

TILING SCHEMAS

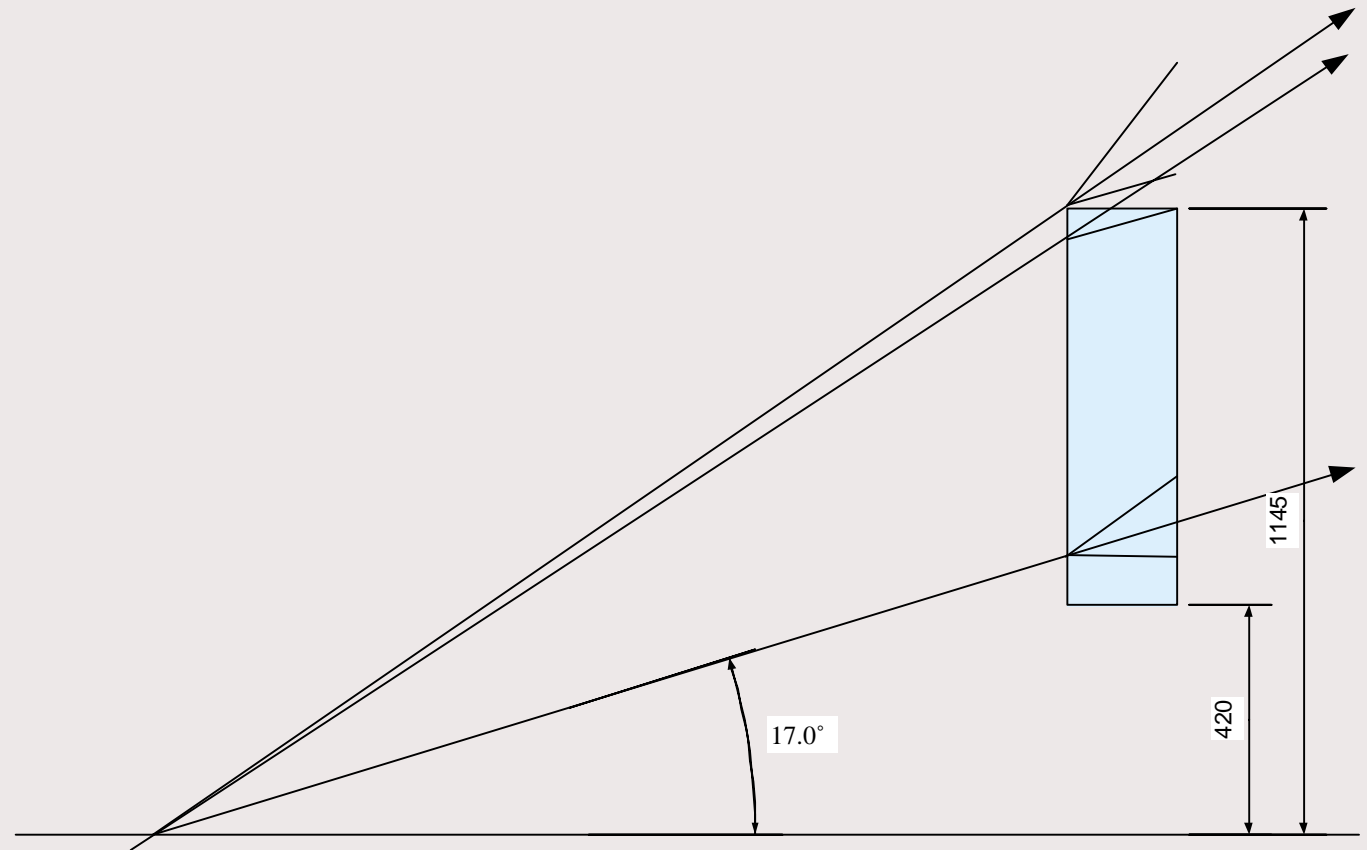
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Aerorich weekly meeting

1. Mechanical and kinematic constraints
2. Photon detector tiling
3. Aerogel tiling

Mechanical and kinematic constraints

- ◆ z position 1670mm
- ◆ inner $r=420\text{mm}$
- ◆ outer $r=1145\text{mm}$
- ◆ acceptance 17°



Tiling of the photon detector

- ◆ fill the space available in the present ACC area ($440 \text{ mm} < r < 1145 \text{ mm}$)
- ◆ assume $72 \text{ mm} \times 72 \text{ mm}$ photon detectors
- ◆ allow for a minimal distance between modules of 0.5 mm

