Simple instructions on using MCNPydE

Data reduction tool for MCNP output

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MCNPydE is a Python library for extracting data from MCNP output file. It requires Python, Matplotlib and Numpy. It is a data reduction tool for MCNP output for ease of results analysis and viewing.

To start using the program, first import the library:

In [1]:

```
from MCNPydE import *
```

To view the MCNP output file, it is best to assign it to a variable by passing a file name to the dataExtract class (*e.g. var1*):

In [2]:

```
var1 = dataExtract('NUR13o.txt')
```

by default it will pass the strings *'There are 20 grid points along the s-axis'* as identifier. It is also possible to use a different strings identifier but the strings identifier must be unique as a starting line to extract the block of data:

In [3]:

```
var1 = dataExtract('NUR13o.txt','There are     20 grid points along the s-
axis')
```

The total line number of the file can then be viewed:

In [4]:

```
var1.lineNumber()
```

```
76713
```

The content of the file can also be viewed even though it is advisable not to view the whole MCNP output file as it is usually very large. The rawContent() function allows viewing the first 100 lines (i.e. the header) of the ouput file and by passing arguments allow user to view specific range of the file:

In [5]:

```
var1.rawContent()
```

```
0 1mcnpx    version 27a   ld=Fri Oct 31 08:00:00 MST 2008               1
2/10/14 16:23:42
0
************************************************************************
************   probid =   12/10/14 16:23:42
0  i=NUR13.txt o=NUR13o
0
0  ***********************************************************
0  *                                                         *
0  *                   MCNPX                                 *
0  *                                                         *
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0  *                                                         *
0  ***********************************************************
0     1-       NUR II CONE DESIGN FULL BEAM D=3.48cm 5cmBi/5cmPb
0     2-       c CELL CARD
0     3-       c SMALL CYLINDER
0     4-         530  0 -500 520 -510 (-501 -510 520 ) #600 #601 #610 #620
0     5-              #630 #640 #611 #621 imp:n=1  imp:p=1
0     6-         501  3 -2.7 -500 501 -510 520  imp:n=1  imp:p=1
0     7-         541  0    -503 510 -521 (-504 510 -521 )(504 :-505 :-510
:511 )
0     8-                   (504 :-505 :-511 :512 )(504 :-505 :-512 :513 )
0     9-                   imp:n=1  imp:p=1
0    10-         506  3    -2.7 -503 504 510 -521 imp:n=1  imp:p=1
0    11-         507  3    -2.7 -504 505 510 -511 imp:n=1  imp:p=1
0    12-         508  5   -11.4 -504 505 511 -512 imp:n=1  imp:p=1
```

```
0    12          508  5    11.4  504 505 511  512 imp:n=1  imp:p=1

0    13-         509  8   -1.12 -504 505 512 -513 imp:n=1  imp:p=1
0    14-       c
0    15-       c OUTSIDE COLLIMATOR
0    16-         510  4   -3.52 520 -521 522 -523 524 -525 (500 520 -510 :5
03 510 -521 )
0    17-                   imp:n=1  imp:p=1
0    18-       c NR EXPOSURE ROOM  SHEILDING
0    19-         511  4 -3.52 521 -530 522 -523 524 -525 (-521 :532 :-533
:534 :-535 :536)
0    20-              imp:n=1  imp:p=1
0    21-       c INSIDE EXPOSURE ROOM
0    22-         513  0 521 -532 533 -534 535 -536 (-540 :541 :-542 :543:-5
44 :545 )
0    23-              imp:n=1  imp:p=1
0    24-       c CCD SHEILDING OUTSIDE
0    25-         514  3 -2.7 540 -541 542 -543 544 -545 (-546 :547 :-548 :5
49 :-550 :551)
0    26-              imp:n=1  imp:p=1
0    27-       c CCD SHEILDING INSIDE
0    28-         515  0         546 -547 548 -549 550 -551 (-552 :553 :-554
:555:-556 :557 )
0    29-              imp:n=1  imp:p=1
0    30-       c CCD CAMERA
0    31-         516 3 -2.7 552 -553 554 -555 556 -557 imp:n=1  imp:p=1
0    32-       c Collimator
0    33-          600 0 -611 -501 520  #610 #611      imp:n=1  imp:p=1
0    34-          601 0 -612 -501 -510 #610 #611      imp:n=1  imp:p=1
0    35-          610 6 -9.8 -620 508  -569           imp:n=1  imp:p=1
0    36-          611 10 -3.9 -620 569 -562           imp:n=1  imp:p=1
0    37-          620 6 -9.8 -501 620  508 -569 #610  imp:n=1  imp:p=1
0    38-          621 10 -3.9 -501 620 569 -562 #610  imp:n=1  imp:p=1
0    39-          630 9 -0.957 611 520 -508 -501      imp:n=1  imp:p=1
0    40-          640 5 -11.4 612 562 -501            imp:n=1  imp:p=1
0    41-       c UNIVERSE
0    42-          9999 0 -520 :530 :-522 :523 :-524 :525 imp:n=0  imp:p=0
0    43-
0    44-       c SURFACE CARD
0    45-         500        cx 7.6
0    46-         501        cx 6.6
0    47-         502        cx 5.6
0    48-       c
0    49-         503        cx 10
0    50-         504        cx 9
0    51-         505        cx 6.6
0    52-         506        cx 2
0    53-       c
0    54-         509        px -40
0    55-         511        px 1
0    56-       c ccccccccccccccccccccccccccc
0    57-       c NEW PLANE FOR SMALL CYLINDER 03/11/2014 HZB
0    58-       c ccccccccccccccccccccccccccc
0    59-         560        px -95
0    60-         561        px -90
0    61-         508        px -80
0    62-         562        px -70
0    63-         569        px -75
```

