Benchmark 11-A2 calculated with milonga

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1 Introduction

1. The benchmark ANL-7416-11A2 [1] was calculated using the milonga code.

2. This benchmark is about the calculation of some variables of a PWR in three dimensions by using the diffusion equation.

3. The codes used were:

   milonga 0.4.65 (45d6523484f3 2016-07-02 10:45 -0300) [2]

   free nuclear reactor core analysis code

   rev hash 45d6523484f38dcce25bb1f52779a6ff620a5eb8

   last commit on 2016-07-02 10:45 -0300 (rev 287)

   compiled on 2016-07-02 21:27:52 by pablo@pablo (linux-gnu x86_64)

   with gcc (Debian 4.9.2-10) 4.9.2 using -O2 linked against

   SLEPc Release Version 3.6.2, Nov 03, 2015

   Petsc Release Version 3.6.3, Dec, 03, 2015 arch-linux2-c-debug

   running on Linux 3.16.0-4-amd64 #1 SMP Debian 3.16.7-ckt25-2 (2016-04-08) x86_64

   2 Intel(R) Core(TM)2 CPU 6300 @ 1.86GHz

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   ————— —————- ———— ————

   wasora 0.4.115 (9be9040e9648 2016-07-02 10:43 -0300)

   wasora's an advanced suite for optimization & reactor analysis

   rev hash 9be9040e9648b423fb953fe7814c711998f8b93c

   last commit on 2016-07-02 10:43 -0300 (rev 270)

   compiled on 2016-07-02 21:25:38 by pablo@pablo (linux-gnu x86_64)

   with gcc (Debian 4.9.2-10) 4.9.2 using -O2 and linked against

   GNU Scientific Library version 1.16

   SUNDIALs Library version 2.5.0

   GNU Readline version 6.3

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   and

   Petsc Release Version 3.5.2, Sep, 08, 2014

   The PETSc Team

   petsc-maint@mcs.anl.gov

   http://www.mcs.anl.gov/petsc/

   See docs/changes/index.html for recent updates.

See docs/faq.html for problems.

See docs/manualpages/index.html for help.

Libraries linked from /home/geuzaine/src/petsc-3.5.2/linux_complex_mumps_seq/lib

---

2.12.0 [3]

2 Expected results

1. The benchmark asks the following results:

   1.1 Maximum eigenvalue.

   1.2 Fundamental flux distributions:

   1.2.1 Radial flux traverses in midplane z = 190 cm.

$$\Phi_g(x, 0, 190)$$
$$\Phi_g(x, x, 190)$$

   1.2.2 Radial flux traverses in planes z = 275 cm and z = 285 cm.

$$\Phi_g(x, 0, 275), \qquad \Phi_g(x, 0, 285)$$
$$\Phi_g(x, x, 275), \qquad \Phi_g(x, x, 285)$$

   1.2.3 Axial flux traverses for partially rodded assembly

$$\Phi_g(40, 40, z)$$

   Note: the fluxes Φ_g shall be normalized such that

$$\frac{1}{V_{core}} \int\limits_{V_{core}} \sum_g \nu \Sigma_{fg} \Phi_g dV = 1$$

   1.2.4 Value and location of maximum power density. This correspond to maximum of Φ_2 in the core. It is recommended that the maximum values of Φ_2 both in the inner core and at the core / reflector interface be given.

   1.3 Average subassembly powers P_k

$$P_k = \frac{1}{V_k} \int\limits_{V_k} \sum_g \nu \Sigma_{fg} \Phi_g dV$$

   where V_k volume of the k-th subassembly and k designates the fuel subassemblies as shown in [1].

   1.4 Number of unknowns in the problem.
   Number of iterations, total and outer.

   1.5 Computing time, iteration time, IO-time, computer used.

   1.6 Type and numerical values of convergence criteria.

   1.7 Table of average group fluxes for a cubical mesh grid of 20 x 20 x 20 cm.

   1.8 Dependence of results on mesh spacing.

3 Geometry

1. The geometry was made with the program gmsh. Read the file 3dpwr.geo, it is not going to be explained here. However in the Figure 1 and the Figure 2 the geometry and the mesh (lc = 10) are shown.

Figure 1: gmsh geometry

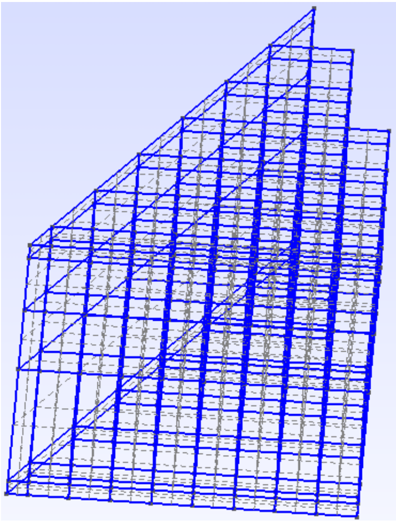
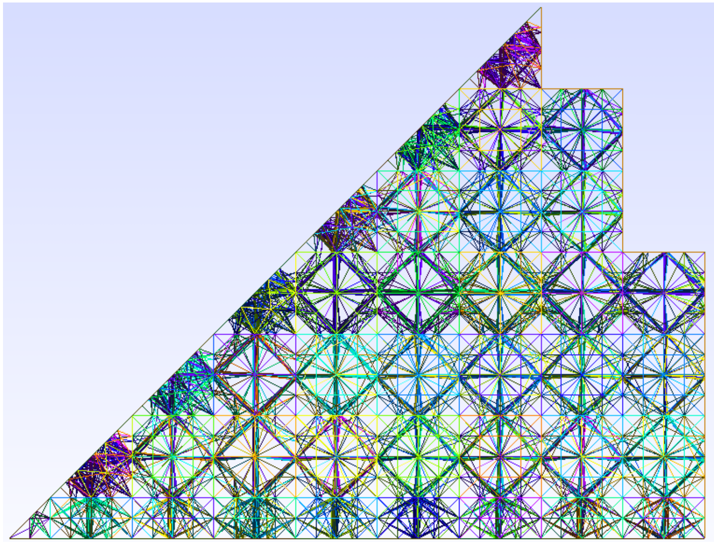


Figure 2: Mesh



4 milongas input file

1. The following milonga keywords were used:

   #: All the words after the # are ignored. It is the comment symbol.

   DEFAULT_ARGUMENT_VALUE: Sets the default value of the parameter given in the command line.

   MESH: Sets options of the mesh file and the dimensions of the problem.

      FILE_PATH: Path and name of the mesh file.

      DIMENSIONS: Geometrical dimension where the problem has to be solved (1,2 or 3).

   MILONGA PROBLEM:

      GROUPS: Number of groups of the multigroup formulation.

      SCHEME: Numerical method of solution. It can be volumes or elements.

   MILONGA_SOLVER: Sets options of the solver.

      EPS_TYPE: Sets the type of solver.

   INCLUDE: It includes a file in this point.

   PHYSICAL_ENTITY: It matches physical entities defined in the mesh file with properities like materials or boundary conditions.

      NAME: Name of the physical entity. It must appear in the mesh file.

      BC: Boundary condition.

      MATERIAL: Physical properties which must be linked with the physical entity.

   CONST: It tell milonga that the following variables are constants.

   = : The assignemt is the operator to set a value in a variable. It is " = ", the quotes show that the = must be preceded and followed by a space; but they must not be written in the milonga input file.

   VECTOR: Sets the vector (array) name.

SIZE: It sets the number of elements of the vector.

power: It sets the power for what the flux is normalized. *power* must be inicialized before the MILONGA_STEP keyword in order to have effect.

MILONGA_STEP: It solves the problem.

FUNCTION: It defines a function.

gauss legendre: It solves integrals of smooth functions. Actually, it is a wasoras keyword.

MATERIAL: It sets the neutronic parameters of the material.

2. There are also other keywords, but they are not listed here because they are well explained in the milonga and wasora examples provided with their distributions. There, you also can see the same benchmark solved in a structured mesh.

5 Calculation

1. Make three different directories called lc10, lc8 and lc6. There you are going to run the cases with different characteristic lenghts.

2. Go to the directory lc10 and copy there the files 3dpwruns.mil, 3dpwr.geo and 3dpwr_materials.mil.

   Do `ls` and check if you see it:

   ```
   3dpwr.geo   3dpwr_materials.mil   3dpwruns.mil
   ```

   If so, open the file 3dpwr.geo with a text editor, search lc = and change it for lc = 10.0.

3. Run gmsh `3dpwr.geo -3`. It should work properly; if not, check the codes version or write to the wasora mailing list:

   wasora@samplex.com

4. Run `milonga 3dpwruns.mil`

5. You should have got something like this:

   ```
   keff =  1.0318755213 , 0.01 2.01 7.09  secs
   Number of unknowns: 15544
   max thermal flux  40.1 located at ( x = 140.00 , y = 60.00 , z = 190.00 )
   ```

   and some files which contain the results. Do `ls`, you should see something like this:

   ```
   3dpwr1x0.dat 3dpwr2x0275.dat 3dpwr2xx275.dat 3dpwr4040z.dat
   3dpwr_materials.mil 3dpwr.pos 3dpwruns.mil subpow.dat
   3dpwr1xx.dat 3dpwr2x0285.dat 3dpwr2xx285.dat 3dpwr.geo
   3dpwr.msh 3dpwr.txt.md 3dpwr.vtk
   ```

6. Read the milonga input file to see in which file is each result.

7. Now, go to the directory lc8, copy the same files as before, change lc = by lc = 8.0. Repeat the same commands as before.

8. At this point you have already calculated the benchmark. It is remaining to give the results.

6 Results

1. In the Table 1 the k_{eff} is shown for each lc. The k_{eff} was compared with the results in [1]; but the time and unknowns were not written because the computers have been improved since the date when those results were got.

2. In the Figure 3, the Figure 4, the Figure 5, the Figure 6, the Figure 7, the Figure 8 and the Figure 9 the traverse fluxes are shown.

3. See the Figure 8 and the Figure 10. They should be equal; but as in the Figure 8 the $\Phi_1(x, y, z)$ is discontinuous, it was also plotted with paraview and it was checked that $\Phi_1(x, y, z)$ is continuous. It seems that there is a problem in milonga. The scale of the x-axe in the Figure 10 is different from the other figures because paraview uses the lenght along the line x,x,285 instead the x's values in the absisas.

Table 1: Answer to the question 1, 4, 5 and 8

	lc			[1] A1-1	
	10	8	6	VENTURE	VANCER
k_{eff}	1.0318755213	1.0298526106	1.0296777639	1.02864	1.02968
Time [s]	7.09	12.83	22.24	-	-
Unknowns	15544	31944	53038	-	-

4. The maximum Φ_2 for each lc is shown in the Table 2. The values from [1] ware not shown because in [1] the power peak density was given instead of the maximum Φ_2 and its coordinates.

5. The average assembly powers P_k are shown in the Table 3. In [1] the power was obtained from Φ_2, so a power was got in the reflector assemblies. Do not pay attention to these values because in the reflector the fission power generated must be zero.