Tried several configuration (perpendicular grid, perpendicular grid with fitting to the external radius etc)

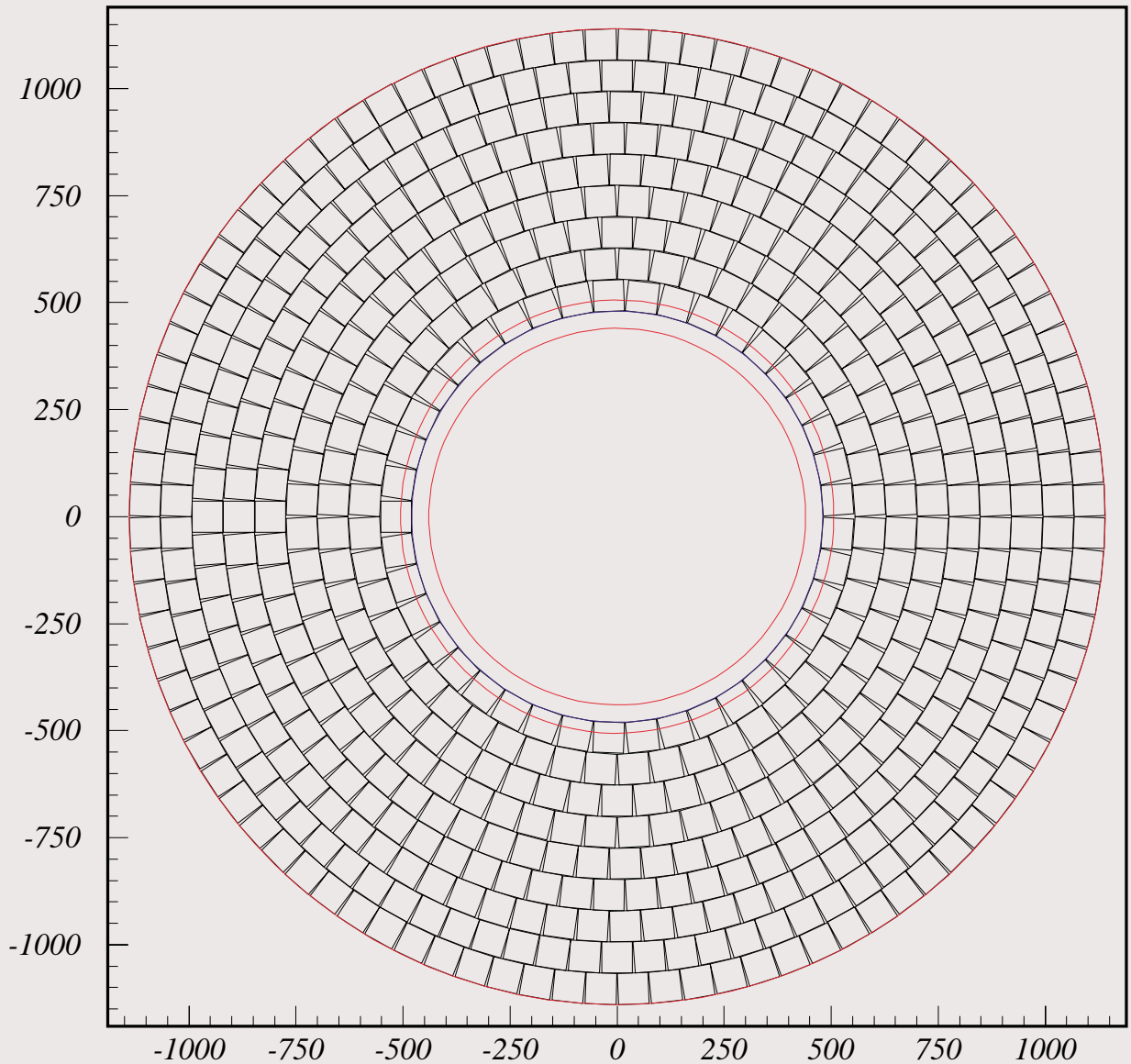
→ by far the best seems to be the natural choice - filling in circles →

PMT distribution

Number of PMTs and fraction of covered area (%):