To see the whole file (which is not advisable):

In [ ]:

```
var1.rawContent(1,-1)
```

To view an instance of the block of data:

In [6]:

```
var1.dataBlockContent()
```

```
Use the index position to select mapping energy when plotting

Line Number--->Energy Index--->Line Content


944                  starting at -9.00000E+00 and ending at  9.00000E+00

945

946

947              s-axis        -9.00000E+00 to -8.10000E+00

948              t-axis       -9.00000E+00 to -8.10000E+00

949                   energy

950     1           0.0000E+00   0.00000E+00 0.0000

951     2           1.0000E-09   0.00000E+00 0.0000

952     3           5.0000E-09   0.00000E+00 0.0000

953     4           1.0000E-08   0.00000E+00 0.0000

954     5           1.5000E-08   0.00000E+00 0.0000

955     6           2.0000E-08   0.00000E+00 0.0000

956     7           2.5000E-08   0.00000E+00 0.0000

957     8           3.0000E-08   0.00000E+00 0.0000

958     9           5.0000E-08   0.00000E+00 0.0000

959     10          1.0000E-07   0.00000E+00 0.0000

960     11          1.0000E-06   0.00000E+00 0.0000

961     12          1.0000E-05   0.00000E+00 0.0000
```

```
962     13          1.0000E-02   0.00000E+00 0.0000

963     14          1.0000E+00   0.00000E+00 0.0000

964     15          1.0000E+01   0.00000E+00 0.0000

965     16            total      0.00000E+00 0.0000

966     17

967     18       Shadow radiography image detector:

968     19           Image grid centered at x,y,z =-9.90000E+01 0.00000E+00
0.00000E+00

969     20
```

Here it can be seen that by default it automatically display up to 25 lines of the first block data starting from the identifying strings. The first column shows the line numbers of the output file whereas second column shows the index number of the energy data which later can be used for plotting. The third column shows the contant of block of data.

To view other block of data, then it must be known beforehand all the lines in the file that contains the identifying strings. This can be done by using the listLinenumber() function.