Table 2: Maximum Φ_2 and its coordinates

	lc		
	10	8	6
Maximum Φ_2 [-]	40	36.7	36.3
x [cm]	140	139.83	135.83
y [cm]	60	59.83	55.83
z [cm]	190	161.69	190

Figure 3: $\Phi_g(x, 0, 190)$

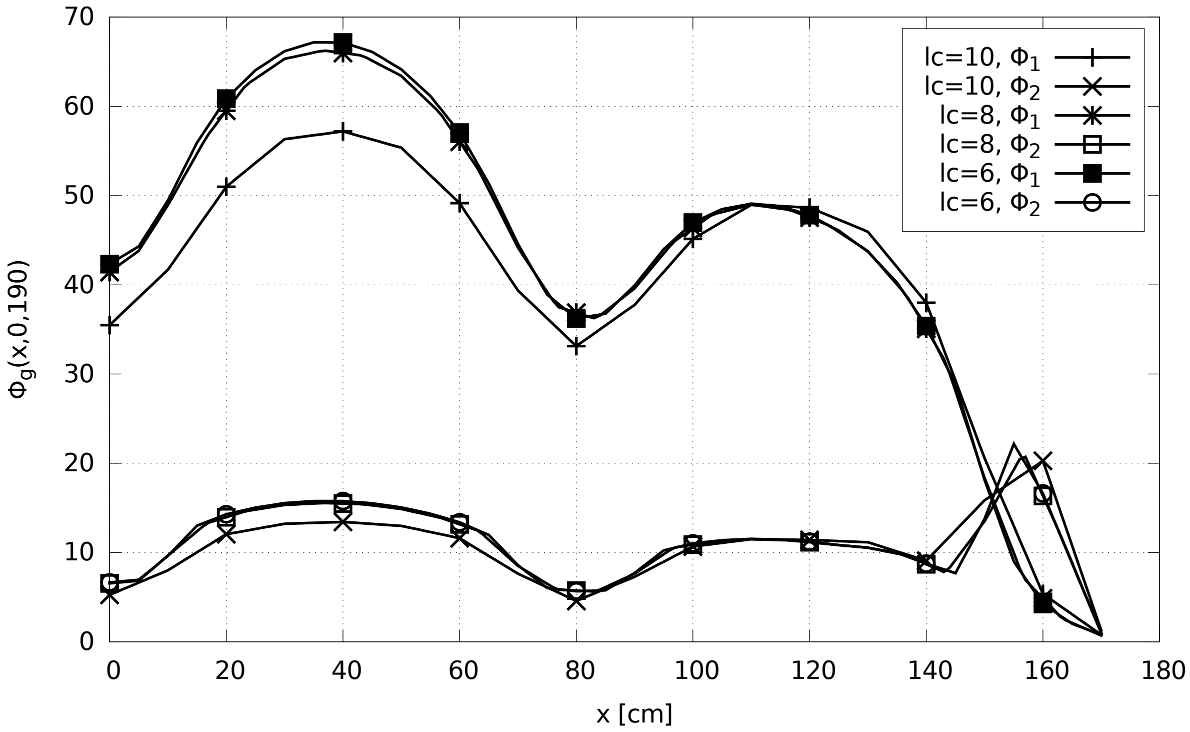


Figure 4: $\Phi_g(x, x, 190)$

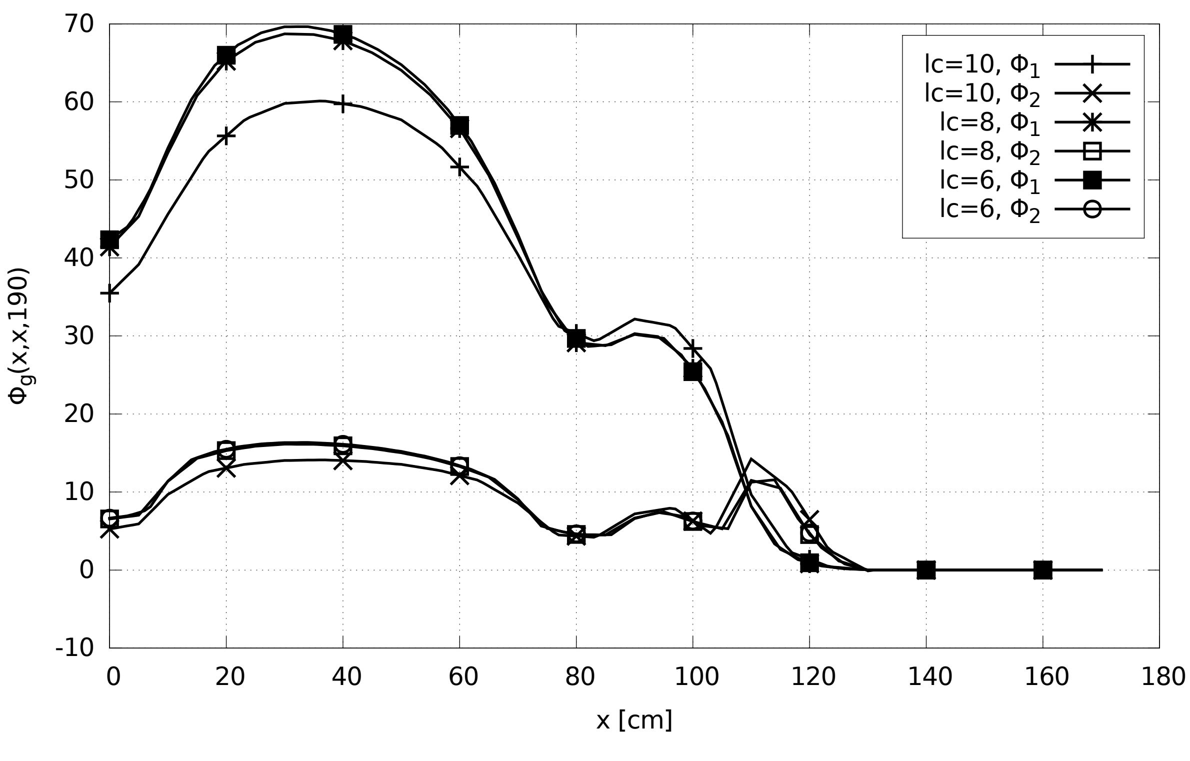


Figure 5: $\Phi_g(x, 0, 275)$

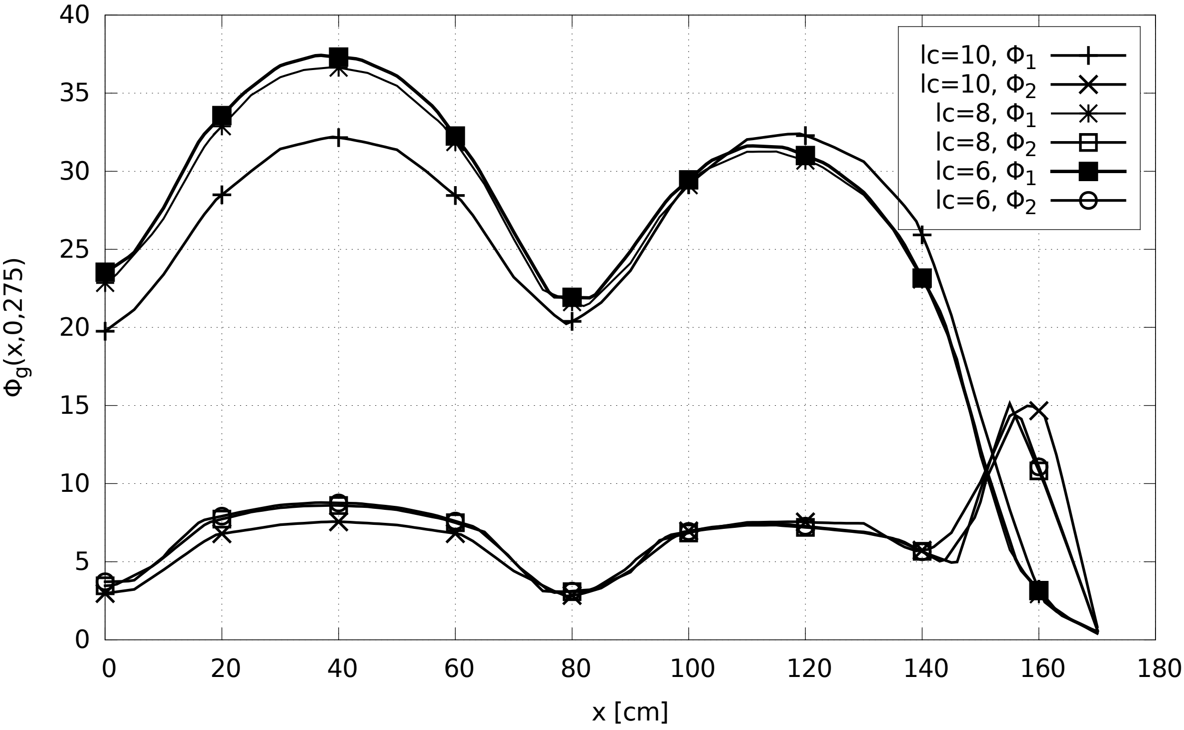