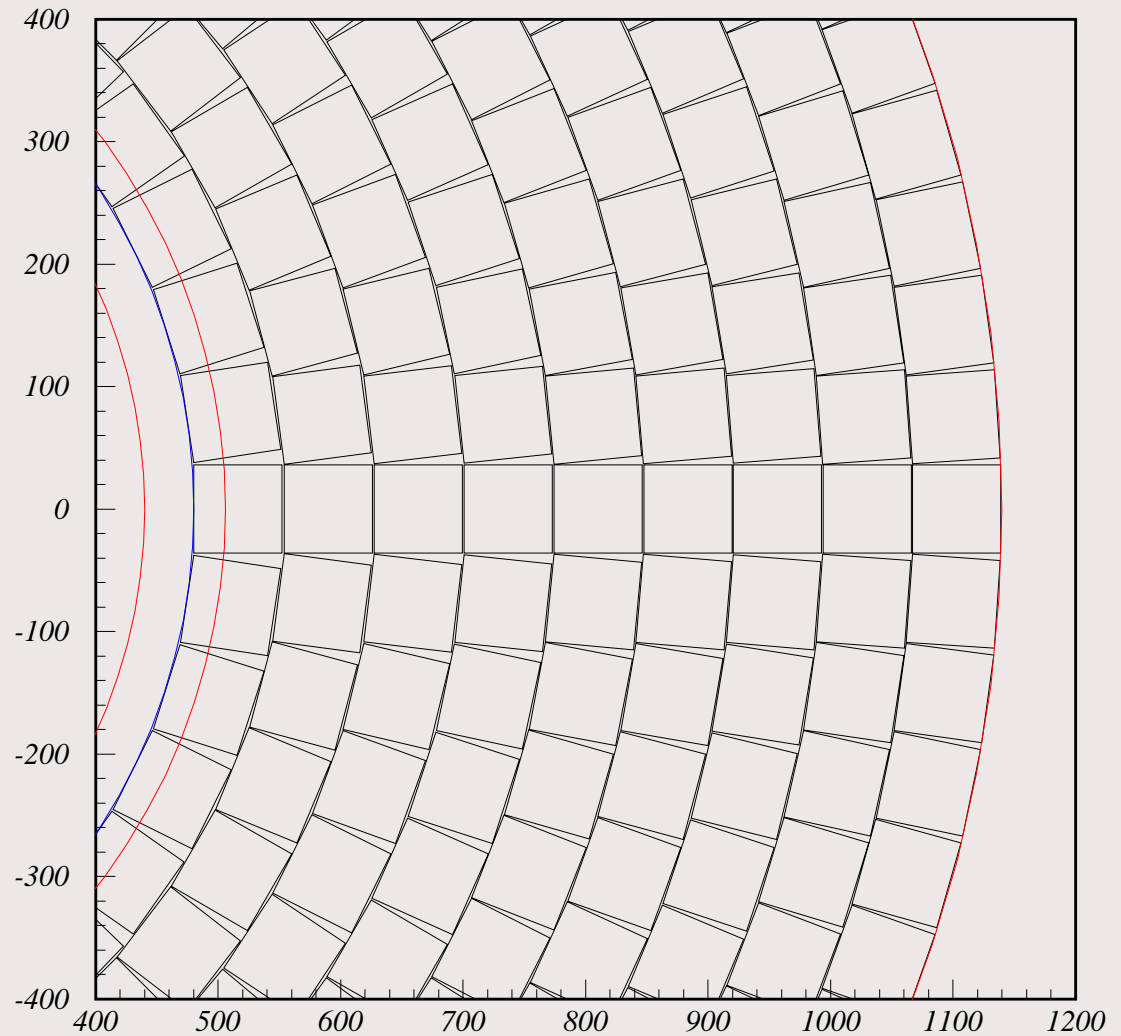
- ◆ all: 600, 93
- ◆ r1: 41, 89
- ◆ r2: 48, 91
- ◆ r3: 54, 91
- ◆ r4: 60, 92
- ◆ r5: 67, 93
- ◆ r6: 73, 93
- ◆ r7: 79, 93
- ◆ r8: 86, 94
- ◆ r9: 92, 94

PMT size 72mm x 72mm
 Minimum distance 0.5mm



PMT distribution - detail

◆ Maximum distance of few mm allows for HV cable feeding to the HPD front side.

