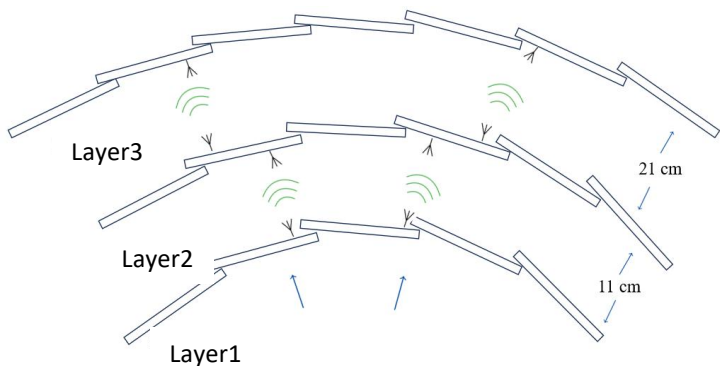


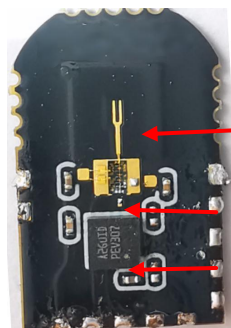


Millimeter-Wave-Based Wireless Transmission System for CEPC Detector

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Institute of High Energy Physics, CAS



