.5479	2.1407	0.0051	2.1427	0.0049	2.1364	0.0048
1.5653	2.1416	0.0051	2.1436	0.005	2.1372	0.0049
1.5827	2.1425	0.0052	2.1444	0.0051	2.1381	0.005
1.6001	2.1434	0.0053	2.1453	0.0051	2.139	0.005
1.6174	2.1443	0.0054	2.1462	0.0052	2.1398	0.0051
1.6348	2.1452	0.0054	2.1471	0.0053	2.1407	0.0052
1.6522	2.1462	0.0055	2.1481	0.0053	2.1416	0.0052
1.6696	2.1472	0.0056	2.149	0.0054	2.1426	0.0053
1.687	2.1481	0.0056	2.15	0.0055	2.1435	0.0054
1.7044	2.1491	0.0057	2.1509	0.0056	2.1444	0.0054
1.7218	2.1501	0.0058	2.1519	0.0056	2.1454	0.0055
1.7392	2.1511	0.0058	2.1529	0.0057	2.1463	0.0056
1.7566	2.1521	0.0059	2.1539	0.0058	2.1473	0.0056
1.774	2.1532	0.006	2.1549	0.0058	2.1483	0.0057
1.7914	2.1542	0.0061	2.1559	0.0059	2.1493	0.0058
1.8088	2.1553	0.0061	2.1569	0.006	2.1503	0.0058
1.8261	2.1564	0.0062	2.158	0.006	2.1513	0.0059
1.8435	2.1574	0.0063	2.159	0.0061	2.1524	0.006
1.8609	2.1585	0.0064	2.1601	0.0062	2.1534	0.0061

1.8783	2.1596	0.0064	2.1612	0.0063	2.1545	0.0061
1.8957	2.1608	0.0065	2.1623	0.0063	2.1555	0.0062
1.9131	2.1619	0.0066	2.1634	0.0064	2.1566	0.0063
1.9305	2.1631	0.0067	2.1645	0.0065	2.1577	0.0063
1.9479	2.1642	0.0067	2.1656	0.0066	2.1588	0.0064
1.9653	2.1654	0.0068	2.1668	0.0066	2.1599	0.0065
1.9827	2.1666	0.0069	2.1679	0.0067	2.1611	0.0066
2.0001	2.1678	0.007	2.1691	0.0068	2.1622	0.0066
2.0175	2.169	0.0071	2.1703	0.0069	2.1634	0.0067
2.0349	2.1703	0.0071	2.1715	0.007	2.1646	0.0068
2.0522	2.1715	0.0072	2.1727	0.007	2.1657	0.0069
2.0696	2.1728	0.0073	2.174	0.0071	2.1669	0.007
2.087	2.1741	0.0074	2.1752	0.0072	2.1682	0.007
2.1044	2.1753	0.0075	2.1764	0.0073	2.1694	0.0071
2.1218	2.1767	0.0076	2.1777	0.0074	2.1706	0.0072
2.1392	2.178	0.0076	2.179	0.0074	2.1719	0.0073
2.1566	2.1793	0.0077	2.1803	0.0075	2.1732	0.0073
2.174	2.1807	0.0078	2.1816	0.0076	2.1744	0.0074
2.1914	2.182	0.0079	2.1829	0.0077	2.1757	0.0075
2.2088	2.1834	0.008	2.1843	0.0078	2.177	0.0076
2.2262	2.1848	0.0081	2.1856	0.0079	2.1784	0.0077
2.2436	2.1862	0.0082	2.187	0.0079	2.1797	0.0078
2.2609	2.1876	0.0083	2.1884	0.008	2.1811	0.0078
2.2783	2.1891	0.0084	2.1898	0.0081	2.1824	0.0079
2.2957	2.1906	0.0084	2.1912	0.0082	2.1838	0.008
2.3131	2.192	0.0085	2.1927	0.0083	2.1852	0.0081
2.3305	2.1935	0.0086	2.1941	0.0084	2.1866	0.0082
2.3479	2.195	0.0087	2.1956	0.0085	2.1881	0.0083
2.3653	2.1966	0.0088	2.1971	0.0086	2.1895	0.0084
2.3827	2.1981	0.0089	2.1986	0.0087	2.191	0.0085
2.4001	2.1997	0.009	2.2001	0.0088	2.1925	0.0085
2.4175	2.2012	0.0091	2.2016	0.0089	2.194	0.0086
2.4349	2.2028	0.0092	2.2031	0.0089	2.1955	0.0087
2.4523	2.2044	0.0093	2.2047	0.009	2.197	0.0088
2.4696	2.2061	0.0094	2.2063	0.0091	2.1985	0.0089
2.487	2.2077	0.0095	2.2079	0.0092	2.2001	0.009
2.5044	2.2094	0.0096	2.2095	0.0093	2.2017	0.0091
2.5218	2.211	0.0097	2.2111	0.0094	2.2033	0.0092

2.5392	2.2127	0.0098	2.2128	0.0095	2.2049	0.0093
2.5566	2.2145	0.0099	2.2144	0.0096	2.2065	0.0094
2.574	2.2162	0.01	2.2161	0.0097	2.2081	0.0095
2.5914	2.218	0.0102	2.2178	0.0098	2.2098	0.0096
2.6088	2.2197	0.0103	2.2195	0.01	2.2115	0.0097
2.6262	2.2215	0.0104	2.2213	0.0101	2.2132	0.0098
2.6436	2.2233	0.0105	2.223	0.0102	2.2149	0.0099
2.661	2.2252	0.0106	2.2248	0.0103	2.2166	0.01
2.6784	2.227	0.0107	2.2266	0.0104	2.2184	0.0101
2.6957	2.2289	0.0108	2.2284	0.0105	2.2201	0.0102
2.7131	2.2308	0.0109	2.2303	0.0106	2.2219	0.0103
2.7305	2.2327	0.0111	2.2321	0.0107	2.2237	0.0105
2.7479	2.2346	0.0112	2.234	0.0108	2.2255	0.0106
2.7653	2.2366	0.0113	2.2359	0.011	2.2274	0.0107
2.7827	2.2386	0.0114	2.2378	0.0111	2.2293	0.0108
2.8001	2.2406	0.0116	2.2397	0.0112	2.2311	0.0109
2.8175	2.2426	0.0117	2.2417	0.0113	2.233	0.011
2.8349	2.2446	0.0118	2.2436	0.0114	2.235	0.0111
2.8523	2.2467	0.0119	2.2456	0.0115	2.2369	0.0113
2.8697	2.2488	0.0121	2.2477	0.0117	2.2389	0.0114
2.8871	2.2509	0.0122	2.2497	0.0118	2.2409	0.0115
2.9044	2.253	0.0123	2.2518	0.0119	2.2429	0.0116
2.9218	2.2551	0.0125	2.2538	0.0121	2.2449	0.0117
2.9392	2.2573	0.0126	2.2559	0.0122	2.2469	0.0119
2.9566	2.2595	0.0127	2.2581	0.0123	2.249	0.012
2.974	2.2617	0.0129	2.2602	0.0124	2.2511	0.0121
2.9914	2.264	0.013	2.2624	0.0126	2.2532	0.0123
3.0088	2.2663	0.0132	2.2646	0.0127	2.2554	0.0124
3.0262	2.2686	0.0133	2.2668	0.0129	2.2575	0.0125
3.0436	2.2709	0.0135	2.2691	0.013	2.2597	0.0127
3.061	2.2732	0.0136	2.2713	0.0131	2.2619	0.0128
3.0784	2.2756	0.0138	2.2736	0.0133	2.2642	0.0129
3.0958	2.278	0.0139	2.2759	0.0134	2.2664	0.0131
3.1131	2.2805	0.0141	2.2783	0.0136	2.2687	0.0132
3.1305	2.2829	0.0142	2.2807	0.0137	2.271	0.0134
3.1479	2.2854	0.0144	2.2831	0.0139	2.2733	0.0135
3.1653	2.2879	0.0145	2.2855	0.014	2.2757	0.0136
3.1827	2.2904	0.0147	2.2879	0.0142	2.2781	0.0138

3.2001	2.293	0.0149	2.2904	0.0143	2.2805	0.0139
3.2175	2.2956	0.0151	2.2929	0.0145	2.2829	0.0141
3.2349	2.2982	0.0152	2.2954	0.0147	2.2854	0.0143
3.2523	2.3009	0.0154	2.298	0.0148	2.2879	0.0144
3.2697	2.3036	0.0156	2.3006	0.015	2.2904	0.0146
3.2871	2.3063	0.0158	2.3032	0.0152	2.2929	0.0147
3.3045	2.3091	0.0159	2.3059	0.0153	2.2955	0.0149
3.3219	2.3118	0.0161	2.3085	0.0155	2.2981	0.0151
3.3392	2.3147	0.0163	2.3113	0.0157	2.3007	0.0152
3.3566	2.3175	0.0165	2.314	0.0159	2.3034	0.0154
3.374	2.3204	0.0167	2.3168	0.0161	2.3061	0.0156
3.3914	2.3233	0.0169	2.3196	0.0163	2.3088	0.0158
3.4088	2.3262	0.0171	2.3224	0.0164	2.3116	0.016
3.4262	2.3292	0.0173	2.3253	0.0166	2.3143	0.0161
3.4436	2.3323	0.0175	2.3282	0.0168	2.3172	0.0163
3.461	2.3353	0.0177	2.3311	0.017	2.32	0.0165
3.4784	2.3384	0.0179	2.3341	0.0172	2.3229	0.0167
3.4958	2.3415	0.0182	2.3371	0.0174	2.3258	0.0169
3.5132	2.3447	0.0184	2.3401	0.0176	2.3288	0.0171
3.5306	2.3479	0.0186	2.3432	0.0179	2.3317	0.0173
3.5479	2.3512	0.0188	2.3463	0.0181	2.3348	0.0175
3.5653	2.3544	0.0191	2.3495	0.0183	2.3378	0.0177
3.5827	2.3578	0.0193	2.3527	0.0185	2.3409	0.0179
3.6001	2.3611	0.0196	2.3559	0.0187	2.344	0.0182
3.6175	2.3646	0.0198	2.3592	0.019	2.3472	0.0184
3.6349	2.368	0.0201	2.3625	0.0192	2.3504	0.0186
3.6523	2.3715	0.0203	2.3659	0.0195	2.3537	0.0188
3.6697	2.3751	0.0206	2.3693	0.0197	2.357	0.0191
3.6871	2.3787	0.0208	2.3727	0.02	2.3603	0.0193
3.7045	2.3823	0.0211	2.3762	0.0202	2.3637	0.0195
3.7219	2.386	0.0214	2.3797	0.0205	2.3671	0.0198
3.7393	2.3897	0.0217	2.3833	0.0207	2.3705	0.02
3.7566	2.3935	0.022	2.3869	0.021	2.374	0.0203
3.774	2.3973	0.0223	2.3906	0.0213	2.3776	0.0206
3.7914	2.4012	0.0226	2.3943	0.0216	2.3811	0.0208
3.8088	2.4052	0.0229	2.398	0.0218	2.3848	0.0211
3.8262	2.4092	0.0232	2.4019	0.0221	2.3885	0.0214
3.8436	2.4132	0.0235	2.4057	0.0224	2.3922	0.0217

3.861	2.4173	0.0239	2.4096	0.0228	2.396	0.0219
3.8784	2.4215	0.0242	2.4136	0.0231	2.3998	0.0222
3.8958	2.4257	0.0245	2.4176	0.0234	2.4037	0.0225
3.9132	2.43	0.0249	2.4217	0.0237	2.4076	0.0229
3.9306	2.4343	0.0253	2.4259	0.0241	2.4116	0.0232
3.948	2.4387	0.0256	2.43	0.0244	2.4156	0.0235
3.9654	2.4432	0.026	2.4343	0.0247	2.4197	0.0238
3.9827	2.4477	0.0264	2.4386	0.0251	2.4239	0.0242
4.0001	2.4524	0.0268	2.443	0.0255	2.4281	0.0245
4.0175	2.457	0.0272	2.4475	0.0259	2.4324	0.0249
4.0349	2.4618	0.0277	2.452	0.0262	2.4367	0.0252
4.0523	2.4666	0.0281	2.4565	0.0266	2.4411	0.0256
4.0697	2.4715	0.0285	2.4612	0.0271	2.4456	0.026
4.0871	2.4765	0.029	2.4659	0.0275	2.4501	0.0264
4.1045	2.4815	0.0295	2.4707	0.0279	2.4547	0.0268
4.1219	2.4867	0.03	2.4756	0.0284	2.4594	0.0272
4.1393	2.4919	0.0305	2.4805	0.0288	2.4642	0.0276
4.1567	2.4972	0.031	2.4855	0.0293	2.469	0.028
4.1741	2.5026	0.0315	2.4907	0.0298	2.4739	0.0285
4.1914	2.5081	0.0321	2.4958	0.0303	2.4788	0.029
4.2088	2.5137	0.0326	2.5011	0.0308	2.4839	0.0294
4.2262	2.5194	0.0332	2.5065	0.0313	2.489	0.0299
4.2436	2.5252	0.0338	2.512	0.0319	2.4942	0.0304
4.261	2.5311	0.0345	2.5175	0.0324	2.4995	0.0309
4.2784	2.5371	0.0351	2.5232	0.033	2.5049	0.0315
4.2958	2.5432	0.0358	2.5289	0.0336	2.5104	0.032
4.3132	2.5494	0.0365	2.5348	0.0342	2.516	0.0326
4.3306	2.5558	0.0372	2.5407	0.0349	2.5217	0.0332
4.348	2.5623	0.038	2.5468	0.0356	2.5275	0.0338
4.3654	2.5689	0.0387	2.553	0.0363	2.5334	0.0344
4.3828	2.5756	0.0396	2.5593	0.037	2.5394	0.0351
4.4002	2.5825	0.0404	2.5658	0.0377	2.5455	0.0358
4.4175	2.5895	0.0413	2.5723	0.0385	2.5517	0.0365
4.4349	2.5967	0.0422	2.579	0.0393	2.5581	0.0372
4.4523	2.6041	0.0432	2.5859	0.0402	2.5645	0.038
4.4697	2.6116	0.0442	2.5929	0.0411	2.5712	0.0388
4.4871	2.6193	0.0453	2.6	0.042	2.5779	0.0396
4.5045	2.6271	0.0464	2.6073	0.043	2.5848	0.0405

4.5219	2.6352	0.0476	2.6148	0.044	2.5918	0.0414
4.5393	2.6434	0.0488	2.6224	0.0451	2.599	0.0423
4.5567	2.6519	0.0501	2.6302	0.0462	2.6064	0.0433
4.5741	2.6605	0.0515	2.6383	0.0474	2.6139	0.0443
4.5915	2.6694	0.053	2.6465	0.0487	2.6216	0.0454
4.6089	2.6786	0.0545	2.6549	0.05	2.6295	0.0466
4.6262	2.688	0.0562	2.6636	0.0514	2.6375	0.0478
4.6436	2.6977	0.058	2.6724	0.0529	2.6458	0.049
4.661	2.7077	0.0599	2.6816	0.0545	2.6543	0.0504
4.6784	2.7179	0.0619	2.691	0.0562	2.663	0.0518
4.6958	2.7285	0.0642	2.7006	0.0581	2.672	0.0533
4.7132	2.7395	0.0666	2.7106	0.06	2.6812	0.055
4.7306	2.7508	0.0692	2.7209	0.0622	2.6906	0.0567
4.748	2.7625	0.072	2.7315	0.0645	2.7004	0.0586
4.7654	2.7746	0.0752	2.7424	0.067	2.7104	0.0606
4.7828	2.7872	0.0787	2.7538	0.0697	2.7208	0.0627
4.8002	2.8002	0.0826	2.7655	0.0728	2.7315	0.0651
4.8176	2.8137	0.0869	2.7776	0.0761	2.7425	0.0677
4.8349	2.8276	0.0918	2.7902	0.0799	2.754	0.0705
4.8523	2.842	0.0974	2.8032	0.0841	2.7658	0.0736
4.8697	2.8569	0.1037	2.8166	0.0888	2.778	0.077
4.8871	2.8721	0.1108	2.8305	0.0941	2.7907	0.0808
4.9045	2.8876	0.1189	2.8448	0.1001	2.8038	0.0851
4.9219	2.9033	0.128	2.8594	0.1069	2.8173	0.0899
4.9393	2.919	0.1383	2.8744	0.1146	2.8313	0.0954
4.9567	2.9347	0.1496	2.8895	0.1233	2.8456	0.1015
4.9741	2.9502	0.1621	2.9048	0.1329	2.8602	0.1084
4.9915	2.9653	0.1758	2.92	0.1437	2.8751	0.1162
5.0089	2.98	0.1907	2.935	0.1556	2.8901	0.1249
5.0263	2.994	0.2066	2.9498	0.1687	2.9052	0.1345
5.0437	3.0071	0.2235	2.9641	0.1829	2.9203	0.1451
5.061	3.0194	0.2414	2.9778	0.1982	2.9353	0.1567
5.0784	3.0306	0.2601	2.9908	0.2145	2.9501	0.1694
5.0958	3.0407	0.2794	3.0029	0.2318	2.9646	0.1831
5.1132	3.0496	0.2992	3.014	0.25	2.9786	0.1978
5.1306	3.0572	0.3194	3.0239	0.2689	2.9922	0.2136
5.148	3.0636	0.3398	3.0327	0.2883	3.0051	0.2303
5.1654	3.0688	0.3602	3.0401	0.3083	3.0172	0.248