Figure 6: $\Phi_g(x, x, 275)$

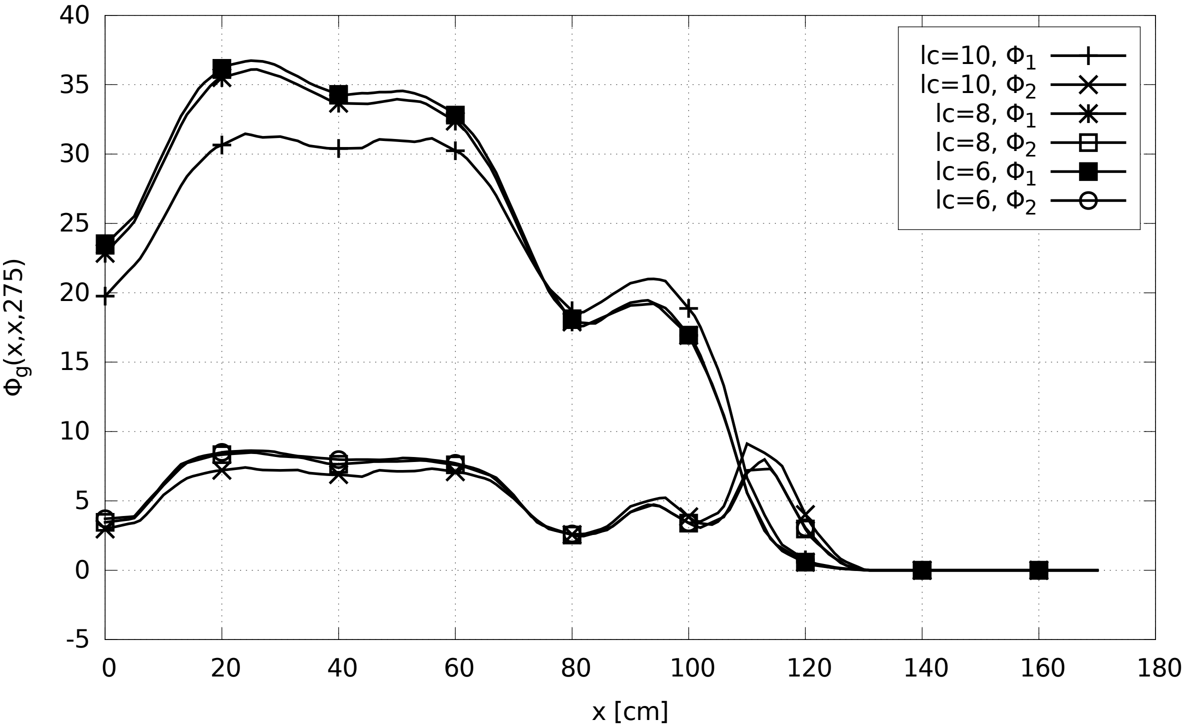


Figure 7: $\Phi_g(x, 0, 285)$

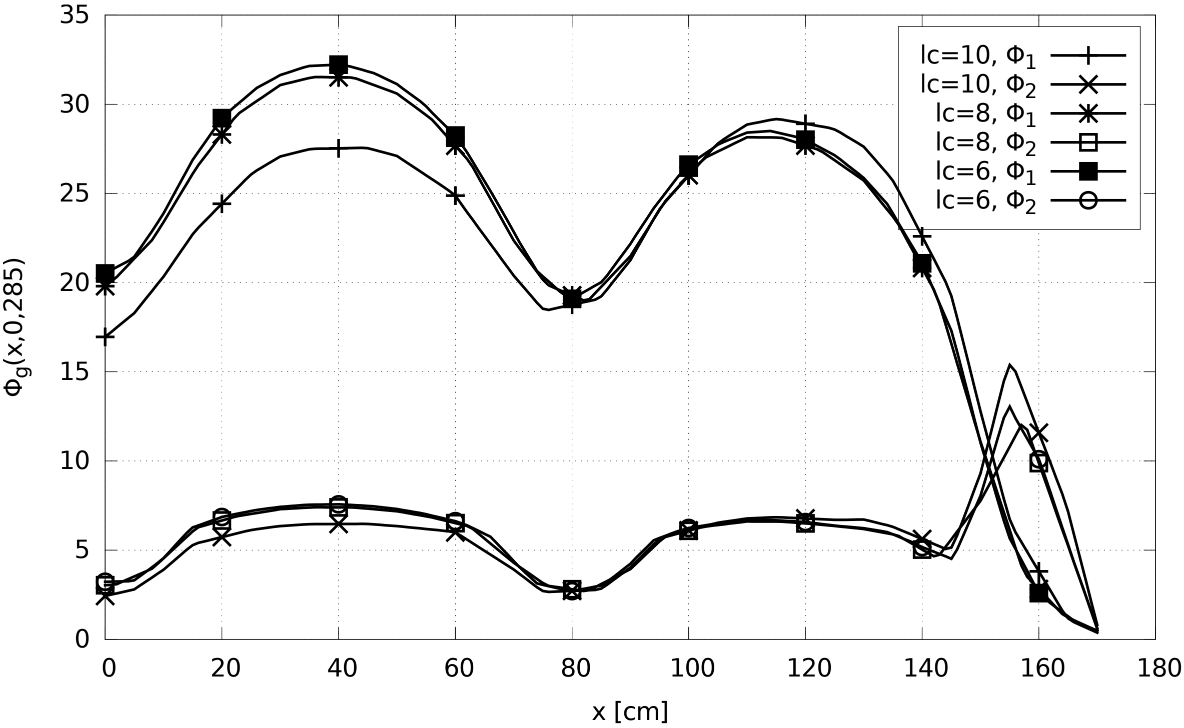


Figure 8: $\Phi_g(x, x, 285)$

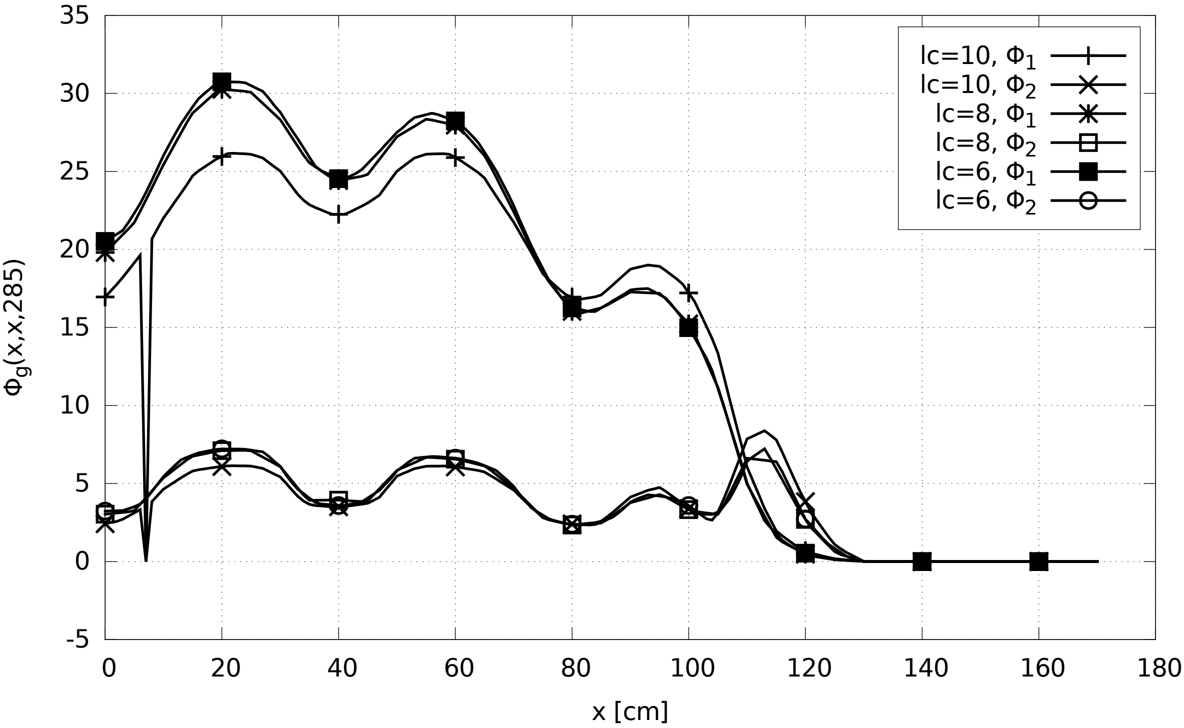


Figure 9: $\Phi_g(40, 40, z)$

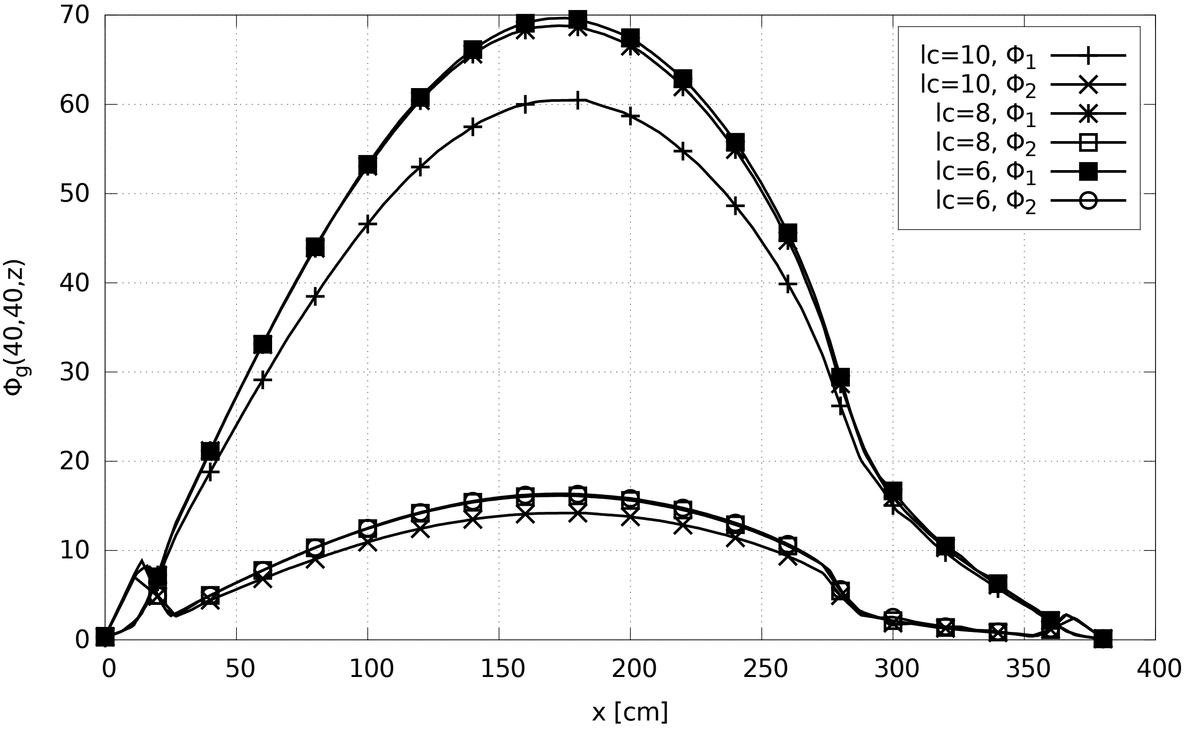
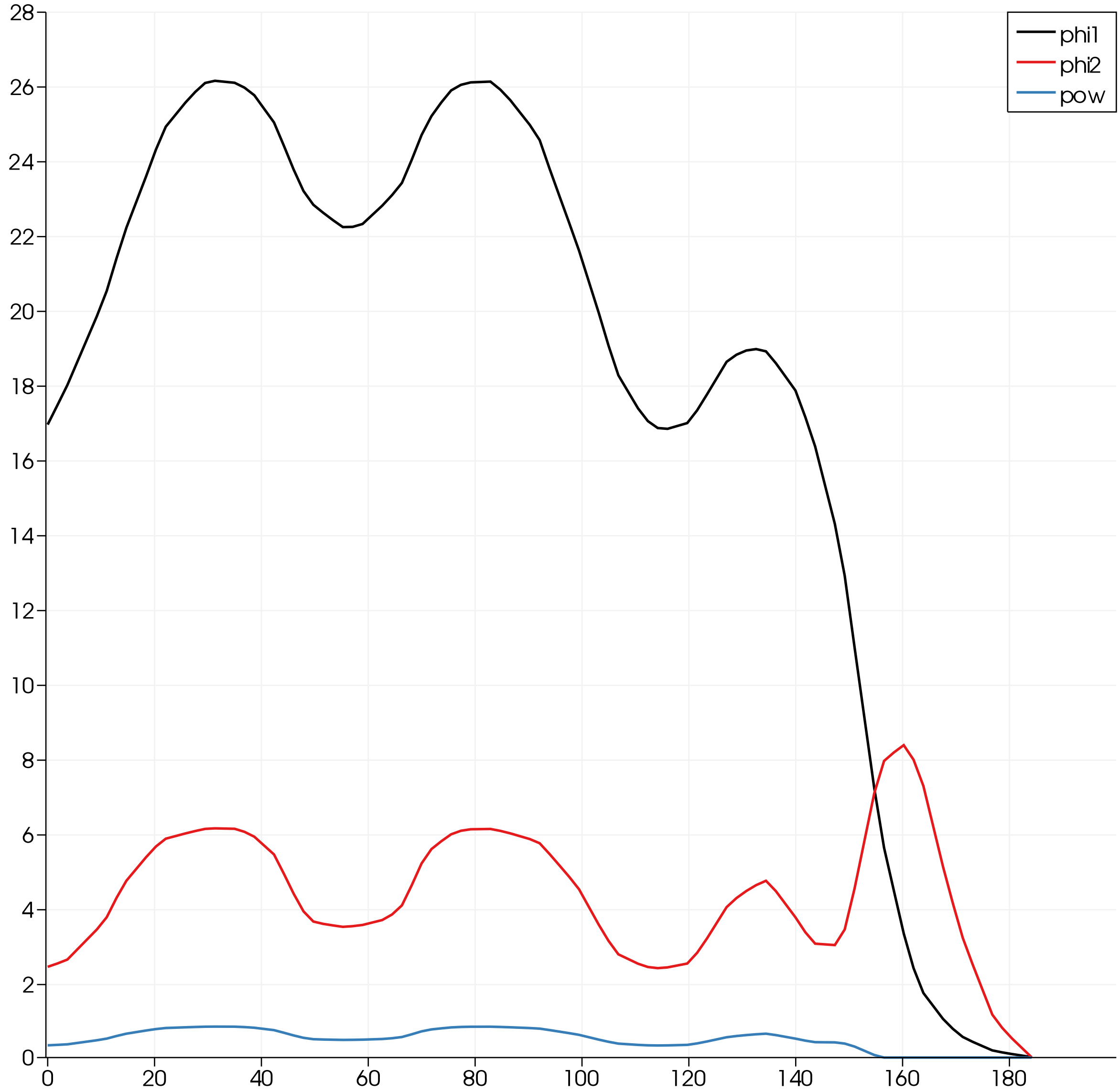


