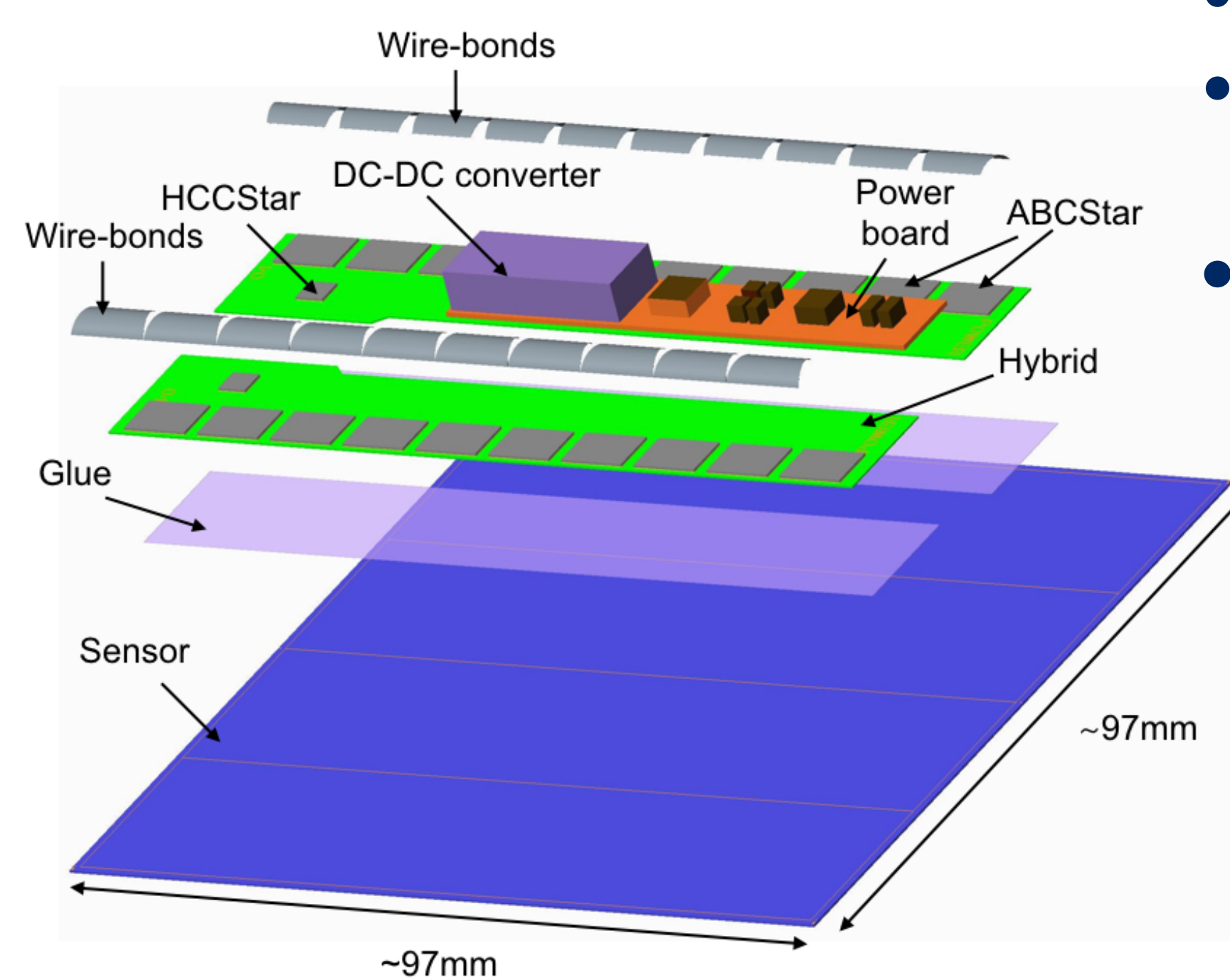