5.1828	3.0728	0.3805	3.0462	0.3284	3.0285	0.2666
5.2002	3.0757	0.4005	3.0509	0.3486	3.0388	0.2861
5.2176	3.0776	0.4202	3.0543	0.3687	3.0479	0.3063
5.235	3.0786	0.4394	3.0565	0.3884	3.0559	0.3272
5.2524	3.0788	0.4581	3.0574	0.4077	3.0624	0.3486
5.2697	3.0782	0.4763	3.0574	0.4263	3.0675	0.3703
5.2871	3.077	0.4938	3.0564	0.4442	3.071	0.3921
5.3045	3.0753	0.5107	3.0547	0.4612	3.073	0.4138
5.3219	3.0731	0.527	3.0524	0.4775	3.0734	0.4351
5.3393	3.0707	0.5427	3.0497	0.4928	3.0725	0.4558
5.3567	3.0679	0.5578	3.0468	0.5073	3.0702	0.4757
5.3741	3.065	0.5723	3.0437	0.5211	3.0669	0.4945
5.3915	3.0619	0.5863	3.0405	0.5341	3.0628	0.5123
5.4089	3.0588	0.5998	3.0374	0.5465	3.058	0.5289
5.4263	3.0556	0.6128	3.0344	0.5582	3.0529	0.5443
5.4437	3.0523	0.6254	3.0316	0.5695	3.0475	0.5586
5.4611	3.0491	0.6376	3.029	0.5804	3.0422	0.5719
5.4784	3.046	0.6493	3.0266	0.5909	3.0371	0.5842
5.4958	3.0429	0.6608	3.0244	0.6011	3.0323	0.5957
5.5132	3.04	0.6719	3.0225	0.6111	3.0278	0.6066
5.5306	3.0372	0.6828	3.0207	0.6209	3.0237	0.617
5.548	3.0347	0.6935	3.0193	0.6306	3.02	0.6271
5.5654	3.0322	0.704	3.018	0.6402	3.0167	0.6369
5.5828	3.0299	0.7145	3.0168	0.6499	3.0137	0.6465
5.6002	3.0277	0.725	3.0159	0.6596	3.011	0.656
5.6176	3.0256	0.7355	3.015	0.6693	3.0085	0.6655
5.635	3.0235	0.7461	3.0141	0.6792	3.0062	0.6751
5.6524	3.0214	0.7566	3.0133	0.6891	3.004	0.6846
5.6698	3.0192	0.7672	3.0124	0.6991	3.0018	0.6942
5.6872	3.0168	0.7779	3.0114	0.7092	2.9997	0.7039
5.7045	3.0144	0.7885	3.0103	0.7194	2.9975	0.7135
5.7219	3.0118	0.799	3.0091	0.7296	2.9952	0.7231
5.7393	3.009	0.8095	3.0076	0.7398	2.9928	0.7327
5.7567	3.006	0.8199	3.006	0.75	2.9903	0.7422
5.7741	3.0029	0.8301	3.0041	0.7601	2.9877	0.7516
5.7915	2.9997	0.8401	3.0021	0.7701	2.985	0.7609
5.8089	2.9963	0.85	2.9999	0.7799	2.9823	0.7701
5.8263	2.9929	0.8597	2.9975	0.7895	2.9794	0.779

5.8437	2.9893	0.8691	2.995	0.7989	2.9766	0.7878
5.8611	2.9857	0.8783	2.9924	0.808	2.9736	0.7965
5.8785	2.982	0.8873	2.9898	0.8169	2.9707	0.805
5.8959	2.9784	0.896	2.9872	0.8255	2.9678	0.8133
5.9132	2.9748	0.9045	2.9846	0.8339	2.9648	0.8215
5.9306	2.9712	0.9128	2.982	0.8421	2.9619	0.8294
5.948	2.9678	0.9208	2.9796	0.85	2.959	0.8373
5.9654	2.9645	0.9286	2.9773	0.8577	2.956	0.8449
5.9828	2.9613	0.9363	2.9751	0.8653	2.9532	0.8524
6.0002	2.9582	0.9438	2.9731	0.8727	2.9503	0.8597
6.0176	2.9554	0.9512	2.9713	0.88	2.9475	0.8669
6.035	2.9526	0.9585	2.9697	0.8873	2.9447	0.8738
6.0524	2.9501	0.9658	2.9682	0.8944	2.942	0.8806
6.0698	2.9477	0.973	2.9669	0.9016	2.9395	0.8871
6.0872	2.9454	0.9802	2.9658	0.9088	2.937	0.8935
6.1046	2.9432	0.9874	2.9648	0.916	2.9347	0.8996
6.1219	2.9412	0.9946	2.964	0.9232	2.9326	0.9056
6.1393	2.9393	1.0018	2.9632	0.9305	2.9307	0.9114
6.1567	2.9375	1.009	2.9626	0.9378	2.9291	0.917
6.1741	2.9357	1.0162	2.9621	0.9452	2.9277	0.9226
6.1915	2.9341	1.0234	2.9616	0.9526	2.9266	0.928
6.2089	2.9326	1.0306	2.9613	0.96	2.9258	0.9335
6.2263	2.9311	1.0379	2.961	0.9675	2.9254	0.9389
6.2437	2.9298	1.0451	2.9608	0.9751	2.9252	0.9444
6.2611	2.9285	1.0524	2.9608	0.9827	2.9253	0.95
6.2785	2.9273	1.0598	2.9608	0.9904	2.9258	0.9556
6.2959	2.9262	1.0672	2.9609	0.9981	2.9265	0.9615
6.3133	2.9252	1.0746	2.9612	1.006	2.9274	0.9675
6.3307	2.9242	1.082	2.9615	1.014	2.9286	0.9738
6.348	2.9233	1.0895	2.9618	1.0222	2.93	0.9803
6.3654	2.9225	1.0971	2.9623	1.0305	2.9315	0.9871
6.3828	2.9217	1.1046	2.9627	1.0389	2.9331	0.9941
6.4002	2.921	1.1122	2.9631	1.0475	2.9349	1.0014
6.4176	2.9204	1.1198	2.9635	1.0562	2.9367	1.0089
6.435	2.9199	1.1274	2.9638	1.065	2.9385	1.0168
6.4524	2.9196	1.135	2.9641	1.074	2.9403	1.0248
6.4698	2.9193	1.1426	2.9644	1.0829	2.9422	1.0331
6.4872	2.9193	1.1503	2.9645	1.0919	2.944	1.0416

6.5046	2.9194	1.1581	2.9647	1.1009	2.9458	1.0503
6.522	2.9198	1.1659	2.9649	1.1099	2.9476	1.0593
6.5394	2.9203	1.1739	2.9651	1.1189	2.9493	1.0684
6.5567	2.9212	1.182	2.9654	1.1279	2.951	1.0778
6.5741	2.9222	1.1904	2.9658	1.1369	2.9527	1.0873
6.5915	2.9235	1.199	2.9663	1.1459	2.9543	1.097
6.6089	2.9249	1.208	2.9669	1.155	2.9558	1.1069
6.6263	2.9265	1.2173	2.9677	1.1642	2.9573	1.117
6.6437	2.9283	1.227	2.9687	1.1735	2.9587	1.1273
6.6611	2.9301	1.2371	2.9698	1.183	2.96	1.1378
6.6785	2.9319	1.2477	2.9711	1.1927	2.9613	1.1484
6.6959	2.9336	1.2587	2.9725	1.2025	2.9624	1.1592
6.7133	2.9353	1.2702	2.9741	1.2127	2.9634	1.1702
6.7307	2.9368	1.282	2.9758	1.2231	2.9643	1.1814
6.7481	2.9382	1.2942	2.9776	1.2338	2.965	1.1926
6.7654	2.9393	1.3068	2.9794	1.2449	2.9656	1.204
6.7828	2.9403	1.3197	2.9813	1.2563	2.966	1.2154
6.8002	2.9409	1.3328	2.9832	1.268	2.9664	1.2268
6.8176	2.9414	1.3462	2.9851	1.28	2.9666	1.2383
6.835	2.9417	1.3598	2.9869	1.2924	2.9668	1.2498
6.8524	2.9418	1.3736	2.9887	1.3051	2.9669	1.2613
6.8698	2.9417	1.3876	2.9905	1.3181	2.9671	1.2727
6.8872	2.9416	1.4018	2.9922	1.3314	2.9673	1.2842
6.9046	2.9413	1.4162	2.9939	1.345	2.9677	1.2956
6.922	2.9409	1.4309	2.9955	1.359	2.9682	1.3071
6.9394	2.9405	1.4458	2.9972	1.3733	2.9689	1.3187
6.9568	2.94	1.4611	2.9988	1.388	2.9699	1.3304
6.9742	2.9394	1.4768	3.0004	1.4031	2.9712	1.3424
6.9915	2.9388	1.4929	3.0021	1.4187	2.9728	1.3546
7.0089	2.9381	1.5095	3.0037	1.4348	2.9748	1.3672
7.0263	2.9372	1.5267	3.0052	1.4514	2.977	1.3804
7.0437	2.9361	1.5445	3.0067	1.4687	2.9795	1.3941
7.0611	2.9347	1.563	3.008	1.4866	2.9821	1.4086
7.0785	2.933	1.5822	3.0092	1.5053	2.9849	1.4237
7.0959	2.9308	1.6022	3.0101	1.5247	2.9877	1.4397
7.1133	2.9281	1.623	3.0106	1.545	2.9904	1.4566
7.1307	2.9246	1.6446	3.0107	1.566	2.9929	1.4743
7.1481	2.9202	1.6671	3.0102	1.5879	2.9953	1.4929

7.1655	2.9148	1.6904	3.0091	1.6107	2.9972	1.5124
7.1829	2.9081	1.7144	3.0073	1.6342	2.9988	1.5328
7.2002	2.9001	1.739	3.0047	1.6585	2.9999	1.5542
7.2176	2.8905	1.764	3.0011	1.6836	3.0003	1.5764
7.235	2.8791	1.7893	2.9966	1.7095	3.0001	1.5997
7.2524	2.8659	1.8147	2.9909	1.7361	2.999	1.6238
7.2698	2.8508	1.8398	2.984	1.7633	2.997	1.6487
7.2872	2.8338	1.8643	2.9757	1.7911	2.9939	1.6745
7.3046	2.8149	1.8879	2.966	1.8195	2.9897	1.7011
7.322	2.7943	1.9103	2.9547	1.8483	2.9841	1.7283
7.3394	2.7723	1.9313	2.9417	1.8773	2.9773	1.756
7.3568	2.749	1.9505	2.9268	1.9066	2.9691	1.7841
7.3742	2.725	1.9679	2.9101	1.9358	2.9594	1.8126
7.3916	2.7006	1.9835	2.8914	1.9649	2.9482	1.8413
7.4089	2.6761	1.9974	2.8705	1.9935	2.9355	1.8702
7.4263	2.6519	2.0098	2.8476	2.0214	2.9213	1.8991
7.4437	2.6281	2.021	2.8225	2.0483	2.9054	1.9279
7.4611	2.6048	2.0312	2.7953	2.0739	2.888	1.9565
7.4785	2.582	2.0409	2.7662	2.0978	2.8691	1.9847
7.4959	2.5597	2.0501	2.7356	2.1195	2.8487	2.0126
7.5133	2.5377	2.0591	2.7039	2.139	2.8269	2.04
7.5307	2.5158	2.0681	2.6716	2.1561	2.8037	2.0669
7.5481	2.4939	2.0771	2.6392	2.1711	2.7791	2.0934
7.5655	2.4717	2.0861	2.6072	2.1843	2.7532	2.1194
7.5829	2.4491	2.0953	2.5757	2.1961	2.7257	2.1452
7.6003	2.4259	2.1044	2.5447	2.2071	2.6967	2.1707
7.6177	2.4019	2.1135	2.514	2.2178	2.6657	2.1958
7.635	2.377	2.1226	2.4832	2.2284	2.6325	2.2205
7.6524	2.351	2.1315	2.4518	2.2391	2.5967	2.2444
7.6698	2.3235	2.1401	2.419	2.2497	2.5581	2.2671
7.6872	2.2942	2.1482	2.3843	2.2598	2.5166	2.2881
7.7046	2.2631	2.1553	2.3476	2.2687	2.4722	2.3068
7.722	2.2299	2.1609	2.3088	2.2754	2.425	2.3224
7.7394	2.1947	2.1644	2.2684	2.2794	2.3756	2.3344
7.7568	2.1577	2.1654	2.2272	2.2802	2.3244	2.3426
7.7742	2.1192	2.1632	2.1858	2.278	2.272	2.3464
7.7916	2.0797	2.1576	2.1447	2.2728	2.2188	2.3458
7.809	2.0398	2.1482	2.1042	2.2651	2.1656	2.3407

7.8264	1.9998	2.1349	2.0642	2.2551	2.1129	2.331
7.8437	1.9605	2.1176	2.0246	2.2429	2.0613	2.3171
7.8611	1.9222	2.0963	1.9855	2.2284	2.0111	2.299
7.8785	1.8855	2.0709	1.9467	2.2113	1.9628	2.2773
7.8959	1.8507	2.0415	1.9086	2.1915	1.9164	2.2522
7.9133	1.8185	2.0082	1.8712	2.1688	1.8718	2.2239
7.9307	1.7894	1.9709	1.8349	2.1429	1.829	2.1922
7.9481	1.7641	1.9298	1.8001	2.1136	1.788	2.1567
7.9655	1.7434	1.8851	1.7673	2.0807	1.7495	2.1169
7.9829	1.7281	1.8375	1.7373	2.0442	1.7143	2.0724
8.0003	1.7191	1.7876	1.7108	2.0044	1.6837	2.0233
8.0177	1.717	1.7367	1.6886	1.9615	1.6591	1.9704
8.0351	1.7219	1.6858	1.6714	1.9165	1.6414	1.9146
8.0524	1.7339	1.6365	1.6595	1.8702	1.6311	1.8575
8.0698	1.7524	1.5898	1.6531	1.8235	1.6283	1.8001
8.0872	1.7768	1.5468	1.6519	1.7773	1.6329	1.7438
8.1046	1.8061	1.5082	1.6556	1.7322	1.6445	1.6897
8.122	1.8394	1.4744	1.6639	1.6888	1.6627	1.6386
8.1394	1.876	1.4454	1.6762	1.6474	1.6871	1.5914
8.1568	1.915	1.4213	1.6924	1.6081	1.7169	1.549
8.1742	1.956	1.402	1.7123	1.5712	1.7514	1.5119
8.1916	1.9987	1.3873	1.7358	1.537	1.7899	1.4809
8.209	2.0427	1.3774	1.7628	1.506	1.8313	1.4565
8.2264	2.0878	1.3722	1.793	1.4786	1.8745	1.4388
8.2438	2.1337	1.3719	1.826	1.4555	1.9186	1.4282
8.2612	2.1801	1.3767	1.8612	1.437	1.9623	1.4243
8.2785	2.2266	1.3867	1.8978	1.4236	2.0048	1.427
8.2959	2.2728	1.402	1.935	1.4152	2.045	1.4356
8.3133	2.3182	1.4229	1.9719	1.412	2.0824	1.4498
8.3307	2.3623	1.4496	2.0077	1.4134	2.1162	1.4688
8.3481	2.4042	1.4822	2.0418	1.4192	2.1459	1.492
8.3655	2.4431	1.5208	2.0736	1.4286	2.1711	1.5187
8.3829	2.478	1.5652	2.1029	1.441	2.1913	1.5481
8.4003	2.5079	1.615	2.1296	1.4557	2.2064	1.5793
8.4177	2.5318	1.6695	2.1537	1.4721	2.2162	1.6113
8.4351	2.5488	1.7277	2.1757	1.4897	2.2211	1.6432
8.4525	2.5584	1.7886	2.196	1.5083	2.2214	1.6741
8.4699	2.5602	1.8509	2.2149	1.5281	2.218	1.7035