Figure 10: Variables along the line x,x,285 plotted with paraview



6. The Figure 11, the Figure 12 and the Figure 13 show the color maps for the lc = 6 case.

Figure 11: Φ_1 color map. lc = 6

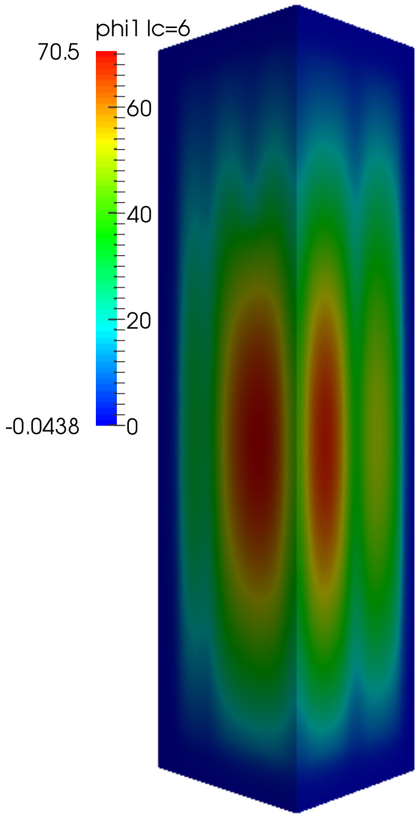


Figure 12: Φ_2 color map. lc = 6

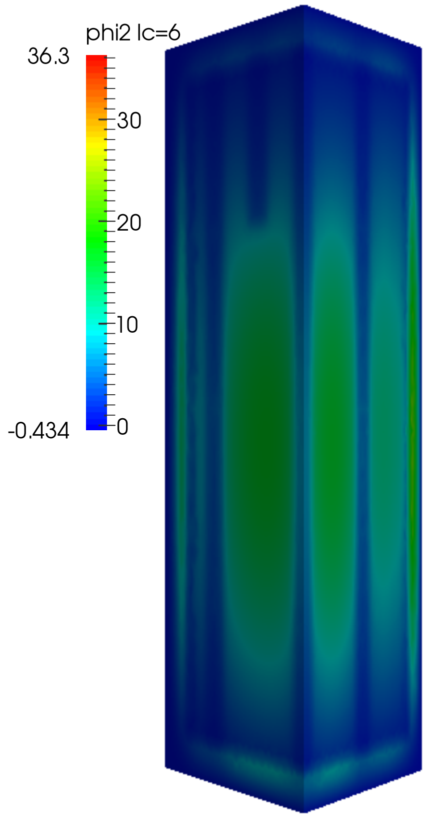


Figure 13: Power color map. lc = 6

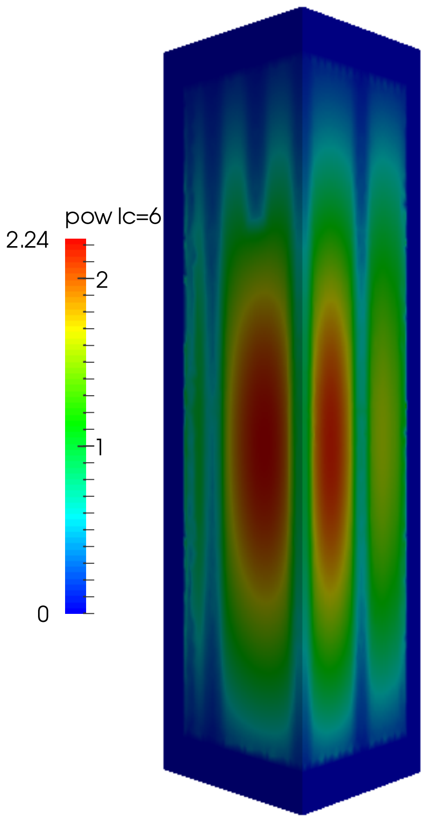


Table 3: Average assembly powers P_k

k	P_k lc			[1]	
	10	8	6	VENTURE	VANCER
1	0.608	0.693	0.706	0.729	0.722
2	1.01	1.18	1.2	1.281	1.2652
3	1.15	1.32	1.34	1.422	1.3317
4	0.977	1.12	1.13	1.193	1.1351
5	0.601	0.62	0.627	0.61	0.6057
6	0.928	0.954	0.956	0.953	0.945
7	1.04	1	1	0.959	0.97
8	0.632	0.704	0.691	0.777	0.8089
9	0	0	0	1.11	1.1348
10	1.12	1.3	1.31	1.397	1.3404
11	1.16	1.34	1.35	1.432	1.3732
12	1.09	1.22	1.23	1.291	1.2408
13	0.949	1.03	1.04	1.072	1.041
14	1.05	1.06	1.07	1.055	1.05
15	1.07	1.03	1.02	0.976	0.992
16	0.587	0.628	0.655	0.757	0.8
17	0	0	0	1.056	1.1116
18	1.14	1.29	1.3	1.368	1.3174
19	1.13	1.25	1.26	1.311	1.2705
20	1.1	1.15	1.16	1.181	1.1615
21	1.12	1.11	1.11	1.089	1.0931
22	1.03	1.04	1.04	1	1.026
23	0.378	0.425	0.463	0.711	0.777
24	0	0	0	0.813	0.8752
25	0.525	0.569	0.574	1.178	1.1495
26	0.915	0.956	0.962	0.972	0.9583
27	0.976	0.959	0.958	0.923	0.9358
28	0.592	0.683	0.717	0.866	0.9203
29	0	0	0	1.722	1.8108
30	0	0	0	0.39	0.4325
31	0.538	0.513	0.511	0.476	0.4906
32	0.736	0.728	0.726	0.7	0.7186
33	0.324	0.375	0.408	0.611	0.6717
34	0	0	0	0.836	0.9038
35	0.353	0.381	0.396	0.597	0.6536
36	0	0	0	1.151	1.2214
37	0	0	0	0.309	0.3459
38	0	0	0	0.354	0.3918

Table 4: Φ_1 averages on blocks

k	lc	Axial layer																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	10	1.81	9.78	18	25.5	32.1	37.4	41.4	44.1	45.3	44.6	42.4	38.7	33.4	26.9	20	14.1	8.96	4.55	0.824
1	8	1.97	11.2	20.9	29.6	37.4	43.6	48.5	51.5	52.8	52	49.3	44.7	38.5	31	23.2	16.1	10.2	5.16	0.884
1	6	1.93	11.2	20.9	29.8	37.6	44.1	48.9	52.1	53.4	52.7	50.1	45.5	39.2	31.6	23.6	16.5	10.5	5.28	0.893
2	10	2.18	12.5	22.9	32.3	40.7	47.7	52.9	56.2	57.7	57	54.1	49.2	42.4	34	25.4	17.6	11.2	5.72	0.977
2	8	2.38	14.4	26.7	37.8	47.7	55.9	62	65.9	67.4	66.5	63.2	57.3	49.3	39.4	29.3	20.3	12.9	6.49	1.04
2	6	2.32	14.4	26.8	38.1	48.1	56.4	62.7	66.8	68.4	67.5	64.1	58.2	50.1	40.2	29.9	20.8	13.2	6.63	1.06
3	10	2.4	13.9	25.5	36	45.2	53	58.8	62.6	64.2	63.5	60.3	54.9	47.4	38	28.3	19.6	12.6	6.42	1.09
3	8	2.64	15.9	29.4	41.7	52.5	61.5	68.3	72.6	74.3	73.3	69.6	63.3	54.4	43.5	32.2	22.2	14.2	7.17	1.15
3	6	2.54	15.8	29.5	42	52.9	62.1	69	73.5	75.3	74.4	70.6	64.3	55.4	44.3	32.8	22.7	14.5	7.31	1.16
4	10	2.08	12	22	31.1	39	45.7	50.8	54.1	55.6	55	52.3	47.7	41.6	33.7	25.6	18.1	11.7	6.11	1.07
4	8	2.29	13.5	25.1	35.5	44.6	52.4	58.2	61.9	63.4	62.6	59.5	54.2	46.9	38	28.6	20.1	13	6.64	1.09
4	6	2.21	13.5	25	35.6	44.9	52.6	58.6	62.5	64.1	63.3	60.2	54.9	47.6	38.6	29.1	20.5	13.2	6.74	1.1
5	10	1.69	9.25	17	24	30.1	35.1	38.9	41.3	42.5	42	40.4	37.2	32.9	27.1	21.4	15.9	10.5	5.51	1.01
5	8	1.73	9.73	18	25.6	32.3	37.6	41.7	44.4	45.5	44.9	42.9	39.3	34.4	28.6	22.3	16.3	10.8	5.58	0.977
5	6	1.67	9.58	17.9	25.4	32.1	37.6	41.8	44.6	45.8	45.3	43.4	39.8	34.9	28.9	22.7	16.5	10.8	5.61	0.962
6	10	1.94	11	20.1	28.3	35.7	41.7	46.4	49.3	50.6	50.5	48.4	44.9	40	34	27.6	20.8	14.2	7.58	1.33
6	8	1.89	11.2	20.7	29.4	36.9	43.2	48	51.1	52.4	51.8	49.5	45.6	40.6	34.3	27.6	20.7	14	7.36	1.22
6	6	1.8	10.9	20.4	29	36.6	42.9	47.9	51	52.4	52.1	49.9	46.1	40.9	34.7	27.9	20.9	14.1	7.35	1.19
7	10	2.03	11.9	21.8	30.7	38.5	44.9	49.8	52.9	54.3	54	52.1	48.6	43.7	37.3	30.5	23.3	16	8.6	1.48
7	8	1.88	11.4	21.1	29.9	37.7	44.1	48.9	52	53.3	52.8	50.6	46.8	41.8	35.7	29.1	22.1	15.1	7.95	1.29
7	6	1.78	11.1	20.7	29.5	37.2	43.6	48.5	51.7	53.2	52.9	50.8	47.2	42.2	36	29.3	22.2	15.1	7.86	1.25
8	10	1.49	8.96	16.7	23.7	29.4	34.1	37.9	40.3	41.1	40.6	39.5	37.3	33.5	28.5	23.2	18	12.4	6.68	1.11
8	8	1.32	8.15	15.2	21.6	27.2	31.8	35.2	37.4	38.3	37.9	36.3	33.6	30.1	25.8	21.2	16.3	11.1	5.88	0.929
8	6	1.23	7.89	14.8	21.1	26.6	31.2	34.7	37	38	37.9	36.5	33.9	30.4	26.1	21.3	16.2	11	5.74	0.89
9	10	0.362	1.86	3.69	5.4	6.58	7.56	8.33	8.93	8.76	8.39	8.83	8.4	7.56	6.12	4.97	4.08	2.84	1.44	0.278
9	8	0.286	1.52	2.84	4.07	5.22	5.91	6.58	6.92	7.11	6.93	6.62	6.15	5.58	4.83	3.96	3.11	2.17	1.11	0.214
9	6	0.278	1.47	2.81	3.92	4.98	5.8	6.32	6.8	7.04	6.87	6.76	6.4	5.69	4.83	3.99	3.04	2.02	1.04	0.199
10	10	2.35	13.6	25	35.3	44.4	51.9	57.7	61.3	62.9	62.1	59	53.7	46.2	36.7	26.5	18	11.5	5.89	0.998

Continued on next page

Φ_1 averages on blocks – *Continued from previous page*

k	lc	Axial layer																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
10	8	2.58	15.6	29	41.1	51.8	60.5	67.2	71.5	73.2	72.1	68.5	62.2	53.3	42.3	30.6	20.9	13.2	6.66	1.07
10	6	2.51	15.6	29	41.3	52.1	61	67.9	72.4	74.1	73.2	69.5	63.2	54.3	43.2	31.3	21.4	13.5	6.81	1.09
11	10	2.52	14.3	26.3	37	46.6	54.6	60.6	64.4	66	64.9	62.1	56.6	48.7	38.4	26.7	17.9	11.4	5.87	1.03
11	8	2.74	16.3	30.1	42.6	53.7	62.9	69.7	74.2	76	74.9	71.2	64.7	55.5	43.5	30.3	20.3	12.9	6.53	1.08
11	6	2.62	16.2	30.1	42.8	54	63.4	70.4	75	76.9	76	72.2	65.7	56.4	44.4	31	20.8	13.2	6.65	1.08
12	10	2.34	13.2	24.1	33.9	42.7	50	55.6	59.1	60.6	59.6	57.1	52.2	45.3	36.6	26.9	18.8	12.2	6.36	1.16
12	8	2.51	14.6	27	38.3	48.2	56.5	62.7	66.7	68.3	67.4	64.1	58.5	50.5	40.5	29.8	20.7	13.3	6.85	1.15
12	6	2.38	14.5	27	38.4	48.4	56.8	63.2	67.3	69	68.2	65	59.3	51.3	41.2	30.3	21.1	13.6	6.94	1.12
13	10	2.07	11.6	21.1	29.8	37.6	43.8	48.6	51.8	53.3	52.6	50.3	46.3	40.9	34.1	26.7	19.5	13	6.9	1.23
13	8	2.13	12.3	22.7	32.2	40.6	47.5	52.8	56.1	57.5	56.8	54.2	49.7	43.6	36	28	20.5	13.5	7.04	1.2
13	6	2.02	12.2	22.6	32.1	40.6	47.5	52.9	56.4	57.9	57.4	54.8	50.3	44.1	36.6	28.5	20.7	13.7	7.07	1.15
14	10	2.15	12.2	22.3	31.5	39.5	46.2	51.4	54.6	55.9	55.2	53.4	49.7	44.2	37.6	30.3	22.9	15.6	8.35	1.47
14	8	2.08	12.3	22.6	32.1	40.5	47.3	52.6	55.9	57.3	56.7	54.2	50	44.3	37.5	30.1	22.6	15.3	8.02	1.34
14	6	1.96	12	22.3	31.8	40.1	47.1	52.3	55.8	57.4	57	54.6	50.5	44.8	38	30.4	22.8	15.3	7.97	1.28
15	10	2.12	12.2	22.5	31.8	39.7	46.4	51.4	54.8	55.9	55.3	54	50.4	45.3	38.6	31.4	24.1	16.6	8.89	1.55
15	8	1.94	11.6	21.5	30.6	38.5	45	50	53.2	54.5	53.9	51.6	47.8	42.6	36.4	29.6	22.5	15.4	8.11	1.34
15	6	1.82	11.3	21.1	30	37.9	44.5	49.5	52.8	54.3	53.9	51.9	48.1	43	36.8	29.8	22.6	15.3	7.99	1.27
16	10	1.52	8.88	16.6	23.6	29.4	34.2	37.8	39.9	41.1	40.3	39.2	37	33.2	28.5	23	17.8	12.4	6.71	1.13
16	8	1.32	8.06	15	21.3	26.8	31.4	34.7	37	37.8	37.3	35.8	33.2	29.6	25.5	20.9	16	11	5.81	0.935
16	6	1.23	7.78	14.6	20.7	26.2	30.7	34.1	36.4	37.5	37.2	35.9	33.4	29.9	25.7	21	16	10.8	5.63	0.877
17	10	0.337	1.89	3.94	5.73	7.16	7.58	8.95	9.75	8.82	8.37	9.64	9.3	8.05	5.96	5.22	4.46	2.95	1.41	0.26
17	8	0.289	1.5	2.88	4.09	5.23	6.02	6.69	7.03	7.16	6.87	6.7	6.14	5.56	4.76	3.93	3.09	2.15	1.1	0.211
17	6	0.267	1.41	2.72	3.82	4.84	5.61	6.26	6.72	6.9	6.78	6.68	6.19	5.57	4.78	3.93	3	1.99	1.03	0.194
18	10	2.55	14.6	26.7	37.6	47.3	55.4	61.5	65.3	67	66.3	63.1	57.6	49.5	37.9	23.6	15.2	9.61	4.9	0.893
18	8	2.72	16.3	30.1	42.7	53.8	62.9	69.9	74.3	76.1	75.1	71.4	64.9	55.6	42.3	25.8	16.4	10.4	5.27	0.917
18	6	2.6	16.2	30.1	42.8	54	63.3	70.4	75	76.9	76.1	72.3	65.9	56.5	43	26.2	16.7	10.5	5.33	0.913
19	10	2.46	13.9	25.3	35.6	44.8	52.5	58.3	61.9	63.5	62.5	60	55	47.7	38.1	27.1	18.6	12.1	6.36	1.15
19	8	2.57	15.1	27.9	39.6	49.8	58.3	64.7	68.8	70.5	69.6	66.3	60.5	52.3	41.5	29.3	20.1	12.9	6.68	1.13
19	6	2.43	14.9	27.8	39.6	50	58.6	65.2	69.4	71.2	70.5	67.1	61.4	53.1	42.1	29.8	20.4	13.2	6.74	1.1
20	10	2.31	12.9	23.7	33.5	42	49	54.4	58.1	59.5	58.6	56.5	52.1	46	38.2	29.9	21.9	14.7	7.81	1.37