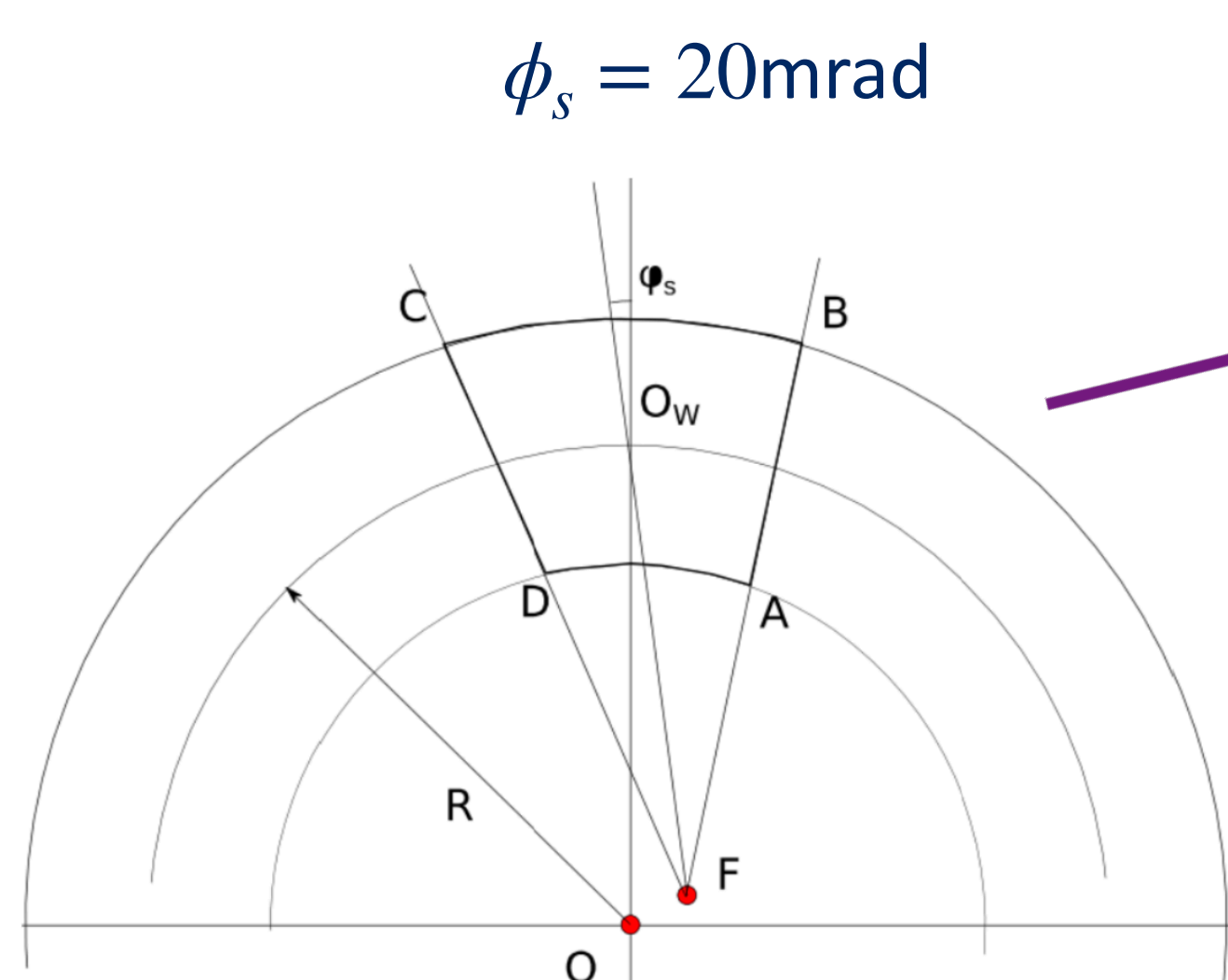