8.4872	2.554	1.9134	2.2327	1.5495	2.2113	1.7312
8.5046	2.5399	1.9748	2.2491	1.5728	2.2019	1.7571
8.522	2.5183	2.034	2.2635	1.5985	2.19	1.7812
8.5394	2.4898	2.0898	2.2753	1.6262	2.176	1.8035
8.5568	2.455	2.1412	2.2836	1.6555	2.1598	1.8238
8.5742	2.415	2.1874	2.2883	1.6857	2.1417	1.8418
8.5916	2.3705	2.228	2.2892	1.7158	2.1221	1.8573
8.609	2.3228	2.2626	2.2865	1.7451	2.1013	1.8701
8.6264	2.2727	2.2909	2.2808	1.7728	2.0798	1.8802
8.6438	2.2213	2.3129	2.2729	1.7987	2.0582	1.8877
8.6612	2.1696	2.3287	2.2636	1.8228	2.0367	1.8927
8.6786	2.1185	2.3389	2.2534	1.8456	2.0156	1.8956
8.6959	2.0686	2.3439	2.2423	1.8674	1.9951	1.8965
8.7133	2.0204	2.3442	2.23	1.8887	1.9751	1.8956
8.7307	1.9742	2.3403	2.2162	1.9093	1.956	1.8929
8.7481	1.9303	2.3327	2.2008	1.9289	1.9378	1.8885
8.7655	1.889	2.3217	2.1837	1.9472	1.9209	1.8827
8.7829	1.8505	2.308	2.1651	1.9638	1.9053	1.8757
8.8003	1.8149	2.2918	2.1455	1.9784	1.8911	1.8678
8.8177	1.7821	2.2737	2.125	1.9909	1.8783	1.8592
8.8351	1.7522	2.254	2.1043	2.0013	1.8667	1.8501
8.8525	1.7252	2.2328	2.0835	2.0097	1.8565	1.8406
8.8699	1.7012	2.2105	2.0631	2.0163	1.8475	1.8309
8.8873	1.6802	2.1875	2.0433	2.0212	1.8399	1.8213
8.9047	1.6622	2.1641	2.0243	2.0249	1.8333	1.812
8.922	1.6472	2.1408	2.0063	2.0277	1.8276	1.8033
8.9394	1.6351	2.1179	1.9891	2.0303	1.8222	1.7952
8.9568	1.6254	2.096	1.9724	2.033	1.8168	1.7878
8.9742	1.6179	2.0753	1.9554	2.0361	1.8109	1.7804
8.9916	1.6119	2.0557	1.9374	2.0394	1.8043	1.7726
9.009	1.6073	2.0374	1.9177	2.042	1.7973	1.7635
9.0264	1.6039	2.0202	1.8962	2.0431	1.7906	1.7529
9.0438	1.6014	2.0041	1.8734	2.0416	1.7847	1.7406
9.0612	1.5999	1.9892	1.8502	2.0369	1.7805	1.7269
9.0786	1.5989	1.9757	1.8275	2.0288	1.7781	1.7124
9.096	1.5982	1.9636	1.8064	2.0178	1.7778	1.6975
9.1134	1.5972	1.9528	1.7874	2.0044	1.7795	1.6827
9.1307	1.5952	1.9429	1.7708	1.9892	1.7829	1.6683

9.1481	1.592	1.933	1.7564	1.9729	1.7879	1.6545
9.1655	1.5876	1.9224	1.7442	1.9556	1.7942	1.6414
9.1829	1.5827	1.9102	1.734	1.9376	1.8018	1.6289
9.2003	1.5781	1.896	1.7261	1.9189	1.8108	1.6172
9.2177	1.5747	1.8799	1.7203	1.8998	1.821	1.6064
9.2351	1.5733	1.8623	1.7168	1.8804	1.8324	1.5967
9.2525	1.5743	1.8439	1.7156	1.861	1.8447	1.5884
9.2699	1.5776	1.8253	1.7166	1.8419	1.8575	1.5816
9.2873	1.583	1.807	1.7198	1.8233	1.8705	1.5761
9.3047	1.5904	1.789	1.7251	1.8053	1.8833	1.5716
9.3221	1.5995	1.7712	1.7323	1.7881	1.8958	1.5676
9.3394	1.6107	1.7536	1.7413	1.7718	1.9084	1.5636
9.3568	1.6243	1.7362	1.7523	1.7564	1.9216	1.5594
9.3742	1.6407	1.7194	1.7651	1.7423	1.9358	1.5553
9.3916	1.6603	1.7039	1.7797	1.7296	1.9515	1.5517
9.409	1.6829	1.6904	1.7958	1.7184	1.9686	1.5492
9.4264	1.7082	1.6797	1.8133	1.709	1.9867	1.5482
9.4438	1.7358	1.6721	1.832	1.7014	2.0056	1.5488
9.4612	1.7652	1.668	1.8517	1.6956	2.0248	1.5509
9.4786	1.7958	1.6677	1.8723	1.6916	2.0442	1.5545
9.496	1.8273	1.6714	1.8937	1.6895	2.0637	1.5592
9.5134	1.8591	1.6793	1.9158	1.6894	2.0835	1.5652
9.5308	1.8906	1.6917	1.9385	1.6913	2.1036	1.5724
9.5482	1.9209	1.7084	1.9616	1.6952	2.124	1.581
9.5655	1.9492	1.7292	1.985	1.7013	2.1447	1.5911
9.5829	1.975	1.7538	2.0086	1.7093	2.1655	1.603
9.6003	1.9975	1.7813	2.0322	1.7195	2.1862	1.6167
9.6177	2.0166	1.8112	2.056	1.7319	2.2065	1.6323
9.6351	2.032	1.8426	2.0796	1.7465	2.226	1.6497
9.6525	2.0439	1.875	2.1031	1.7636	2.2445	1.6686
9.6699	2.0525	1.9075	2.1262	1.7833	2.2619	1.6887
9.6873	2.0583	1.9398	2.1486	1.8058	2.2783	1.7096
9.7047	2.0618	1.9716	2.17	1.8313	2.2939	1.7311
9.7221	2.0634	2.0032	2.1897	1.8599	2.3092	1.7532
9.7395	2.0631	2.0348	2.207	1.8914	2.3243	1.7762
9.7569	2.0608	2.0662	2.2211	1.9254	2.3393	1.8004
9.7742	2.0563	2.0974	2.2316	1.961	2.3541	1.8261
9.7916	2.0497	2.1278	2.2383	1.997	2.3686	1.8533

9.809	2.0414	2.1572	2.2419	2.0327	2.3825	1.8824
9.8264	2.0318	2.1856	2.2431	2.0676	2.3958	1.9136
9.8438	2.0211	2.2132	2.2423	2.1018	2.408	1.947
9.8612	2.0093	2.2401	2.2401	2.1355	2.4186	1.9829
9.8786	1.9964	2.2666	2.2365	2.1689	2.427	2.0211
9.896	1.9821	2.2923	2.2317	2.2022	2.4326	2.0613
9.9134	1.9666	2.3172	2.2254	2.2355	2.435	2.103
9.9308	1.95	2.3411	2.2178	2.2687	2.4339	2.1456
9.9482	1.9325	2.364	2.2085	2.302	2.4294	2.1885
9.9656	1.9141	2.3859	2.1976	2.3352	2.4215	2.2313
9.9829	1.8949	2.4068	2.1849	2.3682	2.4103	2.2736
10	1.8749	2.4267	2.1704	2.401	2.396	2.315

Table S12: Values of photon energy and corresponding complex dielectric function in two distinct directions of disordered wurtzite and one isotropic direction of disordered rocksalt crystal structure in $MgSnN_2$.

Disordered Wurtzite					Disordered Rocksalt		
Photon Energy (eV)	$\parallel$-direction		$\perp$-direction		Photon Energy (eV)	ε_1	ε_2
	ε_1	ε_2	ε_1	ε_2			
0	2.5691	0	2.5884	0	0	3.209	0
0.0182	2.5691	0.0001	2.5884	0.0001	0.018	3.209	0.0002
0.0363	2.5691	0.0002	2.5884	0.0001	0.035	3.209	0.0003
0.0545	2.5692	0.0002	2.5884	0.0002	0.053	3.2091	0.0005
0.0726	2.5692	0.0003	2.5885	0.0003	0.07	3.2092	0.0006
0.0908	2.5693	0.0004	2.5885	0.0003	0.088	3.2093	0.0008
0.1089	2.5694	0.0005	2.5886	0.0004	0.105	3.2095	0.0009
0.1271	2.5695	0.0005	2.5887	0.0005	0.123	3.2096	0.0011
0.1452	2.5696	0.0006	2.5888	0.0005	0.14	3.2099	0.0013
0.1634	2.5697	0.0007	2.5889	0.0006	0.158	3.2101	0.0014
0.1815	2.5698	0.0008	2.589	0.0007	0.175	3.2104	0.0016
0.1997	2.5699	0.0008	2.5891	0.0008	0.193	3.2106	0.0017
0.2178	2.5701	0.0009	2.5893	0.0008	0.211	3.211	0.0019
0.236	2.5703	0.001	2.5894	0.0009	0.228	3.2113	0.0021
0.2541	2.5705	0.0011	2.5896	0.001	0.246	3.2117	0.0022
0.2723	2.5707	0.0011	2.5898	0.001	0.263	3.2121	0.0024
0.2904	2.5709	0.0012	2.59	0.0011	0.281	3.2125	0.0025
0.3086	2.5711	0.0013	2.5902	0.0012	0.298	3.213	0.0027
0.3267	2.5713	0.0014	2.5904	0.0012	0.316	3.2135	0.0029
0.3449	2.5716	0.0014	2.5906	0.0013	0.333	3.214	0.003
0.363	2.5719	0.0015	2.5909	0.0014	0.351	3.2145	0.0032
0.3812	2.5721	0.0016	2.5911	0.0014	0.368	3.2151	0.0033
0.3993	2.5724	0.0017	2.5914	0.0015	0.386	3.2157	0.0035
0.4175	2.5727	0.0017	2.5917	0.0016	0.404	3.2163	0.0037
0.4356	2.5731	0.0018	2.592	0.0017	0.421	3.217	0.0038
0.4538	2.5734	0.0019	2.5923	0.0017	0.439	3.2176	0.004
0.4719	2.5738	0.002	2.5926	0.0018	0.456	3.2184	0.0042
0.4901	2.5741	0.0021	2.5929	0.0019	0.474	3.2191	0.0043
0.5082	2.5745	0.0021	2.5933	0.0019	0.491	3.2199	0.0045
0.5264	2.5749	0.0022	2.5936	0.002	0.509	3.2207	0.0046
0.5445	2.5753	0.0023	2.594	0.0021	0.526	3.2215	0.0048

0.5627	2.5757	0.0024	2.5944	0.0021	0.544	3.2224	0.005
0.5808	2.5762	0.0024	2.5948	0.0022	0.561	3.2232	0.0052
0.599	2.5766	0.0025	2.5952	0.0023	0.579	3.2242	0.0053
0.6171	2.5771	0.0026	2.5956	0.0024	0.596	3.2251	0.0055
0.6353	2.5776	0.0027	2.596	0.0024	0.614	3.2261	0.0057
0.6534	2.578	0.0028	2.5965	0.0025	0.632	3.2271	0.0058
0.6716	2.5786	0.0028	2.5969	0.0026	0.649	3.2281	0.006
0.6897	2.5791	0.0029	2.5974	0.0026	0.667	3.2292	0.0062
0.7079	2.5796	0.003	2.5979	0.0027	0.684	3.2303	0.0063
0.726	2.5802	0.0031	2.5984	0.0028	0.702	3.2314	0.0065
0.7442	2.5807	0.0032	2.5989	0.0029	0.719	3.2326	0.0067
0.7623	2.5813	0.0032	2.5994	0.0029	0.737	3.2338	0.0069
0.7805	2.5819	0.0033	2.6	0.003	0.754	3.235	0.0071
0.7986	2.5825	0.0034	2.6005	0.0031	0.772	3.2362	0.0072
0.8168	2.5831	0.0035	2.6011	0.0032	0.789	3.2375	0.0074
0.8349	2.5838	0.0036	2.6017	0.0032	0.807	3.2388	0.0076
0.8531	2.5844	0.0037	2.6023	0.0033	0.824	3.2402	0.0078
0.8712	2.5851	0.0037	2.6029	0.0034	0.842	3.2416	0.008
0.8894	2.5858	0.0038	2.6035	0.0034	0.86	3.243	0.0081
0.9075	2.5865	0.0039	2.6041	0.0035	0.877	3.2444	0.0083
0.9257	2.5872	0.004	2.6048	0.0036	0.895	3.2459	0.0085
0.9438	2.5879	0.0041	2.6054	0.0037	0.912	3.2474	0.0087
0.962	2.5887	0.0042	2.6061	0.0037	0.93	3.2489	0.0089
0.9801	2.5894	0.0042	2.6068	0.0038	0.947	3.2505	0.0091
0.9983	2.5902	0.0043	2.6075	0.0039	0.965	3.2521	0.0093
1.0164	2.591	0.0044	2.6082	0.004	0.982	3.2537	0.0095
1.0346	2.5918	0.0045	2.6089	0.0041	1	3.2554	0.0097
1.0527	2.5926	0.0046	2.6097	0.0041	1.017	3.2571	0.0099
1.0709	2.5935	0.0047	2.6104	0.0042	1.035	3.2589	0.0101
1.089	2.5943	0.0048	2.6112	0.0043	1.053	3.2606	0.0103
1.1072	2.5952	0.0049	2.612	0.0044	1.07	3.2625	0.0105
1.1254	2.5961	0.0049	2.6128	0.0044	1.088	3.2643	0.0107
1.1435	2.597	0.005	2.6136	0.0045	1.105	3.2662	0.0109
1.1617	2.5979	0.0051	2.6144	0.0046	1.123	3.2681	0.0111
1.1798	2.5989	0.0052	2.6153	0.0047	1.14	3.2701	0.0113
1.198	2.5998	0.0053	2.6161	0.0048	1.158	3.2721	0.0115
1.2161	2.6008	0.0054	2.617	0.0048	1.175	3.2741	0.0117
1.2343	2.6018	0.0055	2.6179	0.0049	1.193	3.2762	0.0119