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Φ_1 averages on blocks – *Continued from previous page*

k	lc	Axial layer																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	8	2.31	13.6	25.1	35.5	44.7	52.3	58.1	61.8	63.3	62.6	59.8	54.9	48.1	39.8	30.8	22.5	14.9	7.75	1.3
20	6	2.18	13.4	24.9	35.4	44.6	52.3	58.2	62.1	63.7	63.1	60.3	55.5	48.6	40.3	31.3	22.7	15	7.76	1.25
21	10	2.29	12.9	23.7	33.5	42	49	54.4	57.8	59.2	58.3	56.4	52.4	46.8	39.8	31.9	24.1	16.5	8.85	1.55
21	8	2.17	12.8	23.6	33.5	42.1	49.3	54.8	58.2	59.6	59	56.5	52.1	46.1	39	31.3	23.5	15.8	8.34	1.39
21	6	2.02	12.5	23.2	33.1	41.7	48.9	54.4	58.1	59.7	59.3	56.8	52.5	46.6	39.4	31.6	23.6	15.9	8.26	1.32
22	10	2.14	12.3	22.8	32.3	40.3	47	52.2	55.4	56.6	55.8	54.4	51.1	45.8	39	31.6	24.2	16.7	9.01	1.55
22	8	1.92	11.5	21.3	30.2	38	44.5	49.4	52.6	53.8	53.2	50.9	47.1	42	35.9	29.2	22.3	15.2	8.01	1.3
22	6	1.77	11.1	20.8	29.6	37.4	43.9	48.8	52	53.5	53.1	51.1	47.5	42.4	36.2	29.4	22.3	15.1	7.84	1.23
23	10	1.34	7.92	14.9	21.3	26.5	30.9	34.1	36.3	37	36.2	35.2	33.6	30.1	25.6	20.7	16.1	11.2	6.04	1.01
23	8	1.13	6.98	13	18.5	23.2	27.2	30.1	32	32.7	32.2	30.9	28.6	25.6	22	18	13.8	9.51	5	0.797
23	6	1.04	6.66	12.5	17.8	22.5	26.4	29.3	31.3	32.2	32	30.9	28.7	25.7	22.1	18	13.7	9.28	4.81	0.75
24	10	0.256	1.57	3.48	4.77	6.12	6.75	7.67	8.35	7.37	6.96	8.15	7.67	6.91	4.97	4.25	3.84	2.55	1.18	0.21
24	8	0.228	1.18	2.28	3.24	4.14	4.66	5.27	5.66	5.71	5.41	5.29	4.84	4.4	3.74	3.08	2.45	1.71	0.87	0.164
24	6	0.207	1.09	2.11	2.99	3.77	4.42	4.93	5.28	5.42	5.31	5.32	4.84	4.35	3.79	3.08	2.34	1.56	0.803	0.15
25	10	1.1	6.32	11.5	16.2	20.4	23.9	26.6	28.3	29	28.8	27.5	25.3	22.1	18	13.3	9.5	6.27	3.32	0.579
25	8	1.14	6.79	12.5	17.8	22.3	26.2	29	30.8	31.6	31.3	29.8	27.3	23.7	19.2	14.3	10	6.56	3.4	0.564
25	6	1.08	6.69	12.5	17.7	22.4	26.2	29.2	31.1	31.9	31.6	30.2	27.6	24	19.5	14.5	10.2	6.65	3.43	0.553
26	10	1.99	11	20.1	28.5	35.8	41.9	46.4	49.4	50.9	50	48.3	44.5	39.3	32.9	26	19.2	12.9	6.83	1.23
26	8	1.95	11.4	21	29.8	37.5	43.9	48.7	51.8	53.1	52.6	50.2	46.1	40.5	33.7	26.4	19.3	12.9	6.71	1.13
26	6	1.85	11.2	20.8	29.6	37.4	43.8	48.7	52	53.4	53	50.6	46.6	41	34.1	26.7	19.6	13	6.71	1.1
27	10	2	11.3	20.8	29.5	37.2	43.2	48.2	51.4	52.3	51.4	50	46.7	41.6	35.3	28.4	21.5	14.8	7.89	1.4
27	8	1.86	11	20.3	28.7	36.2	42.3	47	50	51.2	50.7	48.5	44.8	39.7	33.7	27.1	20.4	13.8	7.25	1.21
27	6	1.74	10.7	19.9	28.3	35.8	42	46.6	49.8	51.2	50.8	48.7	45.1	40.1	34	27.3	20.5	13.8	7.16	1.15
28	10	1.75	10	18.7	26.7	33.4	39	43.1	45.8	46.6	46	44.9	42.3	37.9	32.2	26	20	13.9	7.45	1.31
28	8	1.51	9.17	17.1	24.2	30.4	35.5	39.4	42	43	42.4	40.6	37.6	33.6	28.7	23.3	17.8	12.2	6.39	1.04
28	6	1.4	8.82	16.5	23.5	29.7	34.9	38.8	41.4	42.5	42.2	40.7	37.8	33.7	28.8	23.4	17.7	12	6.21	0.973
29	10	0.605	3.61	7.54	11	13.9	15.4	17.4	18.7	19.2	16.5	18.2	17.7	15.8	12.4	9.98	8.12	5.83	2.97	0.474
29	8	0.528	2.88	5.48	7.74	9.89	11.3	12.6	13.5	13.7	13	12.9	11.7	10.6	9.05	7.49	5.87	4.01	2.04	0.369
29	6	0.476	2.64	5.11	7.19	9.15	10.7	11.9	12.8	13.1	12.9	12.6	11.7	10.4	8.93	7.38	5.57	3.72	1.9	0.337
30	10	0.089	0.389	0.827	1.37	1.49	1.47	1.71	1.68	1.7	1.87	1.95	1.72	1.36	1.06	1.05	0.799	0.481	0.205	0.0608

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Φ_1 averages on blocks – *Continued from previous page*

k	**lc**	**Axial layer**																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
30	8	0.0756	0.331	0.638	0.923	1.14	1.34	1.51	1.53	1.58	1.58	1.51	1.39	1.27	1.04	0.856	0.687	0.457	0.24	0.054
30	6	0.0701	0.312	0.607	0.836	1.07	1.21	1.38	1.49	1.52	1.51	1.49	1.38	1.22	1.06	0.865	0.652	0.433	0.228	0.05
31	10	1.49	8.11	15	21.2	26.7	31	34.5	36.7	37.5	36.8	35.7	33.4	29.5	24.7	19.8	15.1	10.2	5.38	0.988
31	8	1.39	7.84	14.6	20.7	26.1	30.4	33.7	35.9	36.8	36.3	34.8	32	28.3	23.8	19	14.2	9.52	4.98	0.876
31	6	1.32	7.64	14.3	20.3	25.7	30.1	33.6	35.8	36.7	36.4	35	32.3	28.6	24.1	19.1	14.2	9.5	4.92	0.843
32	10	1.54	8.76	16.3	23.3	29.1	33.9	37.9	40.3	40.7	40.1	39.1	36.8	32.6	27.8	22.4	17.1	11.8	6.29	1.09
32	8	1.37	8.21	15.2	21.6	27.1	31.8	35.3	37.5	38.4	38	36.4	33.7	29.9	25.5	20.6	15.6	10.6	5.58	0.927
32	6	1.29	7.95	14.8	21.1	26.7	31.4	34.9	37.2	38.2	38	36.5	33.8	30.1	25.6	20.7	15.6	10.5	5.47	0.872
33	10	1.18	6.83	12.9	18.4	23.2	26.9	29.8	31.6	32.1	31.4	30.8	29.1	26.3	22.2	17.7	13.9	9.6	5.14	0.864
33	8	0.979	6.03	11.3	16	20.1	23.5	26.1	27.8	28.4	28	26.9	24.9	22.2	19	15.5	11.9	8.09	4.24	0.685
33	6	0.907	5.79	10.9	15.5	19.5	22.9	25.6	27.3	28	27.8	26.9	24.9	22.2	19	15.5	11.7	7.91	4.08	0.634
34	10	0.261	1.55	3	4.34	5.83	6.6	7.6	8.33	7.53	6.63	7.64	7.52	6.66	4.92	4.04	3.49	2.46	1.15	0.205
34	8	0.228	1.18	2.23	3.24	4.1	4.64	5.24	5.49	5.62	5.36	5.34	4.84	4.38	3.72	3.05	2.38	1.64	0.833	0.159
34	6	0.205	1.08	2.09	2.94	3.74	4.39	4.89	5.24	5.35	5.27	5.25	4.79	4.28	3.66	3.02	2.28	1.51	0.771	0.145
35	10	2.06	12.1	23.6	33.7	42.4	48.6	54.1	57.5	57.2	54.7	55.7	53.1	47.4	38.2	31.9	24.8	17.1	8.85	1.52
35	8	1.75	10.3	19.2	27.2	34.5	39.8	44.4	47.4	48.5	47.2	45.7	42.1	37.7	32.1	26.3	20.2	13.8	7.16	1.23
35	6	1.61	9.65	18.3	25.9	32.7	38.3	43.1	46	47.1	46.4	45.4	42	37.4	31.9	26	19.7	13.2	6.81	1.13
36	10	0.419	2.49	5.1	7.27	9.19	10.4	11.6	12.3	12.1	10.9	11.9	11.3	10.2	7.81	6.59	5.33	3.67	1.82	0.311
36	8	0.351	1.95	3.7	5.18	6.72	7.58	8.5	9.06	9.3	8.87	8.73	7.95	7.14	6.09	5.04	3.94	2.69	1.37	0.248
36	6	0.319	1.8	3.46	4.88	6.14	7.23	8.19	8.7	8.92	8.73	8.69	7.97	7.12	6.06	4.96	3.76	2.5	1.27	0.226
37	10	0.0714	0.325	0.655	0.999	1.16	1.33	1.43	1.47	1.53	1.57	1.53	1.59	1.42	1.06	0.997	0.66	0.463	0.247	0.0578
37	8	0.0598	0.272	0.511	0.754	0.942	1.08	1.19	1.27	1.28	1.3	1.22	1.13	1.04	0.853	0.703	0.541	0.367	0.186	0.0434
37	6	0.0562	0.255	0.493	0.684	0.863	1	1.13	1.24	1.23	1.22	1.22	1.12	1	0.839	0.693	0.528	0.343	0.183	0.0404
38	10	0.082	0.422	0.77	0.934	1.16	1.64	1.95	1.87	1.91	1.78	1.89	1.4	1.22	1.19	0.907	0.748	0.502	0.275	0.0623
38	8	0.0643	0.291	0.563	0.81	1.01	1.18	1.3	1.37	1.41	1.39	1.33	1.2	1.1	0.942	0.774	0.601	0.415	0.207	0.0467
38	6	0.062	0.279	0.537	0.749	0.944	1.1	1.22	1.34	1.38	1.38	1.32	1.23	1.1	0.946	0.772	0.578	0.379	0.198	0.0434