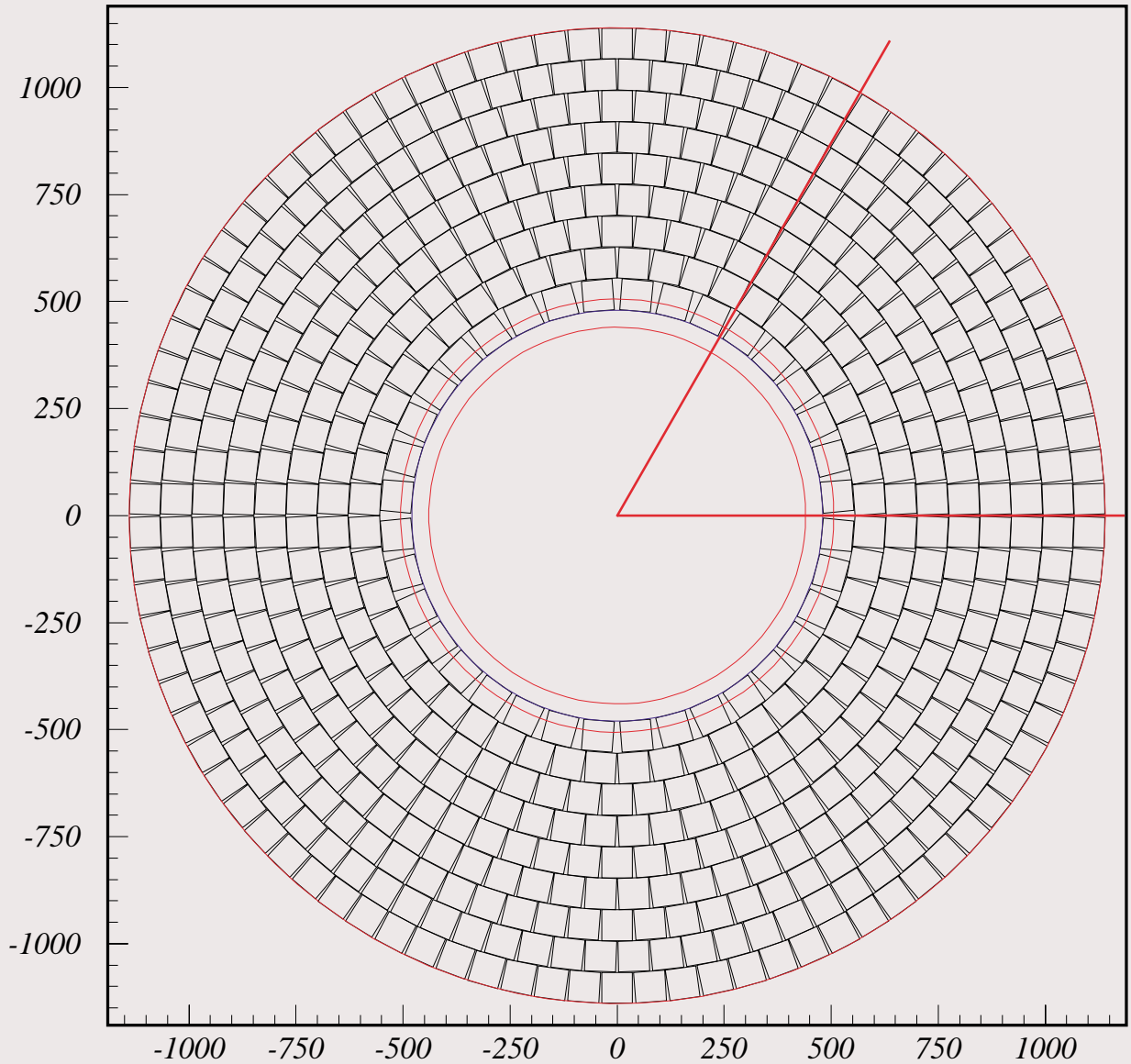


PMT distribution - 6 segments

Number of PMTs and fraction of covered area (%):

- ◆ all: 588, 91
- ◆ r1: 41, 78
- ◆ r2: 48, 91
- ◆ r3: 54, 91
- ◆ r4: 60, 92
- ◆ r5: 67, 92
- ◆ r6: 73, 92
- ◆ r7: 79, 92
- ◆ r8: 86, 92
- ◆ r9: 92, 92

PMT size 72mm x 72mm Minimum distance 0.5mm



Tiling of the aerogel radiator

- ◆ Fill the space available in the present ACC area ($440 \text{ mm} < r < 1145 \text{ mm}$)
- ◆ Minimize losses at the tile edges and **corners**
- ◆ Two scenarios:
 - only production of small tiles is possible (diameter of $\approx 15 \text{ cm}$)
 - tiles with larger sizes can be made (diameter of $\approx 30 \text{ cm}$)