ATLAS ITk Endcap with focus on test beam studies

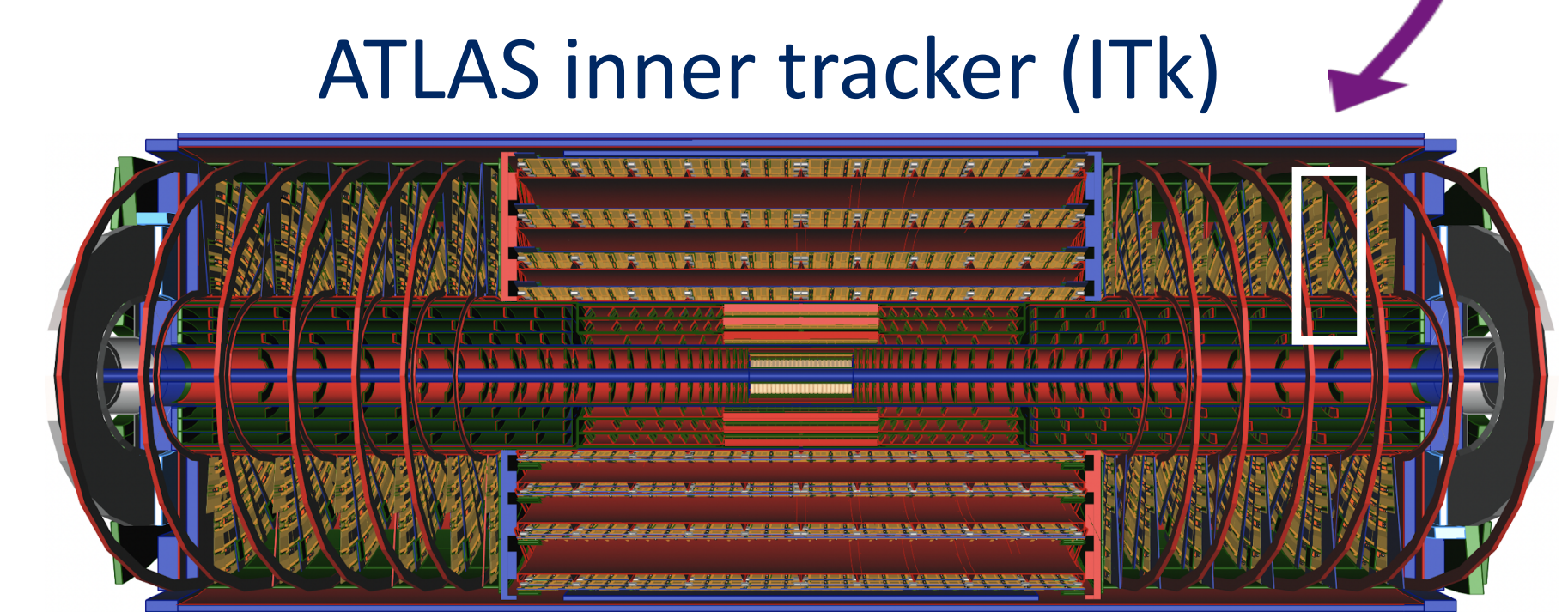