Table 6: Φ_2 averages on blocks

k	lc	Axial layer																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	10	3.87	1.97	3.15	4.47	5.63	6.55	7.26	7.74	7.94	7.8	7.44	6.8	5.85	4.68	3.5	2.48	1.57	0.917	1.74
1	8	4.42	2.24	3.61	5.12	6.49	7.55	8.39	8.9	9.14	8.95	8.54	7.75	6.66	5.37	4.03	2.8	1.78	1.02	1.96
1	6	4.45	2.19	3.63	5.15	6.5	7.66	8.46	9.01	9.23	9.1	8.66	7.89	6.8	5.46	4.09	2.85	1.81	1.03	2.04
2	10	4.66	3.28	5.27	7.45	9.37	11	12.2	12.9	13.3	13.1	12.5	11.3	9.76	7.84	5.85	4.04	2.58	1.49	2.07
2	8	5.31	3.73	6.16	8.74	11	12.9	14.3	15.2	15.6	15.4	14.6	13.2	11.4	9.09	6.76	4.68	2.97	1.67	2.32
2	6	5.26	3.71	6.19	8.79	11.1	13	14.5	15.4	15.8	15.6	14.8	13.4	11.6	9.27	6.9	4.79	3.04	1.71	2.36
3	10	5.12	3.71	5.97	8.44	10.6	12.4	13.8	14.7	15.1	14.9	14.1	12.9	11.1	8.91	6.65	4.61	2.96	1.71	2.31
3	8	5.76	4.21	6.91	9.79	12.3	14.4	16	17	17.4	17.2	16.3	14.9	12.8	10.2	7.55	5.22	3.32	1.88	2.53
3	6	5.7	4.14	6.92	9.85	12.4	14.6	16.2	17.2	17.7	17.5	16.6	15.1	13	10.4	7.7	5.33	3.4	1.92	2.56
4	10	4.57	3.11	5.03	7.09	8.9	10.5	11.6	12.4	12.7	12.6	11.9	10.9	9.49	7.73	5.86	4.11	2.67	1.58	2.28
4	8	5.03	3.52	5.78	8.2	10.3	12.1	13.4	14.3	14.6	14.5	13.7	12.5	10.8	8.75	6.58	4.61	2.99	1.72	2.4
4	6	4.94	3.48	5.77	8.21	10.4	12.1	13.5	14.4	14.8	14.6	13.9	12.6	11	8.9	6.71	4.73	3.05	1.75	2.41
5	10	3.64	1.89	3.06	4.33	5.4	6.29	6.98	7.4	7.6	7.38	7.28	6.72	5.93	4.79	3.8	2.88	1.9	1.12	2.16
5	8	3.86	1.95	3.16	4.47	5.69	6.57	7.3	7.78	7.97	7.82	7.53	6.87	6.03	5	3.92	2.86	1.9	1.11	2.19
5	6	3.77	1.9	3.13	4.43	5.62	6.59	7.3	7.79	8.01	7.89	7.59	6.99	6.11	5.04	3.96	2.88	1.89	1.11	2.17
6	10	4.16	2.87	4.6	6.46	8.16	9.52	10.6	11.2	11.6	11.6	11	10.2	9.14	7.8	6.33	4.75	3.24	1.98	2.82
6	8	4.16	2.89	4.77	6.77	8.48	9.96	11	11.8	12.1	11.9	11.4	10.5	9.34	7.91	6.34	4.77	3.22	1.9	2.69
6	6	4.05	2.82	4.69	6.68	8.42	9.87	11	11.7	12.1	12	11.5	10.6	9.42	8	6.43	4.83	3.25	1.9	2.66
7	10	4.31	3.18	5.16	7.27	9.12	10.6	11.8	12.6	12.8	12.8	12.4	11.5	10.3	8.83	7.21	5.52	3.81	2.3	3.11
7	8	4.11	3.02	4.97	7.05	8.89	10.4	11.5	12.3	12.6	12.4	11.9	11	9.84	8.41	6.84	5.21	3.55	2.1	2.83
7	6	3.96	2.91	4.88	6.94	8.76	10.3	11.4	12.2	12.5	12.5	12	11.1	9.94	8.49	6.9	5.23	3.55	2.07	2.76
8	10	3.23	2.88	4.88	6.87	8.59	9.98	11	11.6	11.8	11.7	11.5	10.8	9.75	8.33	6.7	5.22	3.63	2.18	2.41
8	8	2.92	2.55	4.29	6.09	7.71	8.95	9.93	10.5	10.8	10.6	10.2	9.44	8.49	7.3	5.99	4.59	3.18	1.85	2.08
8	6	2.82	2.46	4.21	5.95	7.52	8.8	9.71	10.4	10.7	10.6	10.3	9.63	8.59	7.33	6.04	4.59	3.09	1.77	2.01
9	10	1.29	3.95	7.42	10.3	13.1	15	16.9	18	17.8	17.9	17.5	16.9	15	12.3	10.4	8.12	5.61	2.96	0.973
9	8	1.11	3.41	6.27	8.98	11.2	13.2	14.5	15.4	15.7	15.5	14.9	13.7	12.4	10.6	8.72	6.73	4.61	2.5	0.791
9	6	1.05	3.28	5.99	8.62	10.8	12.6	14.2	15	15.4	15.5	14.9	13.8	12.4	10.8	8.71	6.66	4.53	2.41	0.764
10	10	5.05	3.63	5.86	8.27	10.4	12.2	13.5	14.4	14.7	14.5	13.8	12.6	10.8	8.61	6.2	4.22	2.69	1.57	2.12

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Φ$_2$ averages on blocks – *Continued from previous page*

k	lc	Axial layer																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
10	8	5.69	4.12	6.79	9.63	12.1	14.2	15.8	16.8	17.2	16.9	16.1	14.6	12.5	9.92	7.16	4.89	3.09	1.75	2.36
10	6	5.63	4.09	6.81	9.68	12.2	14.3	15.9	17	17.4	17.2	16.3	14.8	12.7	10.1	7.31	5.01	3.16	1.78	2.4
11	10	5.23	3.85	6.17	8.7	10.9	12.8	14.2	15.1	15.5	15.2	14.6	13.3	11.4	9.01	6.1	4.07	2.6	1.54	2.15
11	8	5.86	4.31	7.07	10	12.6	14.8	16.4	17.4	17.8	17.6	16.7	15.2	13	10.2	6.98	4.67	2.97	1.69	2.33
11	6	5.78	4.26	7.07	10.1	12.7	14.9	16.5	17.6	18.1	17.8	16.9	15.4	13.2	10.4	7.13	4.79	3.03	1.72	2.37
12	10	4.81	3.54	5.66	7.96	10	11.7	13.1	13.9	14.2	14	13.4	12.3	10.6	8.59	6.33	4.42	2.87	1.74	2.25
12	8	5.3	3.9	6.35	8.98	11.3	13.2	14.7	15.6	16	15.8	15	13.7	11.8	9.5	6.98	4.87	3.13	1.81	2.43
12	6	5.24	3.82	6.33	9	11.4	13.3	14.8	15.8	16.2	16	15.2	13.9	12	9.67	7.1	4.95	3.18	1.82	2.46
13	10	4.35	3.04	4.79	6.78	8.58	10	11.1	11.8	12.2	12.1	11.5	10.5	9.31	7.82	6.11	4.43	2.95	1.81	2.57
13	8	4.56	3.21	5.23	7.41	9.34	10.9	12.2	12.9	13.2	13.1	12.4	11.4	10	8.29	6.45	4.7	3.1	1.83	2.55
13	6	4.46	3.16	5.2	7.39	9.33	10.9	12.2	13	13.3	13.2	12.6	11.6	10.1	8.42	6.55	4.77	3.15	1.82	2.56
14	10	4.47	3.27	5.25	7.41	9.26	10.8	12.1	12.9	13.1	12.9	12.5	11.7	10.4	8.83	7.11	5.37	3.67	2.24	3.02
14	8	4.46	3.26	5.32	7.53	9.49	11.1	12.3	13.1	13.4	13.3	12.7	11.7	10.4	8.8	7.06	5.3	3.58	2.13	2.86
14	6	4.32	3.16	5.24	7.46	9.41	11	12.3	13.1	13.5	13.4	12.8	11.8	10.5	8.91	7.14	5.35	3.59	2.1	2.83
15	10	4.39	3.31	5.35	7.53	9.45	11	12.2	12.8	13.3	13.1	12.8	11.9	10.7	9.16	7.41	5.71	3.92	2.41	3.16
15	8	4.16	3.1	5.11	7.24	9.15	10.7	11.8	12.6	12.9	12.7	12.2	11.3	10.1	8.62	7.01	5.34	3.64	2.16	2.85
15	6	3.98	3	5	7.1	8.97	10.5	11.7	12.5	12.8	12.7	12.3	11.4	10.2	8.69	7.06	5.35	3.62	2.11	2.79
16	10	3.16	2.88	4.99	7.15	8.8	9.99	11.4	12.4	11.9	11.6	12.1	11.4	10.2	8.17	6.9	5.46	3.77	2.17	2.36
16	8	2.87	2.54	4.3	6.07	7.68	8.92	9.92	10.5	10.7	10.5	10.2	9.36	8.39	7.21	5.91	4.58	3.16	1.83	2.03
16	6	2.74	2.42	4.13	5.86	7.4	8.66	9.6	10.3	10.6	10.5	10.2	9.44	8.46	7.27	5.96	4.52	3.06	1.75	1.96
17	10	1.29	3.91	6.73	9.59	11.8	14.7	15.4	16.1	17.3	17.4	15.6	15.1	13.5	12.3	9.64	7.27	5.1	2.93	0.977
17	8	1.07	3.3	5.93	8.58	10.7	12.5	13.8	14.7	15	14.9	14.1	13.3	11.8	10.2	8.33	6.4	4.41	2.39	0.772
17	6	1.01	3.16	5.74	8.24	10.3	12.1	13.5	14.3	14.8	14.7	14.3	13.3	11.9	10.2	8.32	6.37	4.31	2.28	0.735
18	10	5.41	3.89	6.27	8.83	11.1	13	14.4	15.3	15.7	15.6	14.8	13.5	11.6	8.76	4.29	2.73	1.73	1	1.91
18	8	5.94	4.31	7.08	10	12.6	14.8	16.4	17.4	17.9	17.6	16.8	15.2	13	9.76	4.63	2.89	1.83	1.05	2.03
18	6	5.81	4.25	7.07	10.1	12.7	14.9	16.5	17.6	18.1	17.9	17	15.5	13.3	9.96	4.68	2.9	1.83	1.05	2.03
19	10	5.03	3.73	5.93	8.36	10.5	12.3	13.7	14.5	14.9	14.7	14.1	12.9	11.2	8.94	6.2	4.24	2.76	1.68	2.32
19	8	5.49	4.02	6.56	9.29	11.7	13.7	15.2	16.2	16.6	16.3	15.6	14.2	12.3	9.73	6.74	4.61	2.97	1.73	2.42
19	6	5.35	3.94	6.53	9.29	11.7	13.7	15.3	16.3	16.7	16.5	15.8	14.4	12.5	9.88	6.86	4.71	3.03	1.75	2.41
20	10	4.75	3.46	5.58	7.88	9.88	11.5	12.8	13.7	13.9	13.8	13.3	12.3	10.8	8.97	7.04	5.16	3.48	2.09	2.82

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Φ_2 averages on blocks – *Continued from previous page*