In [7]:

```
var1.listLinenumber()
```

```
The line number list that contain the passed
strings is:

[944, 975, 1006, 1037, 1068, 1099, 1130, 1161, 1192, 1223, 1254, 1285, 131
6, 1347, 1378, 1409, 1440, 1471, 1502, 1533, 1564, 1595, 1626, 1657, 1688,
1719, 1750, 1781, 1812, 1843, 1874, 1905, 1936, 1967, 1998, 2029, 2060, 209
1, 2122, 2153, 2184, 2215, 2246, 2277, 2308, 2339, 2370, 2401, 2432, 2463,
2494, 2525, 2556, 2587, 2618, 2649, 2680, 2711, 2742, 2773, 2804, 2835, 286
6, 2897, 2928, 2959, 2990, 3021, 3052, 3083, 3114, 3145, 3176, 3207, 3238,
3269, 3300, 3331, 3362, 3393, 3424, 3455, 3486, 3517, 3548, 3579, 3610, 364
1, 3672, 3703, 3734, 3765, 3796, 3827, 3858, 3889, 3920, 3951, 3982, 4013,
4044, 4075, 4106, 4137, 4168, 4199, 4230, 4261, 4292, 4323, 4354, 4385, 441
6, 4447, 4478, 4509, 4540, 4571, 4602, 4633, 4664, 4695, 4726, 4757, 4788,
4819, 4850, 4881, 4912, 4943, 4974, 5005, 5036, 5067, 5098, 5129, 5160, 519
1, 5222, 5253, 5284, 5315, 5346, 5377, 5408, 5439, 5470, 5501, 5532, 5563,
5594, 5625, 5656, 5687, 5718, 5749, 5780, 5811, 5842, 5873, 5904, 5935, 596
6, 5997, 6028, 6059, 6090, 6121, 6152, 6183, 6214, 6245, 6276, 6307, 6338,
6369, 6400, 6431, 6462, 6493, 6524, 6555, 6586, 6617, 6648, 6679, 6710, 674
1, 6772, 6803, 6834, 6865, 6896, 6927, 6958, 6989, 7020, 7051, 7082, 7113,
7144, 7175, 7206, 7237, 7268, 7299, 7330, 7361, 7392, 7423, 7454, 7485, 751
6, 7547, 7578, 7609, 7640, 7671, 7702, 7733, 7764, 7795, 7826, 7857, 7888,
7919, 7950, 7981, 8012, 8043, 8074, 8105, 8136, 8167, 8198, 8229, 8260, 829
1, 8322, 8353, 8384, 8415, 8446, 8477, 8508, 8539, 8570, 8601, 8632, 8663,
8694, 8725, 8756, 8787, 8818, 8849, 8880, 8911, 8942, 8973, 9004, 9035, 906
```