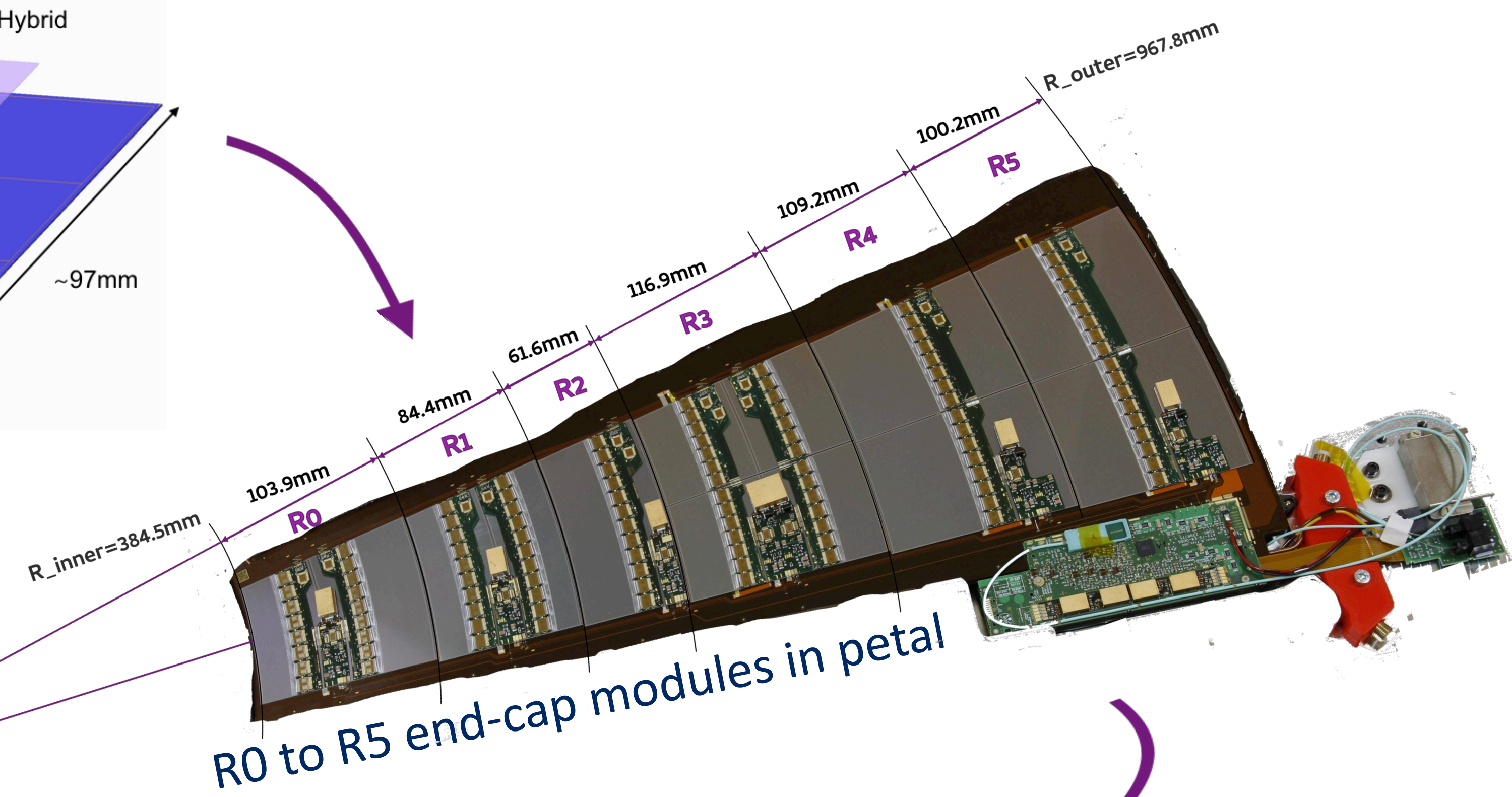
Yajun He (DESY FH ATLAS)