1.2524	2.6028	0.0056	2.6188	0.005	1.21	3.2783	0.0121
1.2706	2.6038	0.0057	2.6197	0.0051	1.228	3.2804	0.0123
1.2887	2.6048	0.0058	2.6206	0.0052	1.245	3.2826	0.0126
1.3069	2.6059	0.0059	2.6216	0.0052	1.263	3.2848	0.0128
1.325	2.607	0.0059	2.6225	0.0053	1.281	3.2871	0.013
1.3432	2.608	0.006	2.6235	0.0054	1.298	3.2894	0.0132
1.3613	2.6091	0.0061	2.6245	0.0055	1.316	3.2917	0.0135
1.3795	2.6103	0.0062	2.6255	0.0056	1.333	3.2941	0.0137
1.3976	2.6114	0.0063	2.6265	0.0057	1.351	3.2965	0.0139
1.4158	2.6126	0.0064	2.6275	0.0057	1.368	3.299	0.0142
1.4339	2.6137	0.0065	2.6286	0.0058	1.386	3.3015	0.0144
1.4521	2.6149	0.0066	2.6297	0.0059	1.403	3.304	0.0147
1.4702	2.6161	0.0067	2.6307	0.006	1.421	3.3066	0.0149
1.4884	2.6174	0.0068	2.6318	0.0061	1.438	3.3092	0.0152
1.5065	2.6186	0.0069	2.6329	0.0062	1.456	3.3119	0.0154
1.5247	2.6199	0.007	2.6341	0.0063	1.474	3.3146	0.0157
1.5428	2.6212	0.0071	2.6352	0.0064	1.491	3.3174	0.0159
1.561	2.6225	0.0072	2.6364	0.0064	1.509	3.3202	0.0162
1.5791	2.6238	0.0073	2.6376	0.0065	1.526	3.3231	0.0165
1.5973	2.6251	0.0075	2.6388	0.0066	1.544	3.326	0.0167
1.6154	2.6265	0.0076	2.64	0.0067	1.561	3.3289	0.017
1.6336	2.6279	0.0077	2.6412	0.0068	1.579	3.3319	0.0173
1.6517	2.6293	0.0078	2.6424	0.0069	1.596	3.335	0.0176
1.6699	2.6307	0.0079	2.6437	0.007	1.614	3.3381	0.0179
1.688	2.6321	0.008	2.645	0.0071	1.631	3.3412	0.0182
1.7062	2.6336	0.0081	2.6463	0.0072	1.649	3.3444	0.0184
1.7243	2.6351	0.0082	2.6476	0.0073	1.666	3.3477	0.0187
1.7425	2.6366	0.0083	2.6489	0.0074	1.684	3.351	0.0191
1.7606	2.6381	0.0084	2.6503	0.0075	1.702	3.3544	0.0194
1.7788	2.6396	0.0086	2.6516	0.0076	1.719	3.3578	0.0197
1.7969	2.6412	0.0087	2.653	0.0077	1.737	3.3612	0.02
1.8151	2.6428	0.0088	2.6544	0.0078	1.754	3.3648	0.0203
1.8332	2.6444	0.0089	2.6558	0.0079	1.772	3.3683	0.0207
1.8514	2.646	0.009	2.6573	0.008	1.789	3.372	0.021
1.8695	2.6477	0.0091	2.6587	0.0081	1.807	3.3757	0.0213
1.8877	2.6493	0.0093	2.6602	0.0082	1.824	3.3794	0.0217
1.9058	2.651	0.0094	2.6617	0.0083	1.842	3.3833	0.022
1.924	2.6527	0.0095	2.6632	0.0084	1.859	3.3872	0.0224

1.9421	2.6545	0.0096	2.6647	0.0085	1.877	3.3911	0.0228
1.9603	2.6562	0.0098	2.6663	0.0086	1.895	3.3951	0.0231
1.9784	2.658	0.0099	2.6678	0.0087	1.912	3.3992	0.0235
1.9966	2.6598	0.01	2.6694	0.0088	1.93	3.4033	0.0239
2.0147	2.6616	0.0102	2.671	0.0089	1.947	3.4076	0.0243
2.0329	2.6635	0.0103	2.6726	0.009	1.965	3.4118	0.0247
2.051	2.6654	0.0104	2.6743	0.0091	1.982	3.4162	0.0251
2.0692	2.6673	0.0106	2.6759	0.0092	2	3.4206	0.0256
2.0873	2.6692	0.0107	2.6776	0.0093	2.017	3.4251	0.026
2.1055	2.6712	0.0108	2.6793	0.0095	2.035	3.4297	0.0265
2.1236	2.6731	0.011	2.6811	0.0096	2.052	3.4344	0.0269
2.1418	2.6751	0.0111	2.6828	0.0097	2.07	3.4391	0.0274
2.1599	2.6772	0.0113	2.6846	0.0098	2.087	3.4439	0.0279
2.1781	2.6792	0.0114	2.6864	0.0099	2.105	3.4488	0.0284
2.1962	2.6813	0.0115	2.6882	0.01	2.123	3.4538	0.0289
2.2144	2.6834	0.0117	2.69	0.0102	2.14	3.4589	0.0294
2.2325	2.6855	0.0118	2.6919	0.0103	2.158	3.4641	0.0299
2.2507	2.6877	0.012	2.6937	0.0104	2.175	3.4693	0.0305
2.2689	2.6899	0.0122	2.6956	0.0105	2.193	3.4747	0.031
2.287	2.6921	0.0123	2.6975	0.0107	2.21	3.4802	0.0316
2.3052	2.6943	0.0125	2.6995	0.0108	2.228	3.4857	0.0322
2.3233	2.6966	0.0126	2.7015	0.0109	2.245	3.4914	0.0328
2.3415	2.6989	0.0128	2.7034	0.011	2.263	3.4972	0.0334
2.3596	2.7013	0.013	2.7055	0.0112	2.28	3.5031	0.0341
2.3778	2.7036	0.0131	2.7075	0.0113	2.298	3.5091	0.0348
2.3959	2.706	0.0133	2.7096	0.0114	2.316	3.5152	0.0355
2.4141	2.7084	0.0135	2.7116	0.0116	2.333	3.5214	0.0362
2.4322	2.7109	0.0136	2.7137	0.0117	2.351	3.5278	0.0369
2.4504	2.7134	0.0138	2.7159	0.0118	2.368	3.5343	0.0377
2.4685	2.7159	0.014	2.718	0.012	2.386	3.5409	0.0385
2.4867	2.7184	0.0142	2.7202	0.0121	2.403	3.5477	0.0394
2.5048	2.721	0.0143	2.7224	0.0123	2.421	3.5546	0.0402
2.523	2.7236	0.0145	2.7247	0.0124	2.438	3.5616	0.0412
2.5411	2.7263	0.0147	2.7269	0.0126	2.456	3.5689	0.0421
2.5593	2.729	0.0149	2.7292	0.0127	2.473	3.5762	0.0431
2.5774	2.7317	0.0151	2.7315	0.0128	2.491	3.5838	0.0441
2.5956	2.7344	0.0153	2.7339	0.013	2.508	3.5915	0.0452
2.6137	2.7372	0.0155	2.7362	0.0132	2.526	3.5995	0.0464

2.6319	2.7401	0.0157	2.7386	0.0133	2.544	3.6076	0.0476
2.65	2.7429	0.0159	2.7411	0.0135	2.561	3.6159	0.0488
2.6682	2.7458	0.0161	2.7435	0.0136	2.579	3.6244	0.0502
2.6863	2.7488	0.0164	2.746	0.0138	2.596	3.6332	0.0516
2.7045	2.7518	0.0166	2.7485	0.014	2.614	3.6422	0.0531
2.7226	2.7548	0.0168	2.7511	0.0141	2.631	3.6514	0.0547
2.7408	2.7578	0.017	2.7536	0.0143	2.649	3.661	0.0564
2.7589	2.7609	0.0172	2.7562	0.0145	2.666	3.6708	0.0583
2.7771	2.7641	0.0175	2.7589	0.0146	2.684	3.6808	0.0603
2.7952	2.7673	0.0177	2.7615	0.0148	2.701	3.6913	0.0624
2.8134	2.7705	0.018	2.7642	0.015	2.719	3.702	0.0647
2.8315	2.7738	0.0182	2.767	0.0152	2.737	3.7131	0.0672
2.8497	2.7771	0.0185	2.7697	0.0154	2.754	3.7246	0.07
2.8678	2.7805	0.0187	2.7725	0.0155	2.772	3.7364	0.0731
2.886	2.7839	0.019	2.7754	0.0157	2.789	3.7487	0.0765
2.9041	2.7873	0.0193	2.7782	0.0159	2.807	3.7615	0.0803
2.9223	2.7908	0.0195	2.7811	0.0161	2.824	3.7747	0.0845
2.9404	2.7944	0.0198	2.7841	0.0163	2.842	3.7884	0.0894
2.9586	2.798	0.0201	2.787	0.0165	2.859	3.8025	0.0949
2.9767	2.8017	0.0204	2.7901	0.0167	2.877	3.817	0.1013
2.9949	2.8054	0.0207	2.7931	0.0169	2.894	3.8318	0.1087
3.013	2.8091	0.021	2.7962	0.0171	2.912	3.8467	0.1172
3.0312	2.813	0.0213	2.7993	0.0174	2.929	3.8615	0.127
3.0493	2.8169	0.0216	2.8025	0.0176	2.947	3.8758	0.1381
3.0675	2.8208	0.0219	2.8057	0.0178	2.965	3.8891	0.1504
3.0856	2.8248	0.0223	2.8089	0.018	2.982	3.9011	0.1634
3.1038	2.8288	0.0226	2.8122	0.0183	3	3.9114	0.1766
3.1219	2.833	0.0229	2.8155	0.0185	3.017	3.9203	0.1891
3.1401	2.8371	0.0233	2.8189	0.0187	3.035	3.9283	0.2001
3.1582	2.8414	0.0237	2.8223	0.019	3.052	3.9364	0.2093
3.1764	2.8457	0.024	2.8258	0.0192	3.07	3.9458	0.2167
3.1945	2.8501	0.0244	2.8293	0.0195	3.087	3.9576	0.2231
3.2127	2.8545	0.0248	2.8328	0.0198	3.105	3.9725	0.2297
3.2308	2.859	0.0252	2.8364	0.02	3.122	3.9905	0.2379
3.249	2.8636	0.0256	2.8401	0.0203	3.14	4.0113	0.249
3.2671	2.8683	0.026	2.8438	0.0206	3.158	4.0339	0.2643
3.2853	2.873	0.0265	2.8475	0.0208	3.175	4.0572	0.2845
3.3034	2.8779	0.0269	2.8513	0.0211	3.193	4.0796	0.3103

3.3216	2.8828	0.0274	2.8552	0.0214	3.21	4.0994	0.3417
3.3397	2.8878	0.0279	2.8591	0.0217	3.228	4.1145	0.378
3.3579	2.8928	0.0284	2.863	0.022	3.245	4.1231	0.4181
3.3761	2.898	0.0289	2.8671	0.0224	3.263	4.1241	0.4595
3.3942	2.9032	0.0294	2.8711	0.0227	3.28	4.1173	0.4998
3.4124	2.9086	0.0299	2.8753	0.023	3.298	4.1035	0.5364
3.4305	2.914	0.0305	2.8795	0.0234	3.315	4.0846	0.5676
3.4487	2.9196	0.0311	2.8837	0.0237	3.333	4.0627	0.5927
3.4668	2.9252	0.0317	2.888	0.0241	3.35	4.0396	0.6119
3.485	2.931	0.0323	2.8924	0.0244	3.368	4.0167	0.6256
3.5031	2.9369	0.0329	2.8969	0.0248	3.386	3.995	0.6342
3.5213	2.9429	0.0336	2.9014	0.0252	3.403	3.9756	0.6383
3.5394	2.949	0.0343	2.906	0.0256	3.421	3.9598	0.639
3.5576	2.9552	0.035	2.9106	0.026	3.438	3.9482	0.6378
3.5757	2.9616	0.0357	2.9154	0.0264	3.456	3.9408	0.6367
3.5939	2.9681	0.0365	2.9202	0.0268	3.473	3.9364	0.6373
3.612	2.9747	0.0373	2.925	0.0273	3.491	3.9332	0.6404
3.6302	2.9815	0.0382	2.93	0.0277	3.508	3.9294	0.6455
3.6483	2.9884	0.0391	2.9351	0.0282	3.526	3.924	0.6516
3.6665	2.9955	0.04	2.9402	0.0287	3.543	3.9167	0.6572
3.6846	3.0027	0.041	2.9454	0.0292	3.561	3.9078	0.6613
3.7028	3.0102	0.042	2.9507	0.0297	3.579	3.8979	0.6631
3.7209	3.0178	0.0431	2.9562	0.0303	3.596	3.8879	0.662
3.7391	3.0256	0.0442	2.9617	0.0308	3.614	3.8786	0.6577
3.7572	3.0336	0.0455	2.9673	0.0314	3.631	3.8713	0.6503
3.7754	3.0418	0.0468	2.973	0.032	3.649	3.8669	0.6405
3.7935	3.0502	0.0481	2.9788	0.0327	3.666	3.866	0.6292
3.8117	3.0588	0.0496	2.9847	0.0333	3.684	3.8687	0.6174
3.8298	3.0677	0.0512	2.9908	0.034	3.701	3.8745	0.6056
3.848	3.0769	0.0529	2.997	0.0347	3.719	3.8833	0.5937
3.8661	3.0863	0.0548	3.0033	0.0354	3.736	3.8955	0.5818
3.8843	3.096	0.0568	3.0097	0.0362	3.754	3.9121	0.57
3.9024	3.106	0.059	3.0163	0.037	3.771	3.9341	0.5597
3.9206	3.1163	0.0614	3.023	0.0379	3.789	3.9618	0.5527
3.9387	3.1268	0.064	3.0299	0.0388	3.807	3.9946	0.5514
3.9569	3.1377	0.0669	3.0369	0.0398	3.824	4.0311	0.5575
3.975	3.1489	0.0701	3.0441	0.0408	3.842	4.0688	0.5724
3.9932	3.1605	0.0737	3.0514	0.0419	3.859	4.1054	0.5964

4.0113	3.1723	0.0776	3.059	0.043	3.877	4.1382	0.6292
4.0295	3.1844	0.0819	3.0667	0.0442	3.894	4.1648	0.6697
4.0476	3.1968	0.0868	3.0746	0.0455	3.912	4.1832	0.7159
4.0658	3.2094	0.0921	3.0828	0.047	3.929	4.1921	0.7654
4.0839	3.2223	0.098	3.0911	0.0485	3.947	4.191	0.8154
4.1021	3.2353	0.1044	3.0997	0.0501	3.964	4.1803	0.863
4.1202	3.2484	0.1115	3.1085	0.0519	3.982	4.1619	0.9056
4.1384	3.2616	0.1193	3.1175	0.0539	4	4.1382	0.942
4.1565	3.2748	0.1276	3.1268	0.056	4.017	4.1116	0.9721
4.1747	3.2879	0.1367	3.1364	0.0584	4.035	4.084	0.997
4.1928	3.3009	0.1464	3.1462	0.061	4.052	4.0562	1.0182
4.211	3.3137	0.1567	3.1562	0.0638	4.07	4.0275	1.0372
4.2291	3.3262	0.1675	3.1665	0.0669	4.087	3.9967	1.0543
4.2473	3.3385	0.179	3.1771	0.0703	4.105	3.9621	1.0686
4.2654	3.3505	0.1909	3.1879	0.0741	4.122	3.9229	1.0781
4.2836	3.3621	0.2032	3.1989	0.0783	4.14	3.8795	1.0798
4.3017	3.3735	0.216	3.2101	0.0828	4.157	3.8344	1.0709
4.3199	3.3845	0.229	3.2215	0.0878	4.175	3.7914	1.05
4.338	3.3953	0.2424	3.2331	0.0932	4.192	3.7552	1.0175
4.3562	3.4059	0.2561	3.2449	0.0991	4.21	3.7296	0.9764
4.3743	3.4163	0.2701	3.2567	0.1056	4.228	3.7169	0.931
4.3925	3.4265	0.2844	3.2687	0.1126	4.245	3.7171	0.8859
4.4106	3.4367	0.2992	3.2807	0.1201	4.263	3.7283	0.8449
4.4288	3.4468	0.3143	3.2928	0.1282	4.28	3.7474	0.8102
4.4469	3.4568	0.33	3.3048	0.1369	4.298	3.7716	0.7824
4.4651	3.4667	0.3464	3.3168	0.1463	4.315	3.799	0.7611
4.4832	3.4764	0.3634	3.3288	0.1563	4.333	3.828	0.7457
4.5014	3.4859	0.3813	3.3406	0.1669	4.35	3.8578	0.736
4.5196	3.495	0.4	3.3523	0.1783	4.368	3.8871	0.7314
4.5377	3.5035	0.4196	3.3637	0.1904	4.385	3.9149	0.7315
4.5559	3.5113	0.4401	3.3749	0.2033	4.403	3.9403	0.7349
4.574	3.5182	0.4615	3.3857	0.2169	4.42	3.963	0.74
4.5922	3.5241	0.4836	3.396	0.2313	4.438	3.9838	0.7457
4.6103	3.5287	0.5064	3.4058	0.2465	4.456	4.0038	0.7512
4.6285	3.532	0.5297	3.4149	0.2624	4.473	4.0241	0.7572
4.6466	3.5339	0.5533	3.4233	0.2791	4.491	4.0452	0.7646
4.6648	3.5343	0.577	3.4307	0.2964	4.508	4.0663	0.7744
4.6829	3.5332	0.6006	3.4371	0.3144	4.526	4.0863	0.787