6, 9097, 9128, 9159, 9190, 9221, 9252, 9283, 9314, 9345, 9376, 9407, 9438, 9469, 9500, 9531, 9562, 9593, 9624, 9655, 9686, 9717, 9748, 9779, 9810, 9841, 9872, 9903, 9934, 9965, 9996, 10027, 10058, 10089, 10120, 10151, 10182, 10213, 10244, 10275, 10306, 10337, 10368, 10399, 10430, 10461, 10492, 10523, 10554, 10585, 10616, 10647, 10678, 10709, 10740, 10771, 10802, 10833, 10864, 10895, 10926, 10957, 10988, 11019, 11050, 11081, 11112, 11143, 11174, 11205, 11236, 11267, 11298, 11329, 11360, 11391, 11422, 11453, 11484, 11515, 11546, 11577, 11608, 11639, 11670, 11701, 11732, 11763, 11794, 11825, 11856, 11887, 11918, 11949, 11980, 12011, 12042, 12073, 12104, 12135, 12166, 12197, 12228, 12259, 12290, 12321, 12352, 12383, 12414, 12445, 12476, 12507, 12538, 12569, 12600, 12631, 12662, 12693, 12724, 12755, 12786, 12817, 12848, 12879, 12910, 12941, 12972, 13003, 13034, 13065, 13096, 13127, 13158, 13189, 13220, 13251, 13282, 13313, 13344, 13376, 13408, 13440, 13472, 13504, 13536, 13568, 13600, 13632, 13664, 13696, 13728, 13760, 13792, 13824, 13856, 13888, 13920, 13952, 13984, 14016, 14048, 14080, 14112, 14144, 14176, 14208, 14240, 14272, 14304, 14336, 14368, 14400, 14432, 14464, 14496, 14528, 14560, 14592, 14624, 14656, 14688, 14720, 14752, 14784, 14816, 14848, 14880, 14912, 14944, 14976, 15008, 15040, 15072, 15104, 15136, 15168, 15200, 15232, 15264, 15296, 15328, 15360, 15392, 15424, 15456, 15488, 15520, 15552, 15584, 15616, 15648, 15680, 15712, 15744, 15776, 15808, 15840, 15872, 15904, 15936, 15968, 16000, 16032, 16064, 16096, 16128, 16160, 16192, 16224, 16256, 16288, 16320, 16352, 16384, 16416, 16448, 16480, 16512, 16544, 16576, 16608, 16640, 16672, 16704, 16736, 16768, 16800, 16832, 16864, 16896, 16928, 16960, 16992, 17024, 17056, 17088, 17120, 17152, 17184, 17216, 17248, 17280, 17312, 17344, 17376, 17408, 17440, 17472, 17504, 17536, 17568, 17600, 17632, 17664, 17696, 17728, 17760, 17792, 17824, 17856, 17888, 17920, 17952, 17984, 18016, 18048, 18080, 18112, 18144, 18176, 18208, 18240, 18272, 18304, 18336, 18368, 18400, 18432, 18464, 18496, 18528, 18560, 18592, 18624, 18656, 18688, 18720, 18752, 18784, 18816, 18848, 18880, 18912, 18944, 18976, 19008, 19040, 19072, 19104, 19136, 19168, 19200, 19232, 19264, 19296, 19328, 19360, 19392, 19424, 19456, 19488, 19520, 19552, 19584, 19616, 19648, 19680, 19712, 19744, 19776, 19808, 19840, 19872, 19904, 19936, 19968, 20000, 20032, 20064, 20096, 20128, 20160, 20192, 20224, 20256, 20288, 20320, 20352, 20384, 20416, 20448, 20480, 20512, 20544, 20576, 20608, 20640, 20672, 20704, 20736, 20768, 20800, 20832, 20864, 20896, 20928, 20960, 20992, 21024, 21056, 21088, 21120, 21152, 21184, 21216, 21248, 21280, 21312, 21344, 21376, 21408, 21440, 21472, 21504, 21536, 21568, 21600, 21632, 21664, 21696, 21728, 21760, 21792, 21824, 21856, 21888, 21920, 21952, 21984, 22016, 22048, 22080, 22112, 22144, 22176, 22208, 22240, 22272, 22304, 22336, 22368, 22400, 22432, 22464, 22496, 22528, 22560, 22592, 22624, 22656, 22688, 22720, 22752, 22784, 22816, 22848, 22880, 22912, 22944, 22976, 23008, 23040, 23072, 23104, 23136, 23168, 23200, 23232, 23264, 23296, 23328, 23360, 23392, 23424, 23456, 23488, 23520, 23552, 23584, 23616, 23648, 23680, 23712, 23744, 23776, 23808, 23840, 23872, 23904, 23936, 23968, 24000, 24032, 24064, 24096, 24128, 24160, 24192, 24224, 24256, 24288, 24320, 24352, 24384, 24416, 24448, 24480, 24512, 24544, 24576, 24608, 24640, 24672, 24704, 24736, 24768, 24800, 24832, 24864, 24896, 24928, 24960, 24992, 25024, 25056, 25088, 25120, 25152, 25184, 25216, 25248, 25280, 25312, 25344, 25376, 25408, 25440, 25472, 25504, 25536, 25568, 25600, 25632, 25664, 25696, 25728, 25760, 25792, 25824, 25856, 25888, 25920, 25952, 25984, 26016, 26048, 26080, 26112, 26186, 26217, 26248, 26279, 26310, 26341, 26372, 26403, 26434, 26465, 26496, 26527, 26558, 26589, 26620, 26651, 26682, 26713, 26744, 26775, 26806, 26837, 26868, 26899, 26930, 26961, 26992, 27023, 27054, 27085, 27116, 27147, 27178, 27209, 27240, 27271, 27302, 27333, 27364, 27395, 27426, 27457, 27488, 27519, 27550, 27581, 27612, 27643, 27674, 27705, 27736, 27767, 27798, 27829, 27860, 27891, 27922, 27953, 27984, 28015, 28046, 28077, 28108, 28139, 28

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43546, 43578, 43610, 43642, 43674, 43706, 43738, 43770, 43802, 43834, 4386
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218, 44250, 44282, 44314, 44346, 44378, 44410, 44442, 44474, 44506, 44538,
44570, 44602, 44634, 44666, 44698, 44730, 44762, 44794, 44826, 44858, 4489
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242, 45274, 45306, 45338, 45370, 45402, 45434, 45466, 45498, 45530, 45562,
45594, 45626, 45658, 45690, 45722, 45754, 45786, 45818, 45850, 45882, 4591
4, 45946, 45978, 46010, 46042, 46074, 46106, 46138, 46170, 46202, 46234, 46
266, 46298, 46330, 46362, 46394, 46426, 46458, 46490, 46522, 46554, 46586,
46618, 46650, 46682, 46714, 46746, 46778, 46810, 46842, 46874, 46906, 4693

