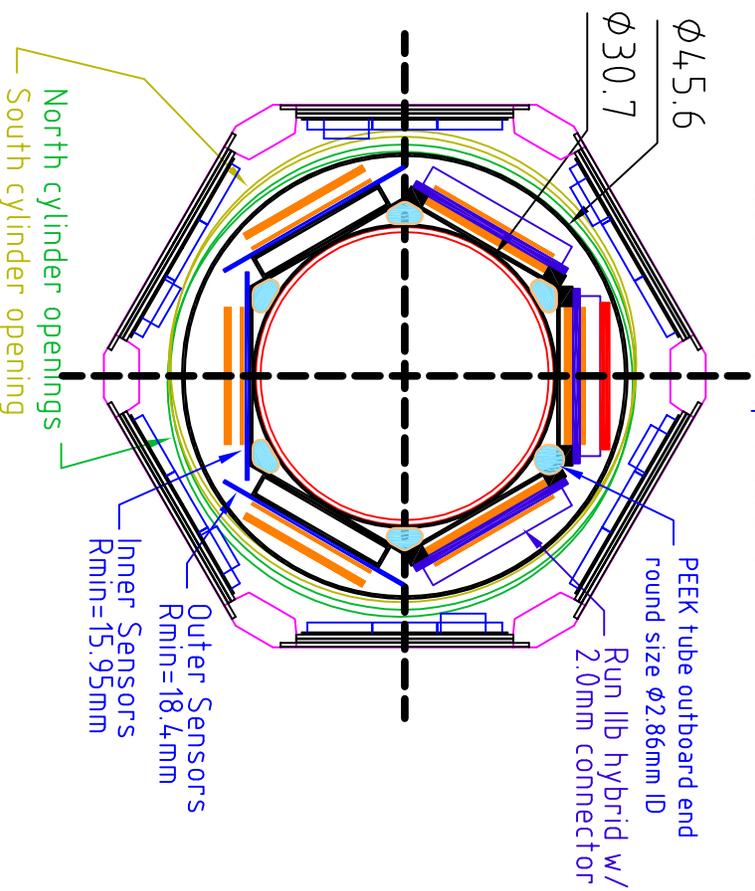


Hexagonal design with sensors at two radii. Coverage is 97% with 256 ch. x 73 micron pitch sensors



Coolant passages are 5.5 sq. mm area, 9mm perimeter. Assuming coolant flows full length of beam pipe (1.8m) at this size we get a flow of 0.06 lpm per tube at $dP = 3$ psi. We suffer $dT = 0.84$ C cooling the hybrids on the inlet side.

Hybrid power of 1 W enters tube over area of roughly 4mm x 25mm. For film coefficient of $450\text{W}/\text{m}^2\text{-K}$, $dT = 23$ C. Heat spreading for on-board hybrid case requires FEA to correctly model longitudinal spread of heat and heat transfer from inner CF tube to cooling tubes, but I would estimate silicon temperatures roughly 15 C above the coolant inlet.

Hexagonal design with hybrids on sensors at one radius. Coverage is 86% with 256 ch. x 60 micron pitch sensors