4.7011	3.5306	0.6239	3.4423	0.3329	4.543	4.1038	0.8019
4.7192	3.5265	0.6466	3.4463	0.3517	4.561	4.1179	0.8177
4.7374	3.5212	0.6687	3.4489	0.3707	4.578	4.1284	0.8326
4.7555	3.5146	0.6898	3.4501	0.3897	4.596	4.1361	0.8447
4.7737	3.5071	0.7099	3.4499	0.4085	4.613	4.1429	0.8525
4.7918	3.4986	0.7289	3.4483	0.4268	4.631	4.1514	0.8556
4.81	3.4895	0.7467	3.4453	0.4446	4.649	4.1646	0.8549
4.8281	3.4798	0.7633	3.4409	0.4615	4.666	4.1848	0.853
4.8463	3.4699	0.7786	3.4355	0.4773	4.684	4.2129	0.8535
4.8644	3.4598	0.7927	3.429	0.4919	4.701	4.2479	0.8604
4.8826	3.4497	0.8056	3.4218	0.5052	4.719	4.287	0.877
4.9007	3.4398	0.8173	3.4139	0.517	4.736	4.3259	0.9049
4.9189	3.4302	0.8279	3.4058	0.5272	4.754	4.36	0.9438
4.937	3.4212	0.8375	3.3975	0.5359	4.771	4.3851	0.9911
4.9552	3.4128	0.8462	3.3895	0.543	4.789	4.3987	1.0428
4.9733	3.4051	0.8542	3.3818	0.5486	4.806	4.4003	1.094
4.9915	3.3983	0.8617	3.3748	0.5527	4.824	4.3919	1.1405
5.0096	3.3924	0.8687	3.3687	0.5556	4.841	4.3772	1.1796
5.0278	3.3874	0.8755	3.3636	0.5573	4.859	4.3602	1.2113
5.0459	3.3834	0.8822	3.3597	0.5581	4.877	4.344	1.2378
5.0641	3.3804	0.8892	3.3572	0.5581	4.894	4.3291	1.2623
5.0822	3.3783	0.8965	3.3561	0.5576	4.912	4.3136	1.2872
5.1004	3.3769	0.9043	3.3567	0.5568	4.929	4.2942	1.3127
5.1185	3.3762	0.9129	3.3589	0.5559	4.947	4.2679	1.3365
5.1367	3.3759	0.9223	3.3627	0.5554	4.964	4.234	1.3538
5.1548	3.376	0.9327	3.3682	0.5553	4.982	4.1946	1.36
5.173	3.3761	0.944	3.3752	0.5562	4.999	4.1546	1.352
5.1911	3.3762	0.9564	3.3836	0.5581	5.017	4.1199	1.3296
5.2093	3.376	0.9697	3.3932	0.5615	5.034	4.0957	1.2955
5.2274	3.3753	0.984	3.4038	0.5665	5.052	4.0854	1.2538
5.2456	3.3739	0.9992	3.4151	0.5734	5.07	4.0904	1.2094
5.2637	3.3718	1.0152	3.4267	0.5823	5.087	4.1104	1.1668
5.2819	3.3688	1.0318	3.4382	0.5933	5.105	4.1441	1.1299
5.3	3.3647	1.0489	3.4493	0.6064	5.122	4.189	1.102
5.3182	3.3596	1.0664	3.4596	0.6215	5.14	4.2423	1.0854
5.3363	3.3533	1.0842	3.4687	0.6385	5.157	4.3006	1.0814
5.3545	3.3458	1.1021	3.4762	0.6571	5.175	4.3606	1.0902
5.3726	3.337	1.12	3.4818	0.6771	5.192	4.4195	1.1116

5.3908	3.3269	1.1377	3.4854	0.6981	5.21	4.4747	1.1447
5.4089	3.3156	1.155	3.4868	0.7197	5.227	4.5237	1.1883
5.4271	3.303	1.1718	3.4858	0.7416	5.245	4.5645	1.2409
5.4452	3.2892	1.188	3.4826	0.7633	5.262	4.5948	1.3005
5.4634	3.2742	1.2033	3.4771	0.7845	5.28	4.6131	1.3642
5.4815	3.2581	1.2177	3.4695	0.8048	5.298	4.6184	1.4285
5.4997	3.241	1.2309	3.4599	0.824	5.315	4.6113	1.4897
5.5178	3.2231	1.2428	3.4487	0.8417	5.333	4.5935	1.5446
5.536	3.2045	1.2533	3.436	0.8578	5.35	4.5672	1.5909
5.5541	3.1854	1.2623	3.4221	0.872	5.368	4.5353	1.6269
5.5723	3.1659	1.2698	3.4073	0.8844	5.385	4.5002	1.6518
5.5904	3.1463	1.2756	3.3919	0.8947	5.403	4.465	1.6647
5.6086	3.1268	1.2799	3.3761	0.903	5.42	4.4328	1.6654
5.6268	3.1076	1.2826	3.3602	0.9092	5.438	4.4078	1.6549
5.6449	3.0888	1.2838	3.3444	0.9134	5.455	4.3938	1.6356
5.6631	3.0707	1.2836	3.3291	0.9156	5.473	4.3936	1.6118
5.6812	3.0533	1.2821	3.3144	0.9158	5.491	4.408	1.5889
5.6994	3.0368	1.2793	3.3005	0.9143	5.508	4.4355	1.5718
5.7175	3.0213	1.2756	3.2878	0.911	5.526	4.4726	1.5645
5.7357	3.0069	1.2709	3.2764	0.9061	5.543	4.515	1.5687
5.7538	2.9937	1.2654	3.2665	0.8998	5.561	4.5586	1.5842
5.772	2.9817	1.2592	3.2582	0.8924	5.578	4.6005	1.6093
5.7901	2.9709	1.2526	3.2517	0.884	5.596	4.6388	1.6423
5.8083	2.9615	1.2455	3.2472	0.8749	5.613	4.6731	1.6811
5.8264	2.9533	1.2382	3.2445	0.8653	5.631	4.703	1.7247
5.8446	2.9464	1.2307	3.2439	0.8554	5.648	4.7285	1.772
5.8627	2.9408	1.2233	3.2453	0.8455	5.666	4.7497	1.8223
5.8809	2.9365	1.216	3.2487	0.8358	5.683	4.7666	1.8748
5.899	2.9335	1.2089	3.2541	0.8265	5.701	4.7797	1.9294
5.9172	2.9318	1.2023	3.2613	0.8179	5.719	4.7893	1.9861
5.9353	2.9313	1.1962	3.2704	0.8101	5.736	4.795	2.0455
5.9535	2.932	1.1908	3.2813	0.8034	5.754	4.7958	2.1081
5.9716	2.9337	1.1863	3.2939	0.798	5.771	4.79	2.1738
5.9898	2.9365	1.1828	3.3081	0.794	5.789	4.7758	2.2414
6.0079	2.9402	1.1804	3.3237	0.7918	5.806	4.7514	2.3089
6.0261	2.9447	1.1794	3.3405	0.7914	5.824	4.7157	2.373
6.0442	2.9497	1.1799	3.3584	0.7932	5.841	4.6692	2.4299
6.0624	2.955	1.182	3.3771	0.7974	5.859	4.6141	2.4752

6.0805	2.9604	1.1858	3.3963	0.804	5.876	4.555	2.5059
6.0987	2.9656	1.1913	3.4156	0.8134	5.894	4.4979	2.5214
6.1168	2.9703	1.1985	3.4346	0.8254	5.912	4.4485	2.5242
6.135	2.9742	1.2074	3.453	0.8402	5.929	4.4107	2.5193
6.1531	2.9769	1.2178	3.4702	0.8576	5.947	4.385	2.5128
6.1713	2.9783	1.2295	3.4857	0.8775	5.964	4.3694	2.51
6.1894	2.9779	1.2424	3.4993	0.8997	5.982	4.3595	2.5141
6.2076	2.9756	1.256	3.5105	0.9238	5.999	4.3503	2.5258
6.2257	2.9714	1.2701	3.519	0.9494	6.017	4.3375	2.5432
6.2439	2.965	1.2843	3.5246	0.976	6.034	4.3185	2.5627
6.262	2.9565	1.2982	3.5272	1.0032	6.052	4.2928	2.5799
6.2802	2.9459	1.3114	3.5267	1.0304	6.069	4.2625	2.5912
6.2983	2.9334	1.3237	3.5231	1.0571	6.087	4.2309	2.5945
6.3165	2.9192	1.3346	3.5167	1.0828	6.104	4.202	2.5898
6.3346	2.9035	1.344	3.5078	1.1072	6.122	4.1785	2.5793
6.3528	2.8865	1.3516	3.4966	1.1297	6.14	4.1613	2.5658
6.3709	2.8685	1.3572	3.4834	1.1502	6.157	4.1496	2.5513
6.3891	2.8499	1.3608	3.4689	1.1685	6.175	4.142	2.5362
6.4072	2.8309	1.3623	3.4532	1.1844	6.192	4.1383	2.5197
6.4254	2.8118	1.3616	3.4369	1.198	6.21	4.1394	2.5006
6.4435	2.7929	1.3589	3.4202	1.2092	6.227	4.1477	2.4793
6.4617	2.7745	1.354	3.4036	1.2182	6.245	4.1658	2.4576
6.4798	2.7568	1.3471	3.3873	1.2252	6.262	4.1948	2.4392
6.498	2.74	1.3383	3.3716	1.2302	6.28	4.2343	2.4281
6.5161	2.7244	1.3276	3.3564	1.2336	6.297	4.2814	2.4281
6.5343	2.7102	1.3153	3.3421	1.2354	6.315	4.3323	2.4409
6.5524	2.6976	1.3015	3.3287	1.2358	6.333	4.3829	2.4665
6.5706	2.6868	1.2864	3.3161	1.235	6.35	4.4301	2.5037
6.5887	2.678	1.2702	3.3045	1.233	6.368	4.4718	2.5504
6.6069	2.6712	1.2531	3.2938	1.23	6.385	4.5067	2.6048
6.625	2.6667	1.2354	3.2842	1.226	6.403	4.5339	2.6652
6.6432	2.6645	1.2173	3.2756	1.2209	6.42	4.553	2.7296
6.6613	2.6645	1.1993	3.2681	1.2149	6.438	4.5638	2.7964
6.6795	2.6669	1.1815	3.2619	1.208	6.455	4.5667	2.8639
6.6976	2.6715	1.1642	3.257	1.2001	6.473	4.5626	2.9309
6.7158	2.6784	1.1478	3.2537	1.1915	6.49	4.5522	2.9967
6.734	2.6872	1.1325	3.2521	1.1821	6.508	4.5362	3.0611
6.7521	2.698	1.1185	3.2523	1.1721	6.525	4.515	3.1238

6.7703	2.7104	1.106	3.2546	1.1617	6.543	4.4882	3.185
6.7884	2.7243	1.0953	3.259	1.1512	6.561	4.4555	3.2438
6.8066	2.7395	1.0865	3.2657	1.1409	6.578	4.4165	3.2991
6.8247	2.7556	1.0797	3.2748	1.131	6.596	4.3714	3.3493
6.8429	2.7724	1.075	3.2863	1.1219	6.613	4.3212	3.3927
6.861	2.7896	1.0724	3.3001	1.1139	6.631	4.2674	3.428
6.8792	2.807	1.0719	3.3161	1.1075	6.648	4.2114	3.4545
6.8973	2.8243	1.0735	3.3341	1.1029	6.666	4.1548	3.4717
6.9155	2.8412	1.0771	3.354	1.1005	6.683	4.0992	3.4785
6.9336	2.8576	1.0827	3.3753	1.1005	6.701	4.0472	3.4739
6.9518	2.8731	1.0901	3.3979	1.1032	6.718	4.0026	3.4577
6.9699	2.8875	1.0991	3.4213	1.1087	6.736	3.9701	3.4315
6.9881	2.9008	1.1096	3.4451	1.1171	6.754	3.9535	3.3993
7.0062	2.9127	1.1214	3.469	1.1286	6.771	3.9553	3.3663
7.0244	2.9231	1.1342	3.4926	1.1431	6.789	3.9756	3.339
7.0425	2.9319	1.1478	3.5154	1.1607	6.806	4.0124	3.3235
7.0607	2.9391	1.162	3.5372	1.1811	6.824	4.0616	3.3247
7.0788	2.9447	1.1766	3.5574	1.2043	6.841	4.1174	3.3465
7.097	2.9487	1.1913	3.5758	1.23	6.859	4.1732	3.3903
7.1151	2.9511	1.2059	3.592	1.2582	6.876	4.2216	3.4552
7.1333	2.952	1.2203	3.6056	1.2884	6.894	4.2561	3.5376
7.1514	2.9516	1.2341	3.6164	1.3203	6.911	4.2724	3.6315
7.1696	2.9498	1.2473	3.6242	1.3535	6.929	4.2686	3.7298
7.1877	2.9469	1.2598	3.6287	1.3877	6.946	4.2466	3.8258
7.2059	2.943	1.2714	3.6298	1.4223	6.964	4.21	3.9148
7.224	2.9382	1.282	3.6274	1.4568	6.982	4.1638	3.9945
7.2422	2.9327	1.2915	3.6216	1.4908	6.999	4.1123	4.0653
7.2603	2.9267	1.2998	3.6125	1.5236	7.017	4.0587	4.1289
7.2785	2.9202	1.3069	3.6004	1.5548	7.034	4.0044	4.1879
7.2966	2.9135	1.3128	3.5854	1.5839	7.052	3.9488	4.2444
7.3148	2.9068	1.3175	3.5681	1.6105	7.069	3.8908	4.2998
7.3329	2.9001	1.3208	3.5489	1.6344	7.087	3.8288	4.3538
7.3511	2.8938	1.3229	3.5282	1.6553	7.104	3.7615	4.4056
7.3692	2.888	1.3238	3.5067	1.673	7.122	3.6887	4.4538
7.3874	2.8828	1.3235	3.4849	1.6876	7.139	3.6101	4.4973
7.4055	2.8785	1.3222	3.4632	1.6993	7.157	3.5257	4.5346
7.4237	2.8752	1.3199	3.4422	1.7081	7.175	3.4354	4.5638
7.4418	2.8731	1.3169	3.4221	1.7143	7.192	3.3401	4.5818