8, 46970, 47002, 47034, 47066, 47098, 47130, 47162, 47194, 47226, 47258, 47
290, 47322, 47354, 47386, 47418, 47450, 47482, 47514, 47546, 47578, 47610,
47642, 47674, 47706, 47738, 47770, 47802, 47834, 47866, 47898, 47930, 4796
2, 47994, 48026, 48058, 48090, 48122, 48154, 48186, 48218, 48250, 48282, 48
314, 48346, 48378, 48410, 48442, 48474, 48506, 48538, 48570, 48602, 48634,
48666, 48698, 48730, 48762, 48794, 48826, 48858, 48890, 48922, 48954, 4898
6, 49018, 49050, 49082, 49114, 49146, 49178, 49210, 49242, 49274, 49306, 49
338, 49370, 49402, 49434, 49466, 49498, 49530, 49562, 49594, 49626, 49658,
49690, 49722, 49754, 49786, 49818, 49850, 49882, 49914, 49946, 49978, 5001
0, 50042, 50074, 50106, 50138, 50170, 50202, 50234, 50266, 50298, 50330, 50
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50714, 50746, 50778, 50810, 50842, 50874, 50906, 50938, 50970, 51002, 5103
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73908, 73940, 73972, 74004, 74036, 74068, 74100, 74132, 74164, 74196, 7422
8, 74260, 74292, 74324, 74356, 74388, 74420, 74452, 74484, 74516, 74548, 74
580, 74612, 74644, 74676, 74708, 74740, 74772, 74804, 74836, 74868, 74900,
74932, 74964, 74996, 75028, 75060, 75092, 75124, 75156, 75188, 75220, 7525
2, 75284, 75316, 75348, 75380, 75412, 75444, 75476, 75508, 75540, 75572, 75
604, 75636, 75668, 75700, 75732, 75764, 75796, 75828, 75860, 75892, 75924,
75956, 75988, 76020, 76052, 76084, 76116, 76148, 76180, 76212, 76244, 7627
6, 76308, 76340, 76372, 76404, 76436, 76468, 76500, 76532, 76564, 76596]
```

Other block data can be viewed by selecting the starting line (from the above list) and the range of lines (number of lines after the string identifier). For instance by selecting the range starting from line of 8508 to 8538:

In [8]:

```
var1.dataBlockContent(8508,30)
```

```
Use the index position to select mapping energy when plotting

Line Number--->Energy Index--->Line Content


8508                 starting at -9.00000E+00 and ending at  9.00000E+00

8509

8510

8511             s-axis         1.80000E+00 to  2.70000E+00

8512             t-axis       -5.40000E+00 to -4.50000E+00
```

```
8513                  energy
8514    1           0.0000E+00   0.00000E+00 0.0000
8515    2           1.0000E-09   1.41266E-08 0.4593
8516    3           5.0000E-09   5.78881E-05 0.6207
8517    4           1.0000E-08   3.38473E-04 0.5224
8518    5           1.5000E-08   1.09083E-04 0.4567
8519    6           2.0000E-08   1.75430E-04 0.3763
8520    7           2.5000E-08   5.32154E-04 0.8067
8521    8           3.0000E-08   2.38874E-04 0.4508
8522    9           5.0000E-08   1.78793E-03 0.3645
8523    10          1.0000E-07   1.13526E-03 0.2257
8524    11          1.0000E-06   6.12968E-04 0.2384
8525    12          1.0000E-05   1.34599E-04 0.1674
8526    13          1.0000E-02   3.34907E-04 0.2768
8527    14          1.0000E+00   1.28669E-03 0.1756
8528    15          1.0000E+01   5.32264E-04 0.0822
8529    16            total      7.27654E-03 0.1727
8530    17
8531    18       Shadow radiography image detector:
8532    19           Image grid centered at x,y,z =-9.90000E+01 0.00000E+00
0.00000E+00
8533    20
8534    21
8535    22               There are     20 grid points along the t-axis
8536    23           starting at -9.00000E+00 and ending at  9.00000E+00
8537    24
8538    25               There are     20 grid points along the s-axis
```

Viewing the data block above allows the user to select the range of data and by default the allBlockData() will select the range from line 8511 to line 8532.

If satisfied, the user can then run the allBlockData() function to extract all the data blocks into a list.

In [9]:

```
var1.allBlockData()
```

```
The number of blocks are 2400
There would be 3 groups of data
```

Here the allBlockData() function informs that there are 2400 blocks of data in three spatial groups (usually starting upstream to downstream of the MCNP simulation). This with the index of 15 different energies as viewed with dataBlockContent().

If the output is specified to list only 2 different energies than it is more practical to specify the range of data to be extracted, e.g.:

var1.allBlockData(lowLim = 3, upLim = 5)

The lowLim variable default value is 3 (which is the listing start of energy index) whereas upLim default value is 23. The position of 1 is for the s-axis and 2 is for the t-axis as viewed previously (s-axis and t-axis number points can be specified using the axisPt variable, by default the value is 20).

Plotting of the results is only possible after executing the allBlockData() function. Plot can be made into 2D or 3D image, showing the intensity of particles with specific energy in the cross section of the model. In this instance there are 3 cross section groups as indicated after executing allBlockData().

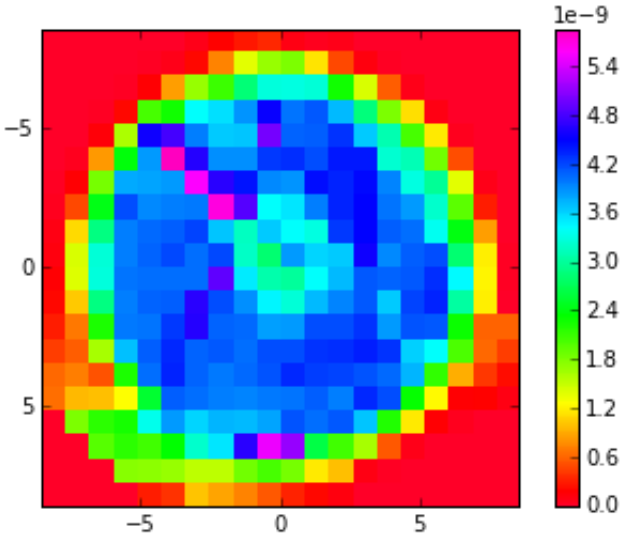
For instance, if the user wants to plot a 2D representation of the intensity at the second spatial or cross section group for particles with energy of 0.025 eV, the user can pass the index value of 2 (for the spatial group) and 7 (by refering to the index of the energy data when viewing the data block) to the Plot2D function:

In [10]:

```
%pylab inline

var1.plot2D(2,7)
```

```
Populating the interactive namespace from numpy and matplotlib
```

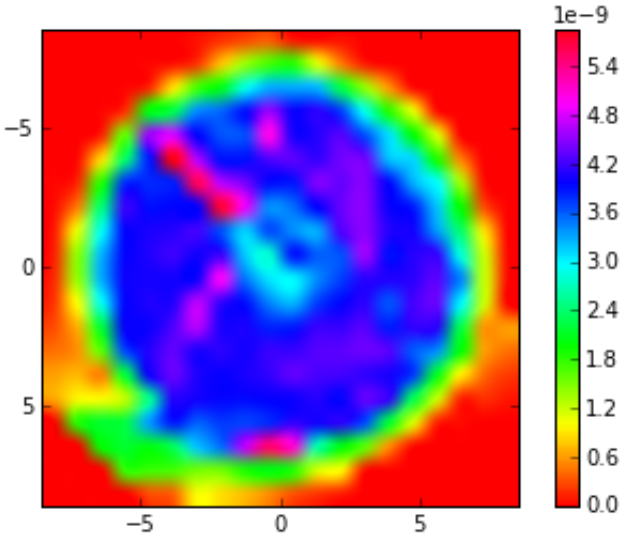



```
Energy : 2.5000E-08 MeV
```

It is possible to filter, save and specififed the color map of the plot (as shown in the same seqeunce below):

In [11]:

```
var1.plot2D(2,7, intPol = 'catrom', figName = 'plot2D.tiff', colorMap=cm.h
sv)
```

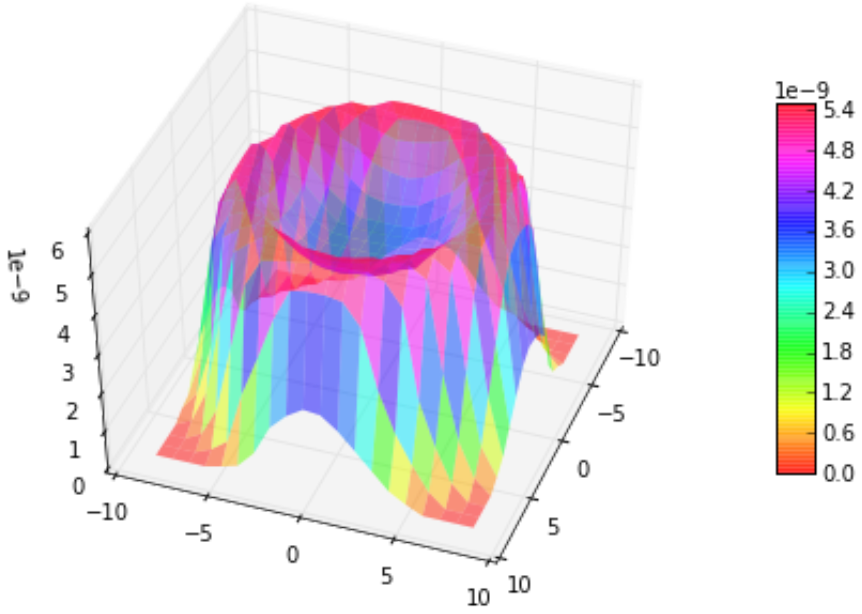



```
Energy : 2.5000E-08 MeV
```

and for instance the 3D plot for the intensity at the third spatial group for particles with energy of 1 MeV:

In [12]:

```
var1.plot3D(3,14)
```

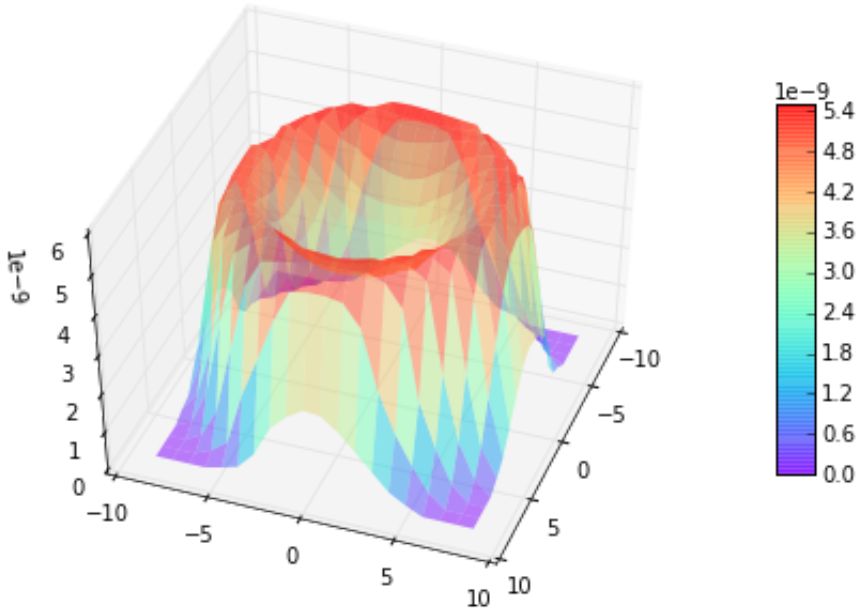



```
Energy : 1.0000E+00 MeV
```

and by assigning the rainbow color map and save the plot file:

In [13]:

```
var1.plot3D(3,14, figName = 'plot3D.tiff', colorMap=cm.rainbow)
```




```
Energy : 1.0000E+00 MeV
```

To process a different MCNP output file, the user can assign a new variable and process the data (this allows ease of comparison between different MCNP output files):

In [14]:

```
var2 = dataExtract('TAN44o.txt')
```

The total line number for 'TAN44o.txt' file:

In [15]:

```
var2.lineNumber()
```

```
216808
```

Checking the format of the data block:

In [16]:

```
var2.dataBlockContent()
```

```
Use the index position to select mapping energy when plotting

Line Number--->Energy Index--->Line Content


2781                 starting at -9.00000E+00 and ending at  9.00000E+00

2782

2783

2784             s-axis        -9.00000E+00 to -8.10000E+00

2785             t-axis       -9.00000E+00 to -8.10000E+00

2786                  energy

2787    1           0.0000E+00   0.00000E+00 0.0000

2788    2           2.5000E-08   0.00000E+00 0.0000

2789    3             total      0.00000E+00 0.0000

2790    4

2791    5        Shadow radiography image detector:

2792    6            Image grid centered at x,y,z =-9.90000E+01 0.00000E+00
0.00000E+00