k	**lc**	**Axial layer**																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	8	4.94	3.61	5.89	8.33	10.5	12.3	13.6	14.5	14.9	14.7	14	12.9	11.3	9.33	7.24	5.27	3.49	2.05	2.76
20	6	4.8	3.52	5.84	8.3	10.5	12.3	13.7	14.6	15	14.8	14.2	13	11.4	9.45	7.33	5.33	3.52	2.04	2.74
21	10	4.7	3.49	5.61	7.93	10	11.6	12.9	13.7	14	13.7	13.3	12.4	11.1	9.38	7.53	5.72	3.92	2.38	3.18
21	8	4.61	3.41	5.57	7.88	9.94	11.6	12.9	13.7	14.1	13.9	13.3	12.3	10.9	9.2	7.37	5.54	3.74	2.22	2.95
21	6	4.45	3.3	5.48	7.79	9.83	11.5	12.8	13.7	14.1	14	13.4	12.4	11	9.29	7.45	5.57	3.74	2.18	2.9
22	10	4.37	3.48	5.43	7.71	9.61	11.4	12.5	13.4	13.8	13.8	12.9	12.1	10.9	9.62	7.66	5.71	3.99	2.53	3.16
22	8	4.05	3.22	5.3	7.53	9.45	11	12.3	13	13.3	13.2	12.6	11.7	10.5	8.91	7.24	5.5	3.76	2.22	2.77
22	6	3.86	3.09	5.17	7.33	9.26	10.8	12.1	12.9	13.3	13.2	12.7	11.8	10.5	8.98	7.29	5.52	3.73	2.17	2.69
23	10	2.82	2.97	5.6	8.13	10	11.2	12.8	13.3	13.2	12.3	13.5	12.3	11.1	8.8	7.32	6.09	4.13	2.31	2.12
23	8	2.52	2.54	4.3	6.07	7.76	8.87	9.92	10.7	10.9	10.4	10.2	9.34	8.42	7.16	5.92	4.63	3.19	1.82	1.78
23	6	2.37	2.36	4.09	5.81	7.34	8.57	9.54	10.2	10.5	10.4	10.1	9.4	8.4	7.22	5.92	4.49	3.02	1.71	1.69
24	10	1.05	3.16	5.47	7.98	9.6	11.7	12.3	13	13.9	14.3	12.6	12.4	10.8	9.98	7.82	5.72	4.14	2.37	0.791
24	8	0.848	2.64	4.74	6.82	8.52	10	11.1	11.6	11.9	11.8	11.2	10.5	9.34	8.07	6.61	5.06	3.53	1.88	0.608
24	6	0.798	2.48	4.52	6.45	8.11	9.55	10.7	11.4	11.7	11.7	11.1	10.5	9.37	8.08	6.58	5.03	3.39	1.79	0.577
25	10	2.38	1.68	2.71	3.81	4.79	5.62	6.24	6.64	6.79	6.75	6.44	5.94	5.18	4.21	3.13	2.23	1.47	0.884	1.23
25	8	2.48	1.8	2.94	4.16	5.24	6.13	6.8	7.23	7.42	7.34	6.99	6.39	5.56	4.5	3.34	2.35	1.53	0.9	1.22
25	6	2.43	1.76	2.92	4.16	5.25	6.14	6.84	7.29	7.48	7.41	7.07	6.48	5.64	4.56	3.39	2.39	1.56	0.9	1.22
26	10	4.09	2.91	4.6	6.51	8.19	9.62	10.6	11.3	11.7	11.5	11.1	10.2	8.97	7.54	5.95	4.38	2.94	1.8	2.5
26	8	4.2	2.96	4.85	6.87	8.64	10.1	11.2	11.9	12.2	12.1	11.6	10.6	9.34	7.77	6.07	4.45	2.96	1.75	2.44
26	6	4.07	2.91	4.8	6.83	8.62	10.1	11.2	12	12.3	12.2	11.7	10.7	9.45	7.86	6.16	4.51	2.99	1.74	2.41
27	10	4.1	3.07	4.92	6.99	8.63	10.2	11.3	11.8	12.2	12.2	11.6	10.8	9.73	8.24	6.7	5	3.44	2.14	2.81
27	8	3.94	2.94	4.81	6.8	8.58	10	11.1	11.8	12.1	12	11.5	10.6	9.4	7.97	6.41	4.83	3.27	1.93	2.57
27	6	3.8	2.83	4.7	6.69	8.45	9.91	11	11.8	12.1	12	11.5	10.7	9.46	8.02	6.45	4.84	3.25	1.9	2.51
28	10	3.59	3.34	5.85	8.29	10.6	12	13.7	14.9	15.1	13.7	14.1	13.8	12.3	10.1	7.98	6.24	4.48	2.64	2.59
28	8	3.26	2.94	4.97	6.98	8.85	10.2	11.4	12.2	12.4	12.1	11.8	10.8	9.68	8.32	6.75	5.23	3.54	2.05	2.25
28	6	3.1	2.78	4.75	6.75	8.54	10	11.2	11.9	12.2	12.1	11.7	10.8	9.69	8.25	6.76	5.1	3.44	1.97	2.16
29	10	2.3	6.08	10.3	14.6	18.3	22.3	24	25.4	24.6	27.5	24.2	23.1	20.6	18.2	14.7	11.2	7.62	4.27	1.77
29	8	1.86	5.28	9.59	13.8	17.1	20.3	22.4	23.5	24.1	24.3	22.7	21.4	18.9	16.3	13.3	10.1	7.01	3.75	1.3
29	6	1.74	5.07	9.21	13.2	16.6	19.5	21.8	23.2	23.9	23.9	22.8	21.3	19	16.3	13.2	10.1	6.83	3.63	1.24
30	10	0.414	1.77	3.94	5.38	6.85	7.9	8.71	10.2	9.84	7.93	9.19	9.34	8.5	6.21	4.89	4.38	3.16	1.49	0.3

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Φ_2 averages on blocks – *Continued from previous page*

k	**lc**	**Axial layer**																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
30	8	0.362	1.33	2.5	3.5	4.42	5.12	5.68	6.2	6.24	6.04	5.8	5.33	4.74	4.17	3.45	2.67	1.86	0.965	0.256
30	6	0.336	1.23	2.3	3.3	4.14	4.9	5.46	5.78	5.94	5.92	5.74	5.37	4.79	4.13	3.37	2.58	1.72	0.903	0.244
31	10	3.13	1.66	2.74	3.85	4.83	5.59	6.27	6.61	6.75	6.52	6.45	6.04	5.36	4.41	3.54	2.74	1.84	1.11	2.07
31	8	3.08	1.58	2.57	3.65	4.64	5.36	5.95	6.35	6.52	6.37	6.15	5.64	5	4.2	3.36	2.52	1.69	1	1.91
31	6	2.99	1.52	2.52	3.57	4.49	5.29	5.91	6.29	6.46	6.36	6.19	5.67	5.03	4.24	3.36	2.49	1.67	0.978	1.89
32	10	3.19	2.42	3.79	5.45	6.88	8.01	8.82	9.48	9.76	9.78	9.32	8.6	7.76	6.76	5.42	4.07	2.82	1.74	2.26
32	8	2.96	2.23	3.7	5.25	6.61	7.74	8.59	9.12	9.32	9.27	8.84	8.19	7.29	6.2	5	3.77	2.56	1.53	1.98
32	6	2.83	2.17	3.61	5.13	6.48	7.6	8.48	9.05	9.29	9.23	8.88	8.22	7.31	6.23	5.04	3.79	2.55	1.49	1.92
33	10	2.47	2.56	4.72	6.69	8.63	9.59	10.7	11.7	11	10.4	11.1	10.8	9.51	7.46	6.37	4.9	3.5	1.93	1.82
33	8	2.19	2.17	3.72	5.26	6.69	7.66	8.57	9.16	9.38	9.04	8.87	8.08	7.3	6.21	5.05	3.94	2.68	1.53	1.51
33	6	2.06	2.04	3.54	5.01	6.34	7.42	8.3	8.89	9.08	8.96	8.78	8.09	7.23	6.16	5.07	3.82	2.56	1.44	1.44
34	10	1.07	3.28	6.1	8.85	10.6	12.4	13.2	13.8	14.9	15	13.7	13.2	11.6	10.5	8.31	6.11	4.26	2.5	0.815
34	8	0.869	2.71	4.93	7.11	8.84	10.4	11.4	12.1	12.4	12.3	11.7	10.9	9.69	8.31	6.85	5.26	3.56	1.9	0.606
34	6	0.81	2.55	4.67	6.68	8.47	9.93	11.1	11.8	12.1	12.2	11.6	10.8	9.67	8.3	6.73	5.17	3.46	1.82	0.573
35	10	6.19	13.9	24.8	34.9	44.3	52.8	58.2	61.4	61.5	60.6	58.6	55.6	49.4	42.5	33.2	26.9	18.3	10	4.5
35	8	5.21	11.4	20.5	29.4	37.2	43.1	47.6	50.4	51.5	51.2	48.5	45.3	40.3	34.7	28.4	21.7	15	8.04	3.61
35	6	4.89	10.7	19.5	27.6	35	41.4	46	49.2	50.2	50.8	48.5	45	40.1	34.5	28	21.2	14.2	7.59	3.42
36	10	1.57	4.24	7.1	10.2	12.7	15.5	16.6	17.5	18.1	19.1	16.6	16.1	14.3	13.2	10.1	7.66	5.27	3.05	1.13
36	8	1.25	3.57	6.53	9.44	11.6	13.8	15.2	16.2	16.3	16.5	15.4	14.6	12.9	11.1	9.04	6.83	4.72	2.53	0.881
36	6	1.18	3.43	6.26	8.92	11.3	13.3	14.8	15.8	16.2	16.4	15.4	14.5	12.9	11.1	8.96	6.85	4.61	2.43	0.829
37	10	0.34	1.45	3.05	4.14	5.61	6.13	7.14	7.88	6.94	6.17	7.28	6.88	5.92	4.47	3.69	3.37	2.26	1.05	0.265
37	8	0.289	1.07	1.95	2.83	3.6	4.13	4.53	4.85	5.03	4.8	4.73	4.35	3.82	3.31	2.77	2.13	1.43	0.76	0.205
37	6	0.27	0.986	1.85	2.66	3.31	3.95	4.42	4.73	4.77	4.79	4.64	4.3	3.83	3.26	2.68	2.04	1.36	0.712	0.193
38	10	0.397	1.66	3.04	4.58	5.93	6.46	7.03	7.52	7.33	6.79	6.76	7.23	6.4	4.72	4.13	3.08	2.27	1.11	0.298
38	8	0.318	1.17	2.18	3.08	4.03	4.55	4.97	5.39	5.46	5.34	5.16	4.74	4.22	3.66	3.04	2.36	1.58	0.826	0.227
38	6	0.305	1.1	2.05	2.92	3.69	4.37	4.87	5.17	5.34	5.31	5.12	4.74	4.24	3.62	2.96	2.27	1.51	0.794	0.213

Table 8: Power averages on blocks

k	lc	Axial layer																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	10	0	0.204	0.426	0.604	0.76	0.884	0.981	1.04	1.07	1.05	1	0.918	0.789	0.632	0.472	0.334	0.212	0.0958	0
1	8	0	0.236	0.487	0.691	0.877	1.02	1.13	1.2	1.23	1.21	1.15	1.05	0.899	0.725	0.544	0.378	0.24	0.107	0
1	6	0	0.254	0.49	0.695	0.878	1.03	1.14	1.22	1.25	1.23	1.17	1.07	0.918	0.737	0.552	0.384	0.245	0.12	0
2	10	0	0.36	0.711	1.01	1.27	1.48	1.64	1.75	1.79	1.78	1.68	1.53	1.32	1.06	0.789	0.546	0.348	0.165	0
2	8	0	0.412	0.832	1.18	1.48	1.74	1.93	2.05	2.1	2.08	1.97	1.79	1.53	1.23	0.912	0.632	0.401	0.19	0
2	6	0	0.435	0.835	1.19	1.5	1.75	1.95	2.08	2.13	2.11	2	1.81	1.56	1.25	0.931	0.647	0.41	0.199	0
3	10	0	0.407	0.806	1.14	1.43	1.68	1.86	1.98	2.03	2.01	1.91	1.74	1.5	1.2	0.897	0.622	0.399	0.188	0
3	8	0	0.465	0.932	1.32	1.66	1.95	2.16	2.3	2.35	2.32	2.21	2.01	1.72	1.38	1.02	0.705	0.448	0.214	0
3	6	0	0.487	0.935	1.33	1.68	1.97	2.19	2.33	2.39	2.36	2.24	2.04	1.75	1.4	1.04	0.72	0.459	0.223	0
4	10	0	0.341	0.679	0.957	1.2	1.41	1.57	1.67	1.72	1.71	1.61	1.47	1.28	1.04	0.79	0.555	0.36	0.173	0
4	8	0	0.39	0.78	1.11	1.39	1.63	1.81	1.93	1.97	1.95	1.85	1.69	1.46	1.18	0.888	0.623	0.403	0.195	0
4	6	0	0.403	0.779	1.11	1.4	1.64	1.83	1.95	1.99	1.97	1.88	1.71	1.48	1.2	0.905	0.638	0.412	0.199	0
5	10	0	0.202	0.413	0.585	0.729	0.85	0.943	1	1.03	0.996	0.983	0.907	0.8	0.646	0.514	0.388	0.257	0.12	0
5	8	0	0.208	0.426	0.603	0.768	0.887	0.985	1.05	1.08	1.06	1.02	0.927	0.814	0.675	0.529	0.386	0.256	0.122	0
5	6	0	0.216	0.423	0.598	0.758	0.89	0.985	1.05	1.08	1.06	1.02	0.943	0.825	0.68	0.535	0.389	0.255	0.125	0
6	10	0	0.314	0.621	0.872	1.1	1.28	1.43	1.52	1.56	1.57	1.49	1.38	1.23	1.05	0.855	0.641	0.437	0.217	0
6	8	0	0.318	0.643	0.913	1.14	1.34	1.49	1.59	1.63	1.61	1.54	1.42	1.26	1.07	0.856	0.643	0.435	0.215	0
6	6	0	0.327	0.633	0.901	1.14	1.33	1.49	1.59	1.63	1.62	1.55	1.43	1.27	1.08	0.868	0.652	0.439	0.217	0
7	10	0	0.35	0.697	0.982	1.23	1.43	1.59	1.7	1.73	1.72	1.67	1.56	1.4	1.19	0.973	0.746	0.514	0.254	0
7	8	0	0.333	0.671	0.952	1.2	1.4	1.56	1.65	1.7	1.68	1.61	1.49	1.33	1.14	0.924	0.703	0.48	0.238	0
7	6	0	0.339	0.659	0.937	1.18	1.39	1.54	1.64	1.69	1.68	1.62	1.5	1.34	1.15	0.932	0.706	0.479	0.238	0
8	10	0	0.223	0.42	0.581	0.739	0.858	0.957	0.996	1.05	1.19	1.01	0.922	0.832	0.737	0.659	0.444	0.307	0.15	0
8	8	0	0.236	0.472	0.673	0.803	0.99	1.11	1.17	1.2	1.19	1.13	1.05	0.939	0.803	0.643	0.476	0.315	0.166	0
8	6	0	0.237	0.459	0.643	0.824	0.951	1.08	1.16	1.17	1.21	1.13	1.03	0.937	0.817	0.662	0.501	0.336	0.175	0
9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	10	0	0.39	0.791	1.12	1.4	1.64	1.83	1.94	1.99	1.96	1.87	1.7	1.46	1.16	0.837	0.57	0.363	0.171	0