7.46	2.8723	1.3132	3.4033	1.7183	7.21	3.2429	4.5853
7.4781	2.8729	1.3091	3.3861	1.7204	7.227	3.1491	4.5725
7.4963	2.875	1.3048	3.3704	1.7209	7.245	3.0653	4.5449
7.5144	2.8786	1.3006	3.3564	1.72	7.262	2.9969	4.5075
7.5326	2.8838	1.2965	3.3441	1.7181	7.28	2.9457	4.4676
7.5507	2.8905	1.293	3.3334	1.7154	7.297	2.9093	4.4323
7.5689	2.8986	1.2901	3.3244	1.7119	7.315	2.8823	4.4057
7.587	2.908	1.2882	3.3169	1.7079	7.332	2.8589	4.3876
7.6052	2.9187	1.2873	3.3109	1.7033	7.35	2.8357	4.3751
7.6233	2.9304	1.2876	3.3066	1.6983	7.367	2.8125	4.3648
7.6415	2.943	1.2893	3.3039	1.6927	7.385	2.7919	4.3552
7.6596	2.9563	1.2925	3.303	1.6868	7.403	2.776	4.3483
7.6778	2.9702	1.2972	3.3041	1.6805	7.42	2.765	4.3474
7.6959	2.9844	1.3035	3.3074	1.674	7.438	2.756	4.3557
7.7141	2.9988	1.3114	3.3129	1.6676	7.455	2.7443	4.3738
7.7322	3.0132	1.3209	3.3211	1.6615	7.473	2.7258	4.3996
7.7504	3.0275	1.332	3.3319	1.656	7.49	2.6987	4.429
7.7685	3.0415	1.3447	3.3456	1.6516	7.508	2.6634	4.4586
7.7867	3.0549	1.3589	3.3622	1.6487	7.525	2.6217	4.4861
7.8048	3.0678	1.3747	3.3815	1.648	7.543	2.5753	4.5114
7.823	3.0799	1.3919	3.4035	1.6499	7.56	2.525	4.5347
7.8411	3.091	1.4104	3.428	1.6549	7.578	2.4701	4.5563
7.8593	3.1011	1.4303	3.4544	1.6636	7.596	2.4097	4.575
7.8775	3.1101	1.4513	3.4824	1.6765	7.613	2.3439	4.5887
7.8956	3.1178	1.4734	3.5114	1.6939	7.631	2.2737	4.5953
7.9138	3.124	1.4964	3.5406	1.7163	7.648	2.2016	4.5931
7.9319	3.1289	1.5201	3.5695	1.7436	7.666	2.1304	4.582
7.9501	3.1322	1.5445	3.5971	1.7762	7.683	2.0629	4.5628
7.9682	3.1341	1.5693	3.6227	1.8138	7.701	2.0009	4.5374
7.9864	3.1344	1.5945	3.6454	1.8564	7.718	1.9452	4.5081
8.0045	3.1332	1.6199	3.6644	1.9036	7.736	1.8959	4.4768
8.0227	3.1305	1.6454	3.6791	1.955	7.753	1.8524	4.445
8.0408	3.1264	1.6709	3.6885	2.0098	7.771	1.8143	4.4137
8.059	3.1208	1.6964	3.6923	2.0676	7.788	1.7811	4.3839
8.0771	3.1139	1.7218	3.6897	2.1273	7.806	1.7526	4.3569
8.0953	3.1055	1.747	3.6805	2.1881	7.824	1.7275	4.3343
8.1134	3.0957	1.772	3.6644	2.2489	7.841	1.7037	4.3175
8.1316	3.0845	1.7968	3.6415	2.3087	7.859	1.6782	4.3067

8.1497	3.0718	1.8214	3.6117	2.3664	7.876	1.6477	4.3002
8.1679	3.0574	1.8455	3.5755	2.421	7.894	1.6104	4.295
8.186	3.0414	1.8691	3.5333	2.4715	7.911	1.5659	4.287
8.2042	3.0236	1.8921	3.4859	2.5169	7.929	1.516	4.2729
8.2223	3.004	1.9141	3.4341	2.5564	7.946	1.4639	4.2502
8.2405	2.9827	1.9351	3.3789	2.5895	7.964	1.4133	4.2183
8.2586	2.9595	1.9546	3.3215	2.6157	7.981	1.368	4.178
8.2768	2.9347	1.9726	3.2629	2.6348	7.999	1.331	4.1318
8.2949	2.9083	1.9886	3.2044	2.6468	8.016	1.3043	4.0831
8.3131	2.8805	2.0024	3.1472	2.6519	8.034	1.2881	4.0359
8.3312	2.8516	2.0138	3.0923	2.6507	8.052	1.2809	3.9942
8.3494	2.8219	2.0227	3.0407	2.6436	8.069	1.28	3.9606
8.3675	2.7917	2.0288	2.9932	2.6316	8.087	1.2815	3.9366
8.3857	2.7613	2.0322	2.9504	2.6157	8.104	1.2818	3.922
8.4038	2.731	2.0327	2.9128	2.5967	8.122	1.2774	3.9153
8.422	2.7013	2.0305	2.8805	2.5757	8.139	1.266	3.9138
8.4401	2.6725	2.0255	2.8536	2.5539	8.157	1.246	3.9142
8.4583	2.6448	2.0181	2.8318	2.5322	8.174	1.2176	3.9129
8.4764	2.6186	2.0082	2.8148	2.5115	8.192	1.1822	3.9065
8.4946	2.594	1.9962	2.8019	2.4926	8.209	1.1427	3.8924
8.5127	2.5713	1.9822	2.7926	2.4761	8.227	1.1028	3.8697
8.5309	2.5507	1.9665	2.7859	2.4624	8.245	1.066	3.8393
8.549	2.5323	1.9493	2.7813	2.4518	8.262	1.035	3.8035
8.5672	2.5162	1.9308	2.7777	2.4445	8.28	1.0108	3.7652
8.5853	2.5024	1.9114	2.7745	2.4403	8.297	0.9932	3.7274
8.6035	2.4911	1.8913	2.771	2.439	8.315	0.9806	3.6921
8.6216	2.4822	1.8706	2.7664	2.4403	8.332	0.9709	3.6601
8.6398	2.4758	1.8497	2.7603	2.4437	8.35	0.9624	3.631
8.6579	2.4718	1.8288	2.7523	2.4486	8.367	0.9544	3.604
8.6761	2.4702	1.8081	2.7422	2.4545	8.385	0.9468	3.5782
8.6942	2.471	1.7878	2.7298	2.4607	8.402	0.9404	3.5537
8.7124	2.4741	1.7681	2.7151	2.4666	8.42	0.9351	3.5311
8.7305	2.4794	1.7493	2.6983	2.4717	8.437	0.93	3.5112
8.7487	2.4867	1.7315	2.6796	2.4755	8.455	0.9239	3.4939
8.7668	2.4959	1.7149	2.6594	2.4775	8.473	0.9156	3.4782
8.785	2.507	1.6997	2.638	2.4773	8.49	0.905	3.4625
8.8031	2.5197	1.686	2.616	2.4747	8.508	0.8931	3.4458
8.8213	2.534	1.6739	2.5938	2.4696	8.525	0.8811	3.4279

8.8394	2.5495	1.6635	2.5719	2.462	8.543	0.8698	3.4101
8.8576	2.5661	1.655	2.5508	2.4518	8.56	0.8584	3.3933
8.8757	2.5837	1.6484	2.531	2.4392	8.578	0.8455	3.378
8.8939	2.6021	1.6437	2.5129	2.4244	8.595	0.8296	3.3628
8.912	2.621	1.641	2.4968	2.4077	8.613	0.8103	3.3458
8.9302	2.6402	1.6402	2.483	2.3895	8.63	0.7886	3.3249
8.9483	2.6597	1.6415	2.4717	2.3701	8.648	0.7667	3.2993
8.9665	2.6791	1.6446	2.4632	2.3498	8.666	0.7463	3.2692
8.9847	2.6984	1.6497	2.4575	2.3291	8.683	0.7288	3.2359
9.0028	2.7174	1.6566	2.4545	2.3084	8.701	0.7141	3.2006
9.021	2.7359	1.6652	2.4544	2.288	8.718	0.7016	3.1639
9.0391	2.7537	1.6755	2.4569	2.2683	8.736	0.6909	3.1253
9.0573	2.7708	1.6874	2.462	2.2497	8.753	0.682	3.0839
9.0754	2.7871	1.7008	2.4694	2.2324	8.771	0.676	3.0385
9.0936	2.8023	1.7155	2.479	2.2167	8.788	0.6752	2.9886
9.1117	2.8165	1.7314	2.4905	2.2028	8.806	0.6822	2.9347
9.1299	2.8296	1.7484	2.5035	2.1909	8.823	0.6999	2.8788
9.148	2.8415	1.7663	2.5179	2.1812	8.841	0.7305	2.8243
9.1662	2.8521	1.7851	2.5333	2.1736	8.858	0.775	2.776
9.1843	2.8614	1.8045	2.5494	2.1683	8.876	0.8321	2.7395
9.2025	2.8694	1.8243	2.5659	2.1652	8.894	0.8983	2.7204
9.2206	2.8762	1.8446	2.5826	2.1643	8.911	0.9671	2.7226
9.2388	2.8817	1.865	2.5991	2.1654	8.929	1.0301	2.7472
9.2569	2.8861	1.8854	2.6153	2.1684	8.946	1.0785	2.7914
9.2751	2.8894	1.9058	2.631	2.173	8.964	1.1052	2.8486
9.2932	2.8917	1.9261	2.646	2.1791	8.981	1.1063	2.9089
9.3114	2.8931	1.9461	2.6604	2.1865	8.999	1.083	2.9617
9.3295	2.8937	1.9657	2.674	2.1948	9.016	1.0409	2.998
9.3477	2.8937	1.9851	2.6871	2.204	9.034	0.9892	3.0122
9.3658	2.8932	2.004	2.6995	2.2139	9.051	0.9379	3.0034
9.384	2.8922	2.0227	2.7117	2.2243	9.069	0.8963	2.9751
9.4021	2.8909	2.0409	2.7235	2.2352	9.087	0.8708	2.9339
9.4203	2.8894	2.0589	2.7354	2.2467	9.104	0.8641	2.8881
9.4384	2.8877	2.0767	2.7473	2.2587	9.122	0.8756	2.8458
9.4566	2.886	2.0942	2.7596	2.2714	9.139	0.9015	2.8139
9.4747	2.8843	2.1117	2.7722	2.285	9.157	0.9356	2.7967
9.4929	2.8826	2.1291	2.7852	2.2997	9.174	0.9709	2.7957
9.511	2.881	2.1465	2.7986	2.3159	9.192	1.0007	2.8089

9.5292	2.8795	2.1641	2.8123	2.3336	9.209	1.0202	2.8318
9.5473	2.8781	2.1819	2.8261	2.3532	9.227	1.0274	2.8586
9.5655	2.8769	2.2	2.8399	2.375	9.244	1.0236	2.8838
9.5836	2.8759	2.2187	2.8532	2.399	9.262	1.0123	2.9039
9.6018	2.8749	2.2379	2.8658	2.4254	9.279	0.9973	2.9182
9.6199	2.874	2.2579	2.8772	2.4542	9.297	0.9816	2.928
9.6381	2.873	2.2787	2.887	2.4853	9.315	0.9659	2.9356
9.6562	2.8718	2.3005	2.895	2.5186	9.332	0.9491	2.9423
9.6744	2.8702	2.3234	2.9006	2.554	9.35	0.9296	2.9477
9.6925	2.8681	2.3474	2.9035	2.591	9.367	0.9068	2.9497
9.7107	2.8653	2.3726	2.9036	2.6294	9.385	0.882	2.9461
9.7288	2.8614	2.399	2.9005	2.6686	9.402	0.8581	2.9355
9.747	2.8563	2.4264	2.8942	2.7084	9.42	0.8384	2.9191
9.7651	2.8498	2.4549	2.8847	2.7481	9.437	0.825	2.8996
9.7833	2.8416	2.4842	2.8721	2.7874	9.455	0.818	2.8801
9.8014	2.8316	2.5142	2.8564	2.8258	9.472	0.816	2.863
9.8196	2.8197	2.5445	2.838	2.863	9.49	0.8168	2.8491
9.8377	2.8057	2.5751	2.8172	2.8986	9.508	0.8192	2.838
9.8559	2.7897	2.6056	2.7941	2.9325	9.525	0.8229	2.8292
9.874	2.7716	2.6358	2.7693	2.9644	9.543	0.8283	2.8229
9.8922	2.7515	2.6654	2.7431	2.9943	9.56	0.835	2.8201
9.9103	2.7296	2.6944	2.7159	3.0222	9.578	0.8422	2.822
9.9285	2.7058	2.7224	2.6879	3.0481	9.595	0.8477	2.8292
9.9466	2.6804	2.7494	2.6595	3.0722	9.613	0.8494	2.8407
9.9648	2.6534	2.7752	2.6309	3.0946	9.63	0.8459	2.8548
9.9829	2.625	2.7999	2.6023	3.1156	9.648	0.837	2.8693
10.001	2.5953	2.8234	2.5738	3.1354	9.665	0.8236	2.8826
10.019	2.5643	2.8457	2.5454	3.1542	9.683	0.8071	2.894
10.037	2.5321	2.8666	2.5172	3.1721	9.7	0.7883	2.9041
10.056	2.4987	2.8863	2.4891	3.1895	9.718	0.7674	2.9136
10.074	2.464	2.9045	2.461	3.2064	9.736	0.7429	2.9231
10.092	2.4282	2.9213	2.4328	3.2229	9.753	0.7134	2.9316
10.11	2.3911	2.9365	2.4044	3.2391	9.771	0.6775	2.9369
10.128	2.3527	2.9499	2.3756	3.2551	9.788	0.6357	2.9358
10.146	2.3133	2.9614	2.3464	3.2709	9.806	0.5901	2.9251
10.165	2.2727	2.9706	2.3167	3.2863	9.823	0.5444	2.9035
10.183	2.2312	2.9774	2.2862	3.3015	9.841	0.5028	2.8713
10.201	2.189	2.9816	2.255	3.3163	9.858	0.4682	2.8308