2793    7

2794    8

2795    9                There are     20 grid points along the t-axis

2796    10           starting at -9.00000E+00 and ending at  9.00000E+00
```

```
2797    11

2798    12                There are     20 grid points along the s-axis

2799    13            starting at -9.00000E+00 and ending at  9.00000E+00

2800    14

2801    15

2802    16        s-axis         -9.00000E+00 to -8.10000E+00

2803    17        t-axis        -8.10000E+00 to -7.20000E+00

2804    18             energy

2805    19           0.0000E+00   0.00000E+00 0.0000

2806    20           2.5000E-08   0.00000E+00 0.0000
```

In this output file only two index of energies recorded. Extracting all the data blocks into a list:

In [17]:

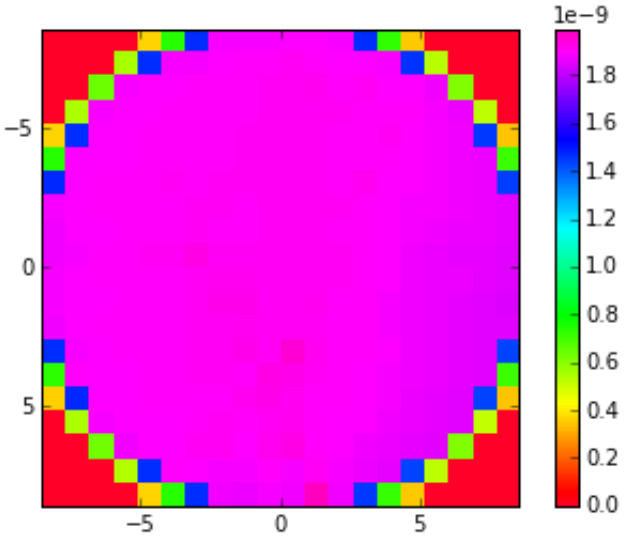
```
var2.allBlockData()
```

```
The number of blocks are 2400
There would be 3 groups of data
```

Lastly, viewing the particles intensity in 2D and 3D:

In [18]:

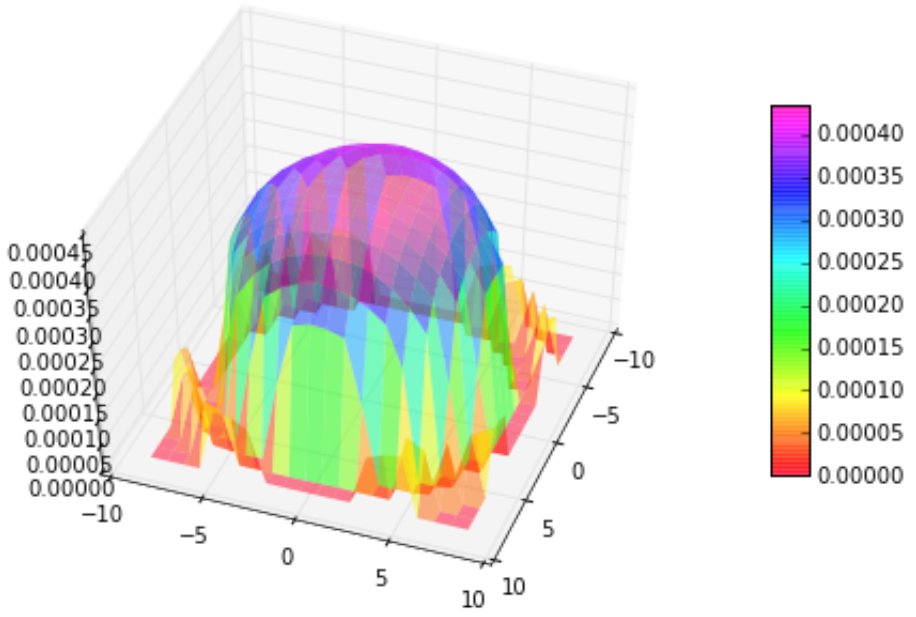
```
var2.plot2D(3,2, figName = 'plot2D.tiff', colorMap=cm.gist_rainbow)
```




```
Energy : 2.5000E-08 MeV
```

In [19]:

```
var2.plot3D(1,2, figName = 'plot2D.tiff', colorMap=cm.gist_rainbow)
```




```
Energy : 2.5000E-08 MeV
```

I hope the MCNPydE library and this simple instructions will be useful to MCNP users. Thank you.