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Power averages on blocks – *Continued from previous page*

k	**lc**	**Axial layer**																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
10	8	0	0.456	0.916	1.3	1.64	1.92	2.13	2.26	2.32	2.28	2.17	1.97	1.69	1.34	0.967	0.66	0.417	0.197	0
10	6	0	0.469	0.919	1.31	1.65	1.93	2.15	2.29	2.35	2.32	2.2	2	1.72	1.37	0.987	0.676	0.427	0.202	0
11	10	0	0.4	0.832	1.17	1.48	1.73	1.92	2.04	2.09	2.06	1.97	1.79	1.54	1.22	0.824	0.55	0.351	0.161	0
11	8	0	0.462	0.954	1.35	1.7	1.99	2.21	2.35	2.41	2.37	2.26	2.05	1.76	1.38	0.943	0.63	0.4	0.183	0
11	6	0	0.477	0.954	1.36	1.71	2.01	2.23	2.38	2.44	2.41	2.29	2.08	1.79	1.4	0.963	0.647	0.409	0.192	0
12	10	0	0.365	0.764	1.07	1.35	1.59	1.76	1.88	1.92	1.89	1.81	1.66	1.44	1.16	0.854	0.597	0.388	0.174	0
12	8	0	0.416	0.857	1.21	1.53	1.79	1.98	2.11	2.16	2.13	2.03	1.85	1.6	1.28	0.943	0.657	0.422	0.195	0
12	6	0	0.427	0.855	1.22	1.53	1.8	2	2.13	2.19	2.16	2.06	1.88	1.62	1.31	0.959	0.668	0.43	0.205	0
13	10	0	0.312	0.647	0.915	1.16	1.35	1.5	1.59	1.65	1.63	1.55	1.42	1.26	1.06	0.824	0.598	0.398	0.188	0
13	8	0	0.342	0.706	1	1.26	1.48	1.64	1.74	1.78	1.76	1.68	1.54	1.35	1.12	0.87	0.634	0.419	0.196	0
13	6	0	0.354	0.702	0.998	1.26	1.48	1.64	1.75	1.8	1.78	1.7	1.56	1.37	1.14	0.884	0.644	0.425	0.205	0
14	10	0	0.339	0.709	1	1.25	1.46	1.63	1.74	1.77	1.75	1.69	1.57	1.4	1.19	0.96	0.725	0.495	0.235	0
14	8	0	0.349	0.718	1.02	1.28	1.5	1.66	1.77	1.81	1.79	1.72	1.58	1.4	1.19	0.954	0.716	0.484	0.229	0
14	6	0	0.356	0.708	1.01	1.27	1.49	1.66	1.77	1.82	1.8	1.73	1.6	1.42	1.2	0.964	0.722	0.485	0.236	0
15	10	0	0.345	0.722	1.02	1.28	1.49	1.65	1.73	1.8	1.77	1.72	1.61	1.45	1.24	1	0.77	0.529	0.254	0
15	8	0	0.335	0.69	0.978	1.24	1.44	1.6	1.7	1.74	1.72	1.65	1.53	1.36	1.16	0.946	0.721	0.492	0.234	0
15	6	0	0.336	0.675	0.959	1.21	1.42	1.58	1.69	1.73	1.72	1.66	1.54	1.37	1.17	0.954	0.722	0.489	0.238	0
16	10	0	0.203	0.406	0.527	0.694	0.847	0.933	0.896	1.04	1.12	0.877	0.823	0.755	0.747	0.587	0.404	0.281	0.147	0
16	8	0	0.206	0.431	0.604	0.726	0.885	0.993	1.06	1.07	1.13	1.04	0.961	0.852	0.747	0.594	0.448	0.296	0.144	0
16	6	0	0.218	0.424	0.614	0.774	0.917	1.01	1.07	1.11	1.14	1.04	0.983	0.89	0.778	0.615	0.467	0.322	0.158	0
17	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	10	0	0.419	0.846	1.19	1.5	1.76	1.95	2.07	2.12	2.1	2	1.82	1.57	1.18	0.579	0.369	0.233	0.106	0
18	8	0	0.478	0.955	1.35	1.71	1.99	2.21	2.35	2.41	2.38	2.26	2.06	1.76	1.32	0.625	0.39	0.247	0.115	0
18	6	0	0.486	0.954	1.36	1.71	2.01	2.23	2.38	2.44	2.41	2.29	2.09	1.79	1.34	0.632	0.392	0.247	0.116	0
19	10	0	0.385	0.8	1.13	1.42	1.66	1.84	1.96	2.01	1.98	1.9	1.74	1.51	1.21	0.837	0.573	0.372	0.169	0
19	8	0	0.43	0.886	1.25	1.58	1.85	2.05	2.18	2.23	2.21	2.1	1.92	1.66	1.31	0.91	0.623	0.401	0.186	0
19	6	0	0.441	0.882	1.25	1.58	1.86	2.06	2.2	2.26	2.23	2.13	1.94	1.68	1.33	0.926	0.635	0.409	0.195	0
20	10	0	0.357	0.753	1.06	1.33	1.55	1.73	1.85	1.88	1.86	1.8	1.66	1.46	1.21	0.951	0.696	0.469	0.219	0

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Power averages on blocks – *Continued from previous page*

k	**lc**	**Axial layer**																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	8	0	0.387	0.795	1.12	1.41	1.66	1.84	1.96	2.01	1.98	1.89	1.74	1.52	1.26	0.977	0.712	0.471	0.222	0
20	6	0	0.394	0.788	1.12	1.41	1.66	1.84	1.97	2.02	2	1.91	1.76	1.54	1.28	0.99	0.72	0.476	0.23	0
21	10	0	0.361	0.757	1.07	1.35	1.56	1.74	1.85	1.9	1.86	1.8	1.68	1.5	1.27	1.02	0.773	0.529	0.25	0
21	8	0	0.366	0.752	1.06	1.34	1.57	1.74	1.85	1.9	1.87	1.8	1.66	1.47	1.24	0.996	0.748	0.505	0.239	0
21	6	0	0.37	0.739	1.05	1.33	1.56	1.73	1.85	1.9	1.88	1.81	1.67	1.48	1.25	1.01	0.752	0.505	0.245	0
22	10	0	0.335	0.692	0.979	1.22	1.44	1.59	1.7	1.75	1.79	1.65	1.55	1.38	1.22	0.993	0.728	0.509	0.248	0
22	8	0	0.341	0.708	1	1.22	1.47	1.64	1.74	1.78	1.76	1.68	1.55	1.39	1.18	0.954	0.725	0.496	0.237	0
22	6	0	0.344	0.688	0.973	1.24	1.44	1.61	1.72	1.76	1.76	1.69	1.57	1.39	1.2	0.972	0.733	0.495	0.242	0
23	10	0	0.139	0.256	0.319	0.443	0.561	0.599	0.617	0.655	0.804	0.587	0.558	0.503	0.519	0.399	0.278	0.19	0.0964	0
23	8	0	0.141	0.298	0.411	0.501	0.605	0.691	0.697	0.713	0.849	0.699	0.648	0.574	0.522	0.413	0.299	0.199	0.0941	0
23	6	0	0.152	0.295	0.451	0.554	0.655	0.745	0.789	0.822	0.846	0.697	0.701	0.643	0.547	0.447	0.332	0.238	0.114	0
24	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	10	0	0.181	0.365	0.515	0.647	0.759	0.842	0.896	0.917	0.911	0.869	0.802	0.699	0.568	0.422	0.3	0.199	0.0957	0
25	8	0	0.199	0.397	0.561	0.707	0.827	0.918	0.976	1	0.991	0.944	0.863	0.75	0.607	0.45	0.317	0.207	0.1	0
25	6	0	0.202	0.394	0.561	0.708	0.829	0.923	0.984	1.01	1	0.954	0.875	0.761	0.616	0.457	0.323	0.21	0.102	0
26	10	0	0.297	0.62	0.879	1.11	1.3	1.43	1.53	1.58	1.55	1.5	1.37	1.21	1.02	0.803	0.592	0.397	0.181	0
26	8	0	0.317	0.655	0.927	1.17	1.37	1.52	1.61	1.65	1.64	1.56	1.44	1.26	1.05	0.82	0.601	0.4	0.188	0
26	6	0	0.324	0.648	0.922	1.16	1.36	1.52	1.62	1.66	1.65	1.58	1.45	1.28	1.06	0.831	0.608	0.404	0.194	0
27	10	0	0.317	0.664	0.943	1.16	1.38	1.53	1.59	1.64	1.65	1.56	1.46	1.31	1.11	0.904	0.675	0.465	0.217	0
27	8	0	0.315	0.649	0.918	1.16	1.35	1.5	1.6	1.64	1.62	1.55	1.43	1.27	1.08	0.865	0.652	0.441	0.21	0
27	6	0	0.317	0.635	0.904	1.14	1.34	1.49	1.59	1.63	1.62	1.56	1.44	1.28	1.08	0.871	0.653	0.438	0.212	0
28	10	0	0.224	0.425	0.601	0.671	0.899	0.915	0.919	1.01	1.22	0.939	0.868	0.772	0.749	0.644	0.407	0.285	0.142	0
28	8	0	0.228	0.475	0.658	0.794	0.966	1.09	1.16	1.17	1.25	1.11	1.03	0.925	0.817	0.647	0.475	0.313	0.153	0
28	6	0	0.236	0.462	0.679	0.859	1.02	1.13	1.18	1.23	1.27	1.14	1.08	0.972	0.837	0.659	0.498	0.348	0.17	0
29	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Power averages on blocks – *Continued from previous page*

k	lc	Axial layer																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
30	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	10	0	0.173	0.37	0.52	0.652	0.755	0.847	0.892	0.911	0.88	0.871	0.815	0.724	0.596	0.478	0.369	0.248	0.117	0
31	8	0	0.17	0.348	0.492	0.626	0.724	0.803	0.857	0.88	0.86	0.83	0.762	0.675	0.567	0.453	0.34	0.228	0.109	0
31	6	0	0.17	0.34	0.482	0.607	0.714	0.798	0.85	0.872	0.858	0.836	0.766	0.68	0.572	0.454	0.336	0.225	0.108	0
32	10	0	0.231	0.483	0.693	0.873	1.01	1.12	1.21	1.24	1.27	1.19	1.1	0.99	0.853	0.704	0.518	0.36	0.169	0
32	8	0	0.236	0.493	0.698	0.85	1.03	1.15	1.21	1.24	1.23	1.18	1.09	0.972	0.824	0.659	0.497	0.33	0.161	0
32	6	0	0.24	0.481	0.682	0.862	1.01	1.13	1.21	1.23	1.23	1.18	1.09	0.97	0.832	0.671	0.502	0.339	0.165	0
33	10	0	0.119	0.22	0.306	0.37	0.473	0.489	0.508	0.574	0.713	0.496	0.448	0.409	0.444	0.346	0.209	0.15	0.0809	0
33	8	0	0.117	0.258	0.36	0.422	0.549	0.586	0.631	0.657	0.737	0.595	0.58	0.503	0.47	0.358	0.259	0.166	0.0817	0
33	6	0	0.139	0.26	0.392	0.485	0.589	0.63	0.663	0.71	0.752	0.627	0.617	0.563	0.475	0.376	0.289	0.205	0.101	0
34	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	10	0	0.126	0.24	0.35	0.442	0.53	0.573	0.575	0.578	0.69	0.618	0.569	0.5	0.453	0.388	0.263	0.183	0.091	0
35	8	0	0.131	0.253	0.364	0.438	0.517	0.582	0.615	0.635	0.675	0.612	0.559	0.502	0.449	0.367	0.253	0.165	0.0874	0
35	6	0	0.135	0.249	0.358	0.515	0.553	0.594	0.616	0.682	0.755	0.604	0.562	0.503	0.455	0.388	0.284	0.194	0.0966	0
36	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

7 Excercise

1. Repeat these same calculations by using the file 3dpwr.mil provided with the milonga distribution.

8 References

[1] ANL-7416-11A2. http://www.corephysics.com/benchmarks/anl7416_benchmark11.pdf

[2] Milonga code. https://bitbucket.org/wasora/milonga/overview

[3] gmsh: mesh generator. http://gmsh.info/