**Exercise 4 – A deep-penetration shielding problem:**

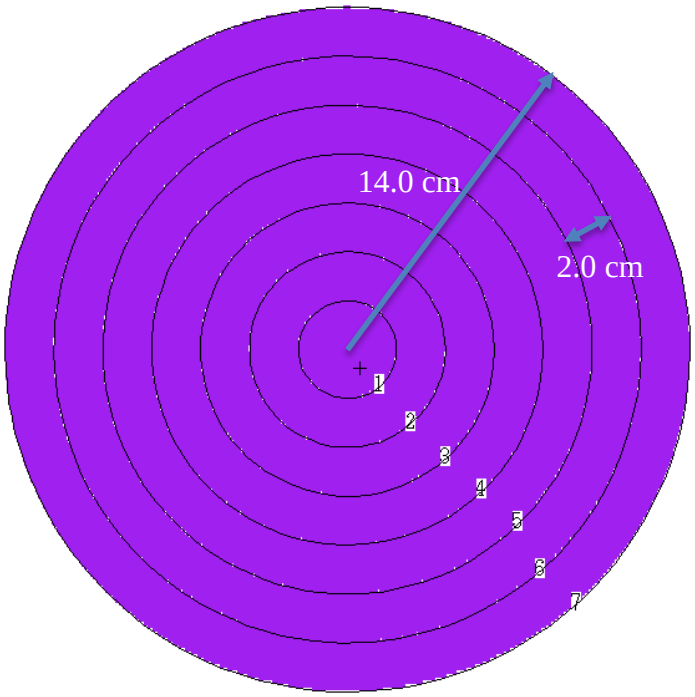
Carrying on from Exercise 3, copy *ex3.ip* to *ex4.ip*. Change the dimensions of the lead sphere defined in the problem and give it a new radius of 14 cm.

Run this simulation and examine the results.

Are these results reliable?
What has happened to the figure of merit?
Can you explain why the result and relative accuracy differs from exercise 3?

**Exercise 5 - Cell importances (geometry splitting):**

Copy *ex4.ip* to a new file. Edit your geometry to subdivide the lead sphere into 7 concentric shells, of width 2cm, to replicate the geometry shown below.




This represents an identical physical system to exercise 4.
Check the geometry with the plotter and don't forget to change the importance map to include the extra cells.
Change the importance map to suggest that outer shells are "more important", an example of this could be to double the importance for each shell as you move from the centre to the outer surface. This gives greater statistical weights (importance) to particles travelling towards the region of interest, in this case the outer surface over which we are tallying photon flux.
Run this simulation and examine the results.

Are these results more reliable?
What is the figure of merit and has it improved?
Can you explain the reasoning behind the geometry splitting technique and the effects this has had upon your results?