From sensor to a new inner tracker (endcap)

- Leading technology of silicon micro-strip sensor in the large-format **6-inch silicon wafer**
- Active thickness: $320\mu\text{m}$
- Strip pitch: $69 - 84\mu\text{m}$
- **Stereo annulus geometry**



- **ABCStar**: AC-coupled front-end readout ASICs
- **HCCStar**: data aggregator chips
- **Power board**: DC-DC Converter, an Autonomous Monitor and Control Chip (AMAC) and a high-voltage GaN FET switch
- **All electronics glued on top of the sensor**

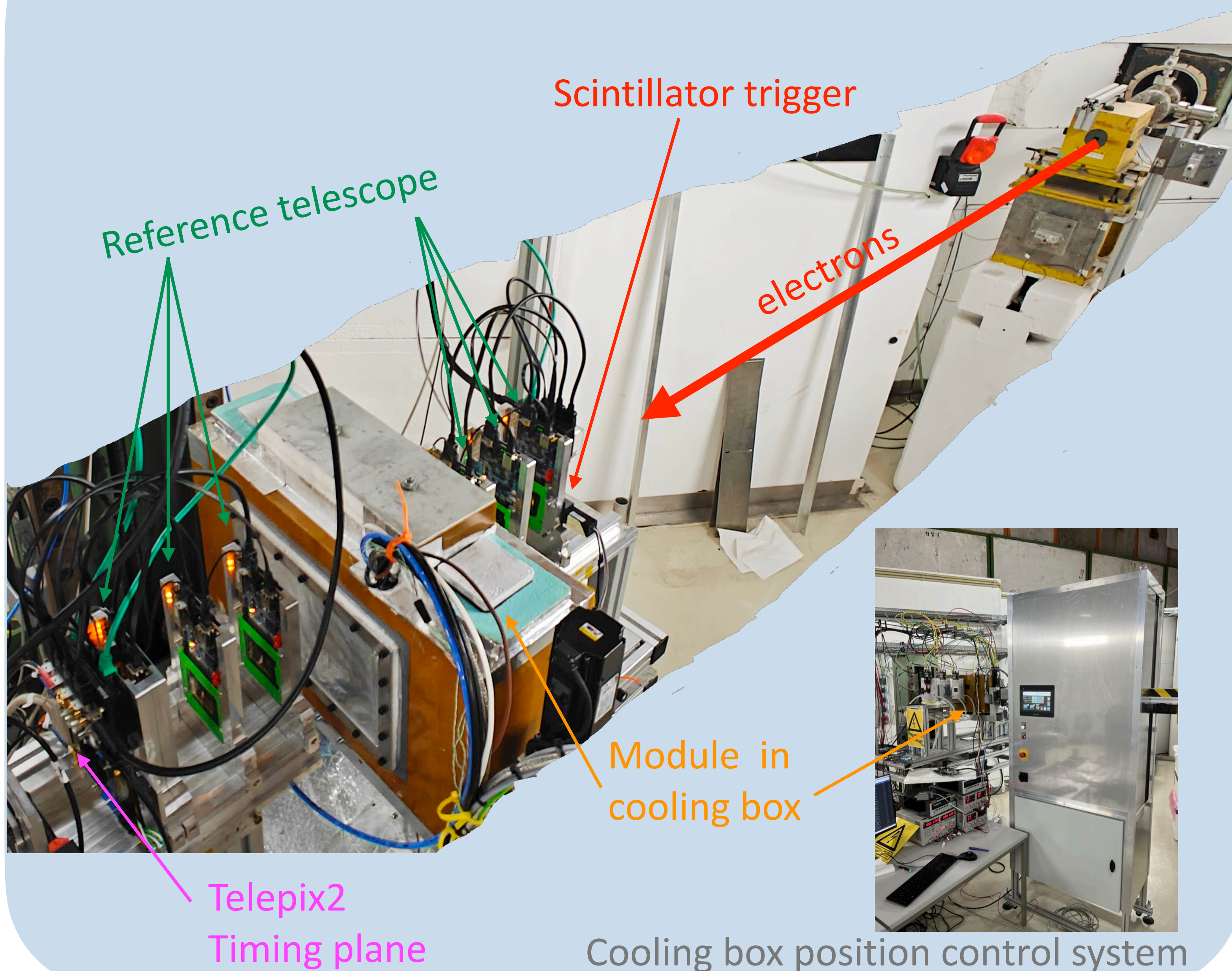


Requirements:

- **Efficiency** $> 99\%$ to maintain physics performance
- **Noise occupancy** $< 0.1\%$ to see pile-up events

All module types have been demonstrated end-of-life operability.