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10.219	2.1463	2.983	2.2229	3.3307	9.876	0.4423	2.7848
10.237	2.1034	2.9814	2.1898	3.3446	9.893	0.4252	2.7358
10.255	2.0607	2.9766	2.1557	3.3578	9.911	0.4165	2.6854
10.273	2.0185	2.9687	2.1205	3.3702	9.929	0.4162	2.6346
10.292	1.9773	2.9576	2.0841	3.3818	9.946	0.425	2.5844
10.31	1.9374	2.9435	2.0466	3.3923	9.964	0.4438	2.5368
10.328	1.8993	2.9264	2.0078	3.4015	9.981	0.4729	2.4947
10.346	1.8633	2.9066	1.9677	3.4092	9.999	0.5113	2.462
10.364	1.8297	2.8842	1.9265	3.4152	10.02	0.556	2.4423
10.382	1.7988	2.8598	1.8842	3.4192	10.03	0.6024	2.4377
10.4	1.7709	2.8334	1.8409	3.4208	10.05	0.6446	2.4485
10.419	1.7461	2.8057	1.797	3.4199	10.07	0.6775	2.472
10.437	1.7246	2.7768	1.7526	3.4162	10.09	0.697	2.5039
10.455	1.7064	2.7473	1.7082	3.4095	10.1	0.7019	2.5383
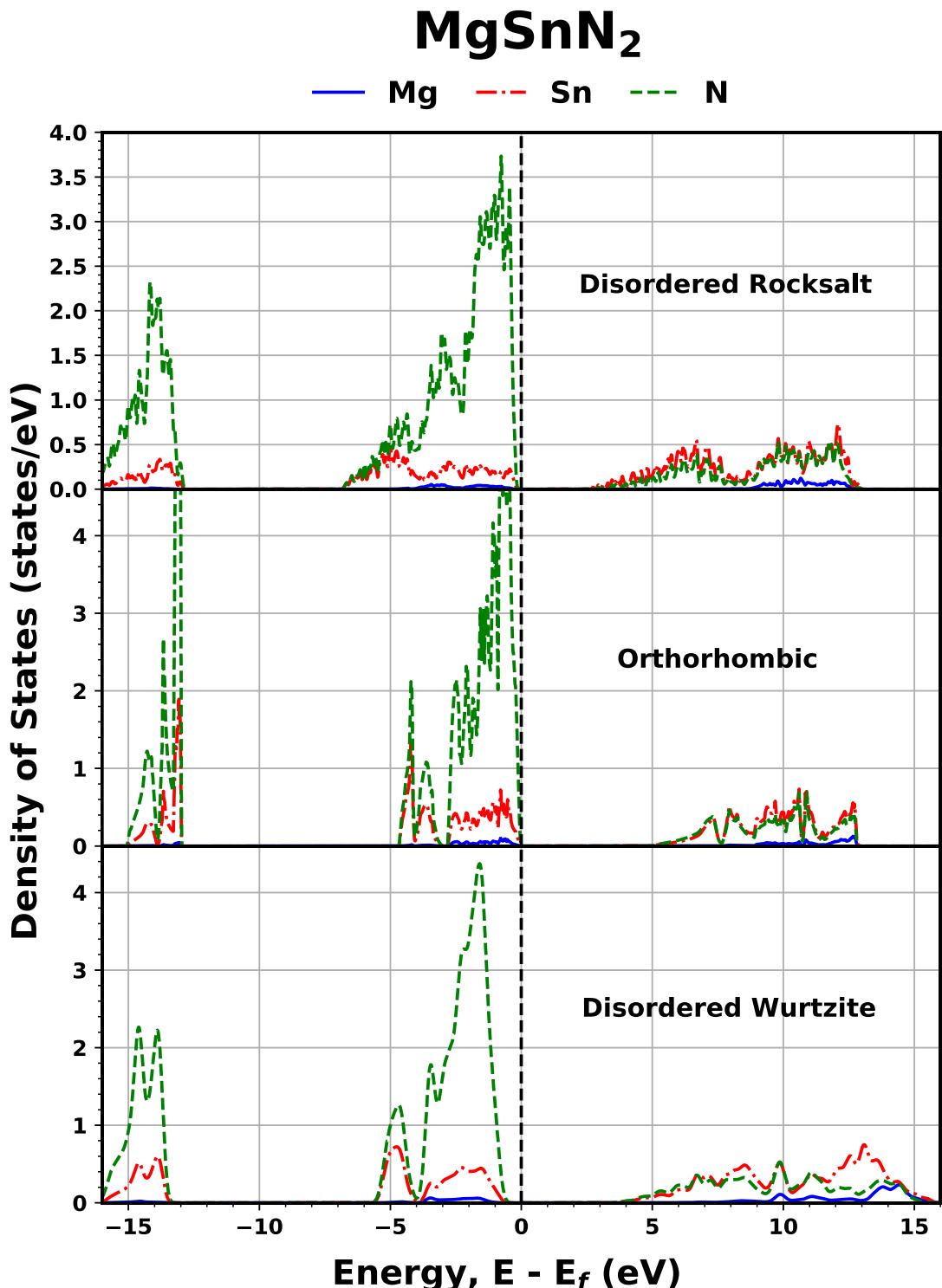
Figure S1: On-site electronic density of states (DOS) per formula unit of MgSnN$_2$ based on different crystal structures, computed using HSE06 functional. Fermi energy is kept at 0 eV.
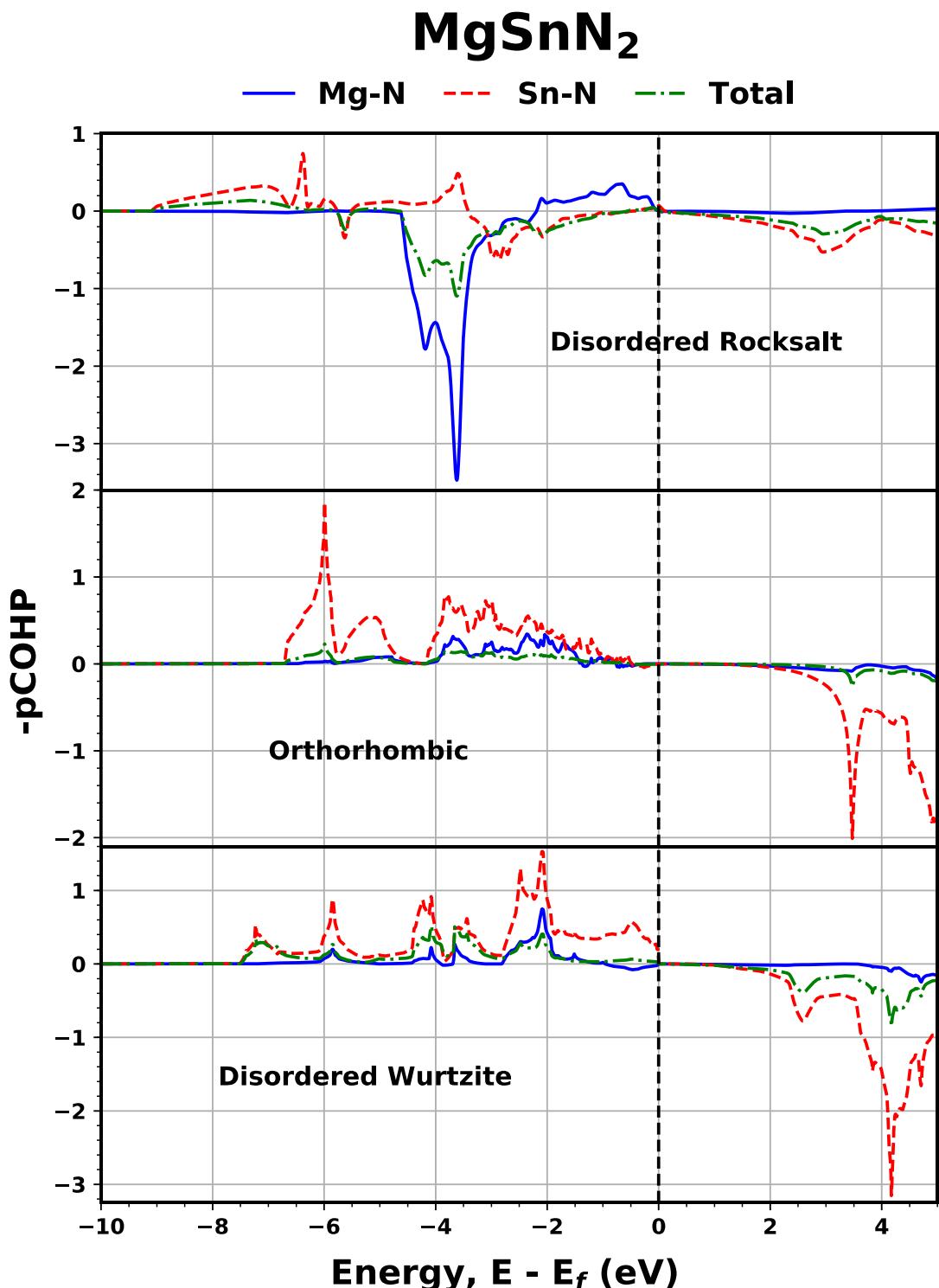
Figure S2: Projected Crystal Orbital Hamilton Populations (-pCOHP) of all nearest-neighbors' interactions in $MgSnN_2$ based on different crystal structures. Positive and negative values of -pCOHP correspond to bonding and antibonding interactions respectively. The Fermi energy is set to 0 eV.
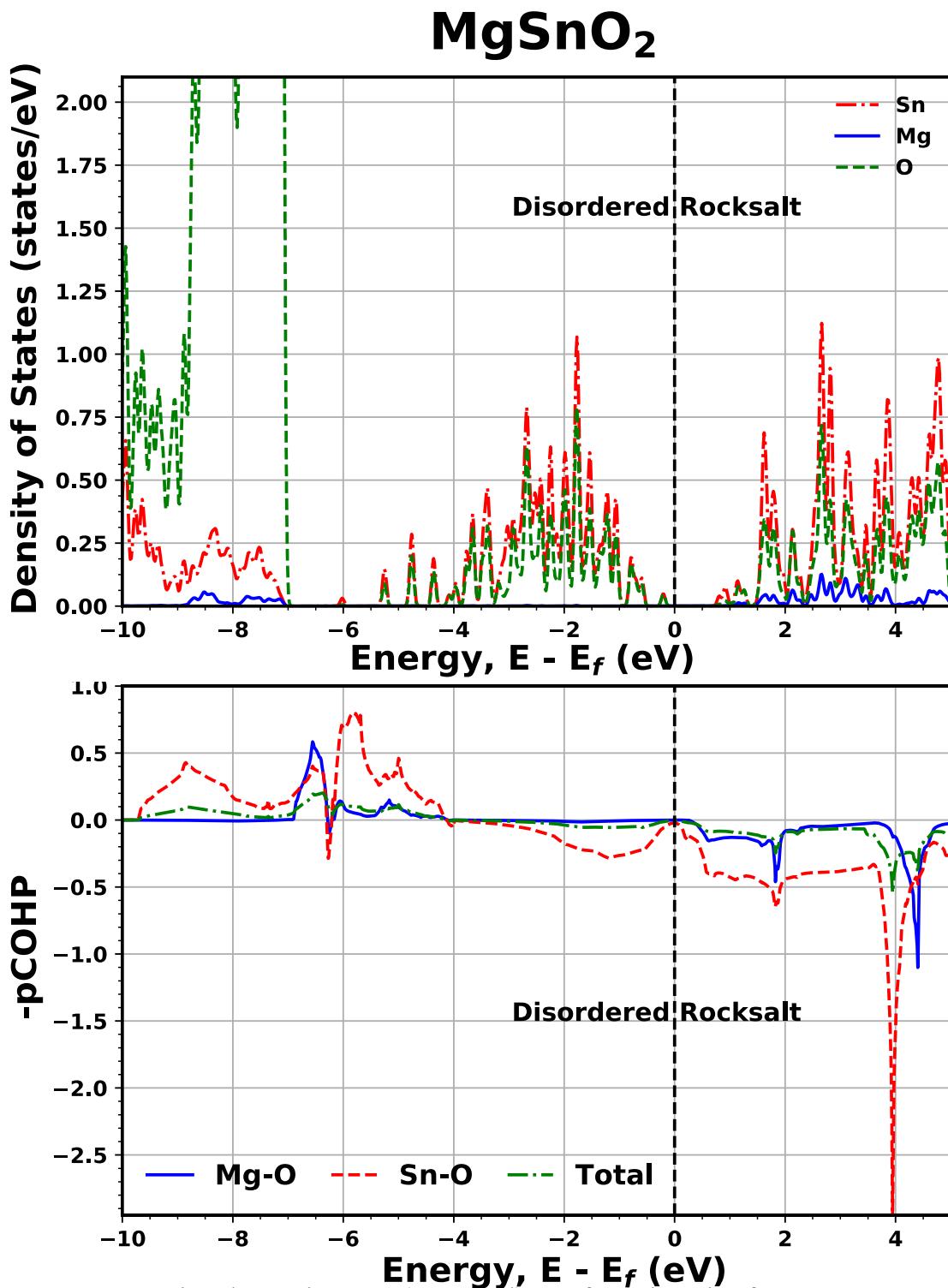
MgSnO$_2$

Figure S3: On-site electronic DOS (top panel) per formula unit of MgSnO$_2$, computed using HSE06 functional, and -pCOHP (bottom panel) of all nearest-neighbors' interactions in MgSnO$_2$ based on disordered rocksalt crystal structure. Positive and negative values of -pCOHP correspond to bonding and antibonding interactions respectively. The Fermi energy is set to 0 eV.
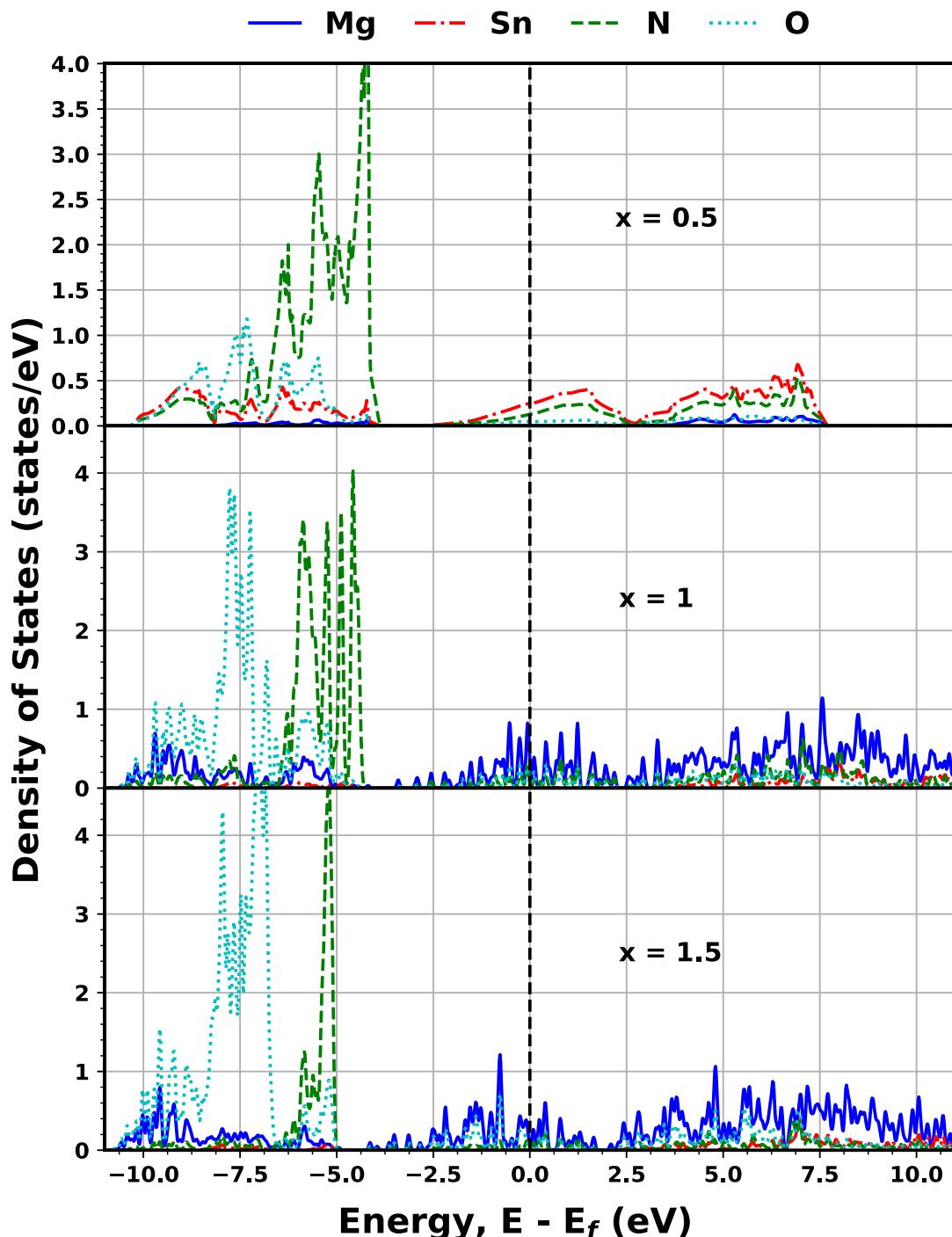
Figure S4: On-site electronic density of states (DOS) per formula unit of $MgSnN_{2-x}O_x$ based on rocksalt crystal structure, computed using HSE06 functional. Fermi energy is kept at 0 eV.
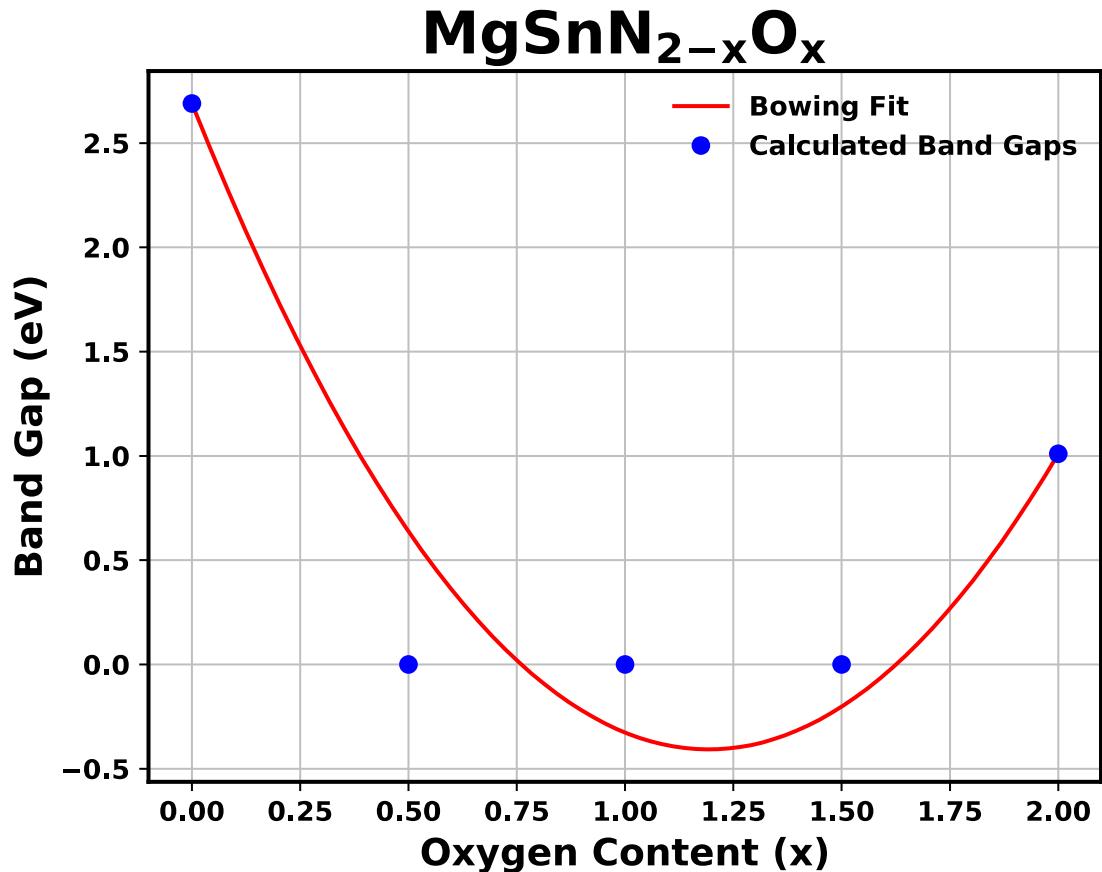
Figure S5: Bandgap vs. oxygen content (x) in disordered-rocksalt $MgSnN_{2-x}O_x$ alloy. Blue dots represent calculated band gap values whereas the red line segment is the fit function from bowing equation given by $E_g = yE_{MgSnO_2} + (1-y)E_{MgSnN_2} - y(1-y)\delta_g$, where $y = x/2$, E_g is the band gap, E_{MgSnO_2} is the band gap of $MgSnO_2$, E_{MgSnN_2} is the band gap of $MgSnN_2$, δ_g is the bowing parameter. The bowing parameter came to be 8.71.