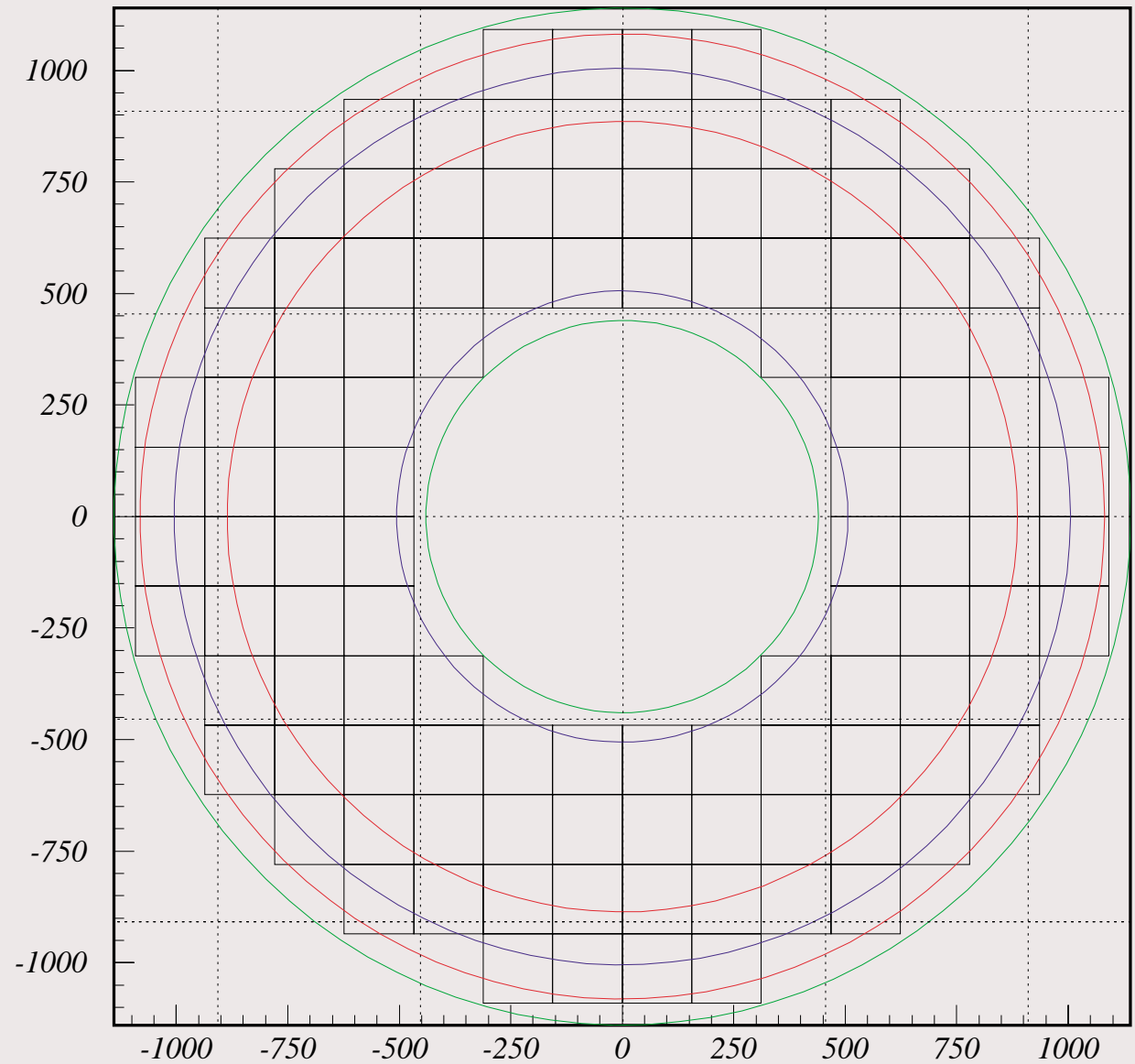
Aerogel tiling - squares

Tile size:

◆ $a=156\text{mm}$

Number of tiles:

◆ $n=116$



Aerogel tiling - hexagons

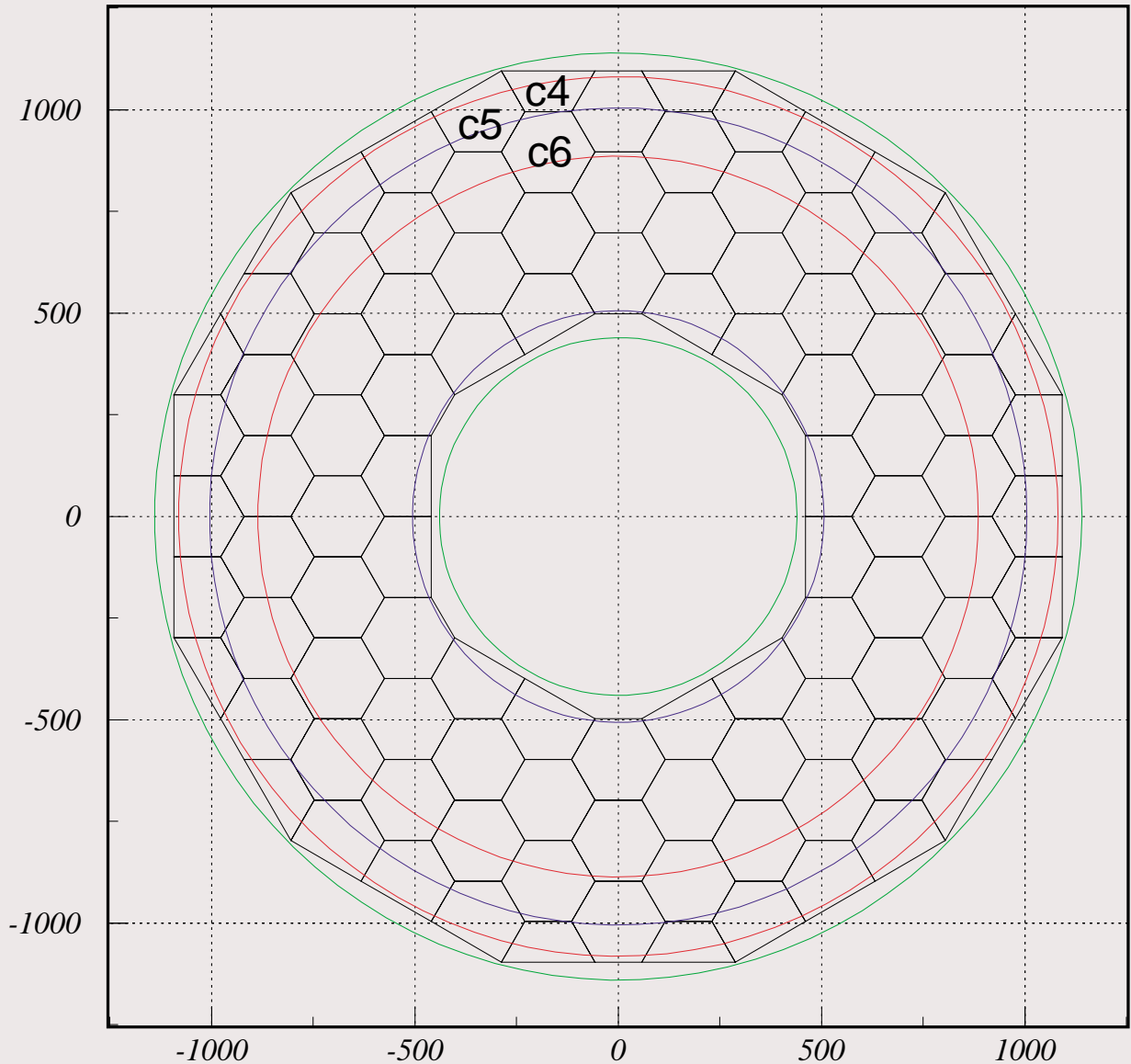
- ◆ small tile size option
- ◆ hexagons have the best edge-to-surface ratio
- ◆ losses at corners are less severe than in the case of squares ($2/3$ instead of $3/4$)

Tile size:

- ◆ $a=115\text{mm}$

Number of tiles:

- ◆ $c6=60$
- ◆ $c5=30$
- ◆ $c4=12$



Aerogel tiling - arcs

◆ large tile size option

Tile size:

◆ $a=233\text{mm}$

Number of tiles:

◆ $r1=19$

◆ $r2=25$

◆ $r3=31$