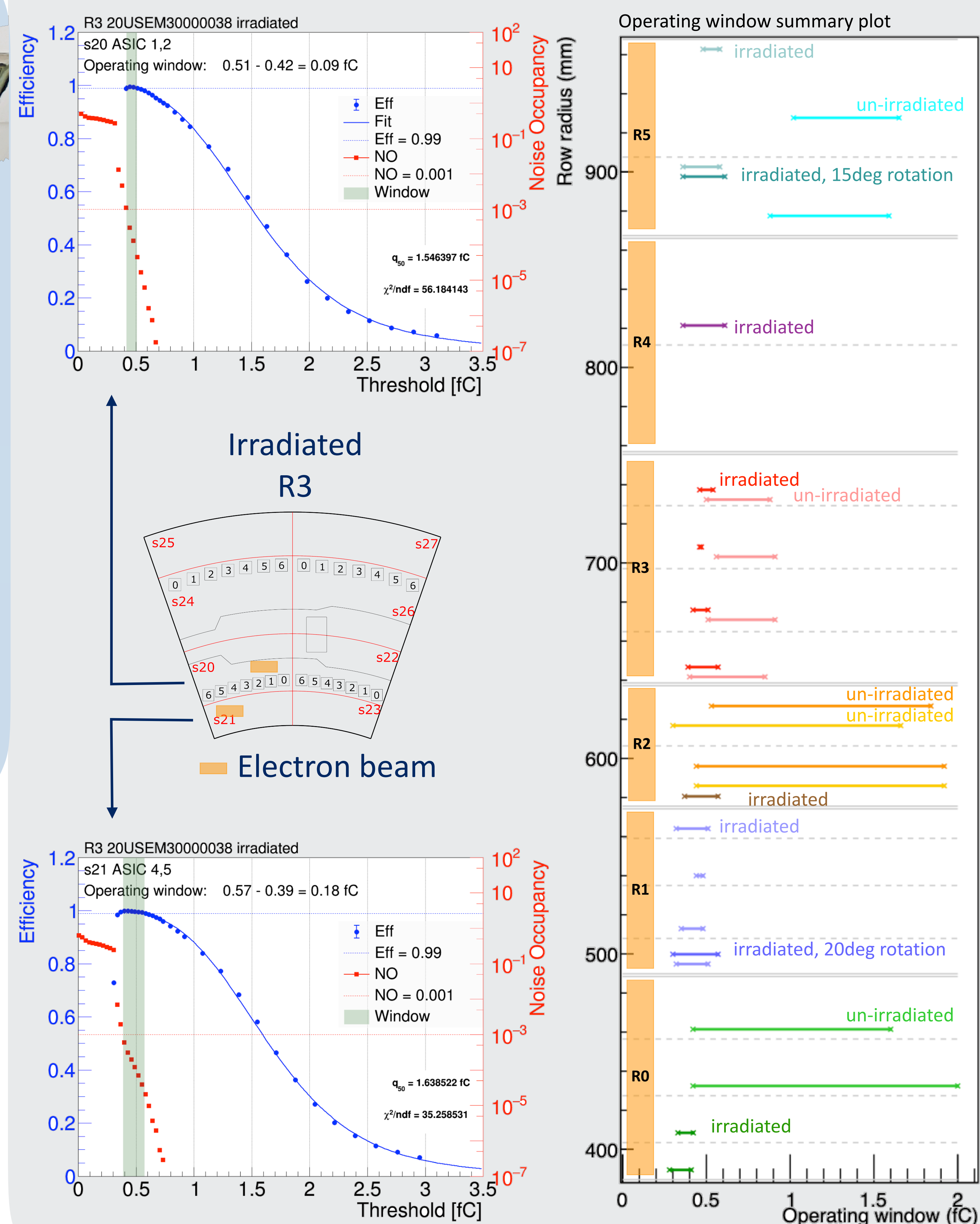
Test beam setup @ DESY



Results

Efficiency VS threshold:

$$f(x) = \frac{1}{2} \cdot \epsilon_{\text{max}} \cdot \text{erfc} \left[\frac{x - q_{50}}{\sqrt{2}\sigma} \cdot \left(1 - 0.6 \tanh \left(\frac{A \cdot (x - q_{50})}{\sqrt{2}\sigma} \right) \right) \right]$$



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- Apr. 2023 - now, fellowship@DESY