MgSnN$_2$
Disordered Rocksalt
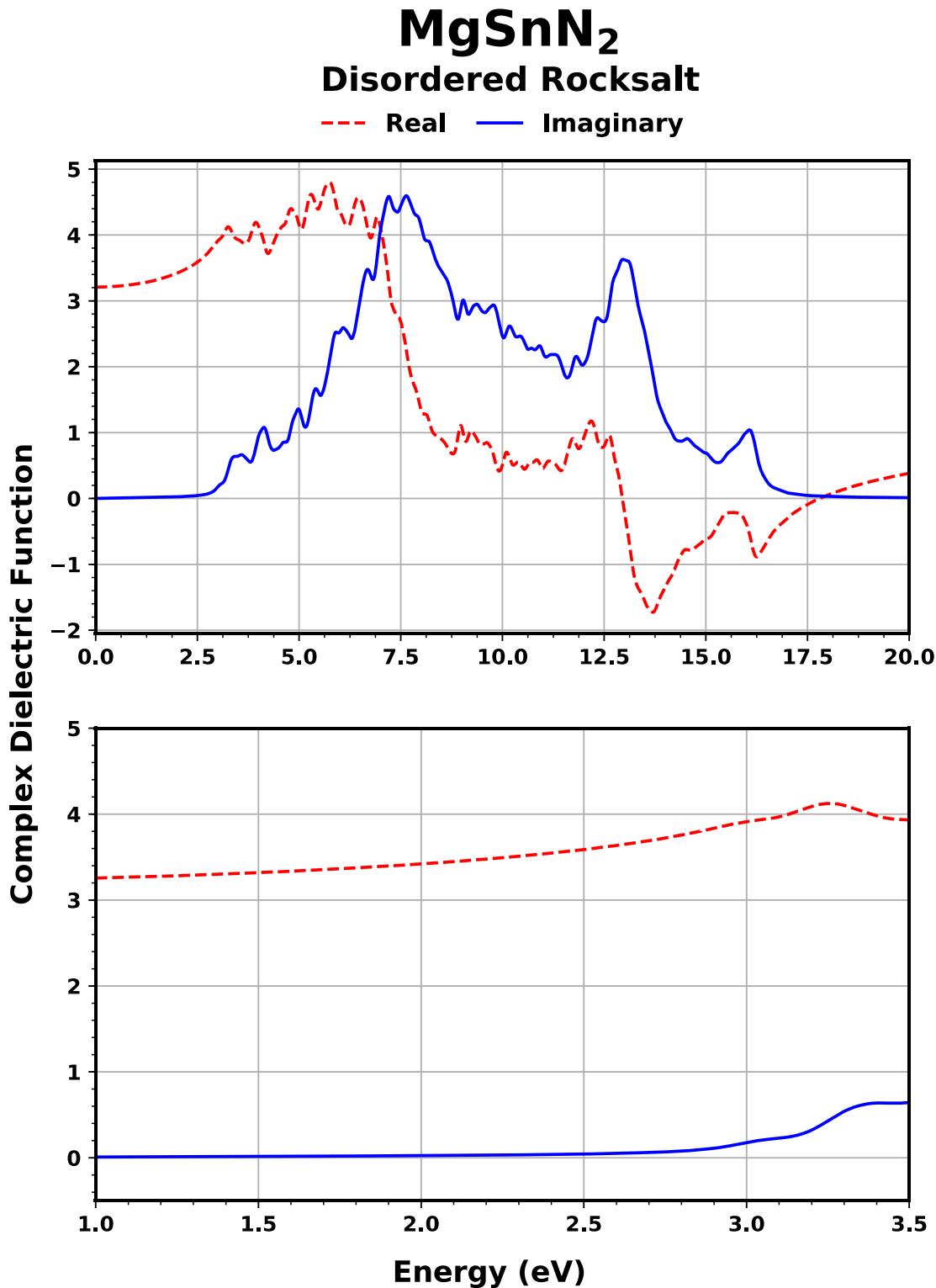
Figure S6: Complex dielectric functions of MgSnN$_2$ based on rocksalt structure, computed utilizing the hybrid HSE06 functional. Top panel shows wide range in photon energies whereas bottom panel shows photon energies in the visible range only.

MgSnN$_2$
Orthorhombic
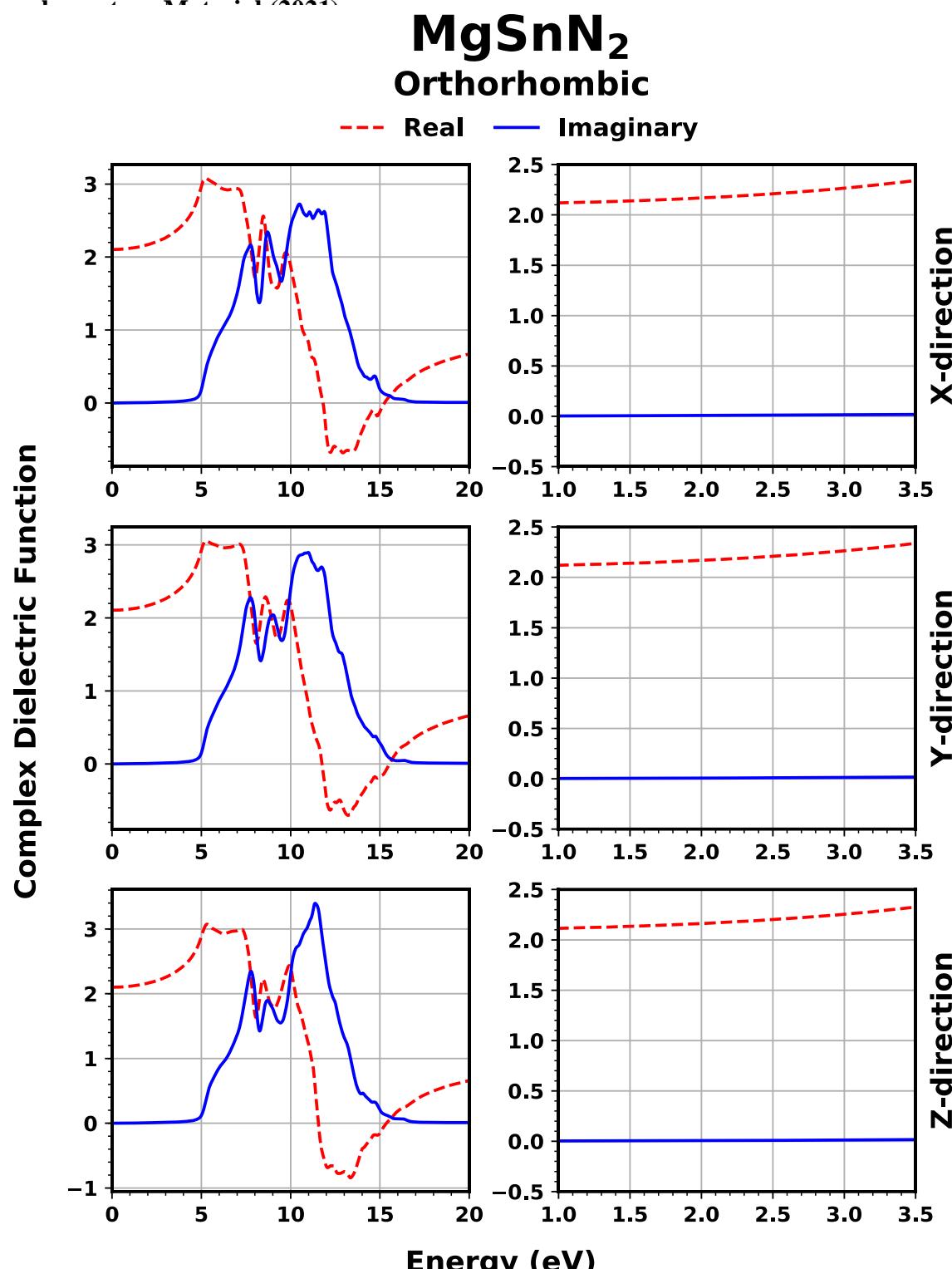
Figure S7: Complex dielectric functions of MgSnN$_2$ based on orthorhombic crystal structure, computed utilizing the hybrid HSE06 functional. Left side shows wide range in photon energies whereas right side shows photon energies in the visible range only. Similarly, top, middle and bottom rows show in X, Y and Z-directions respectively.

MgSnN$_2$
Disordered Wurtzite
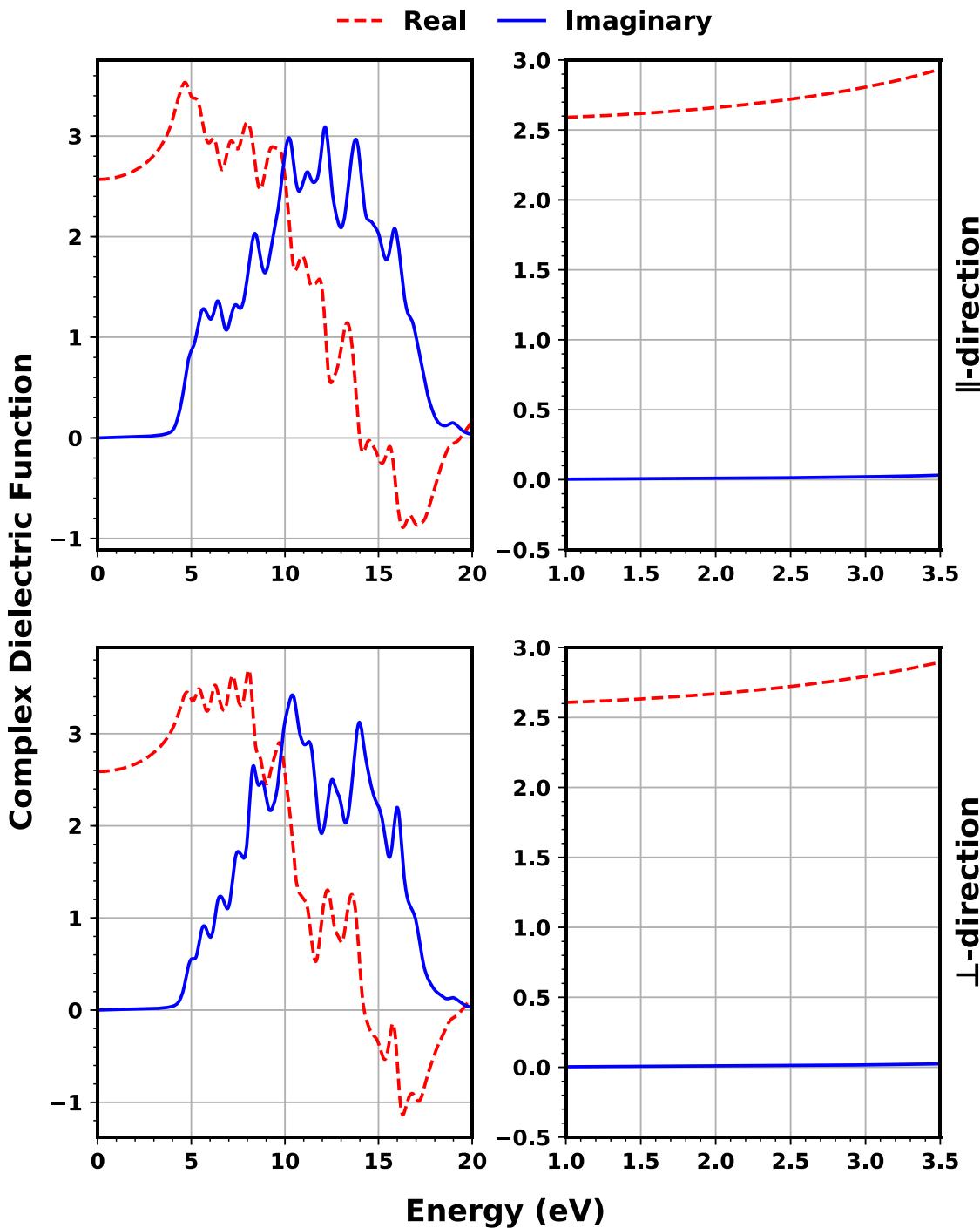
Figure S8: Complex dielectric functions of MgSnN$_2$ based on wurtzite crystal structure, computed utilizing the hybrid HSE06 functional. Left side shows wide range in photon energies whereas right side shows photon energies in the visible range only. Similarly, top row shows in parallel-direction whereas bottom row shows in perpendicular-direction.

References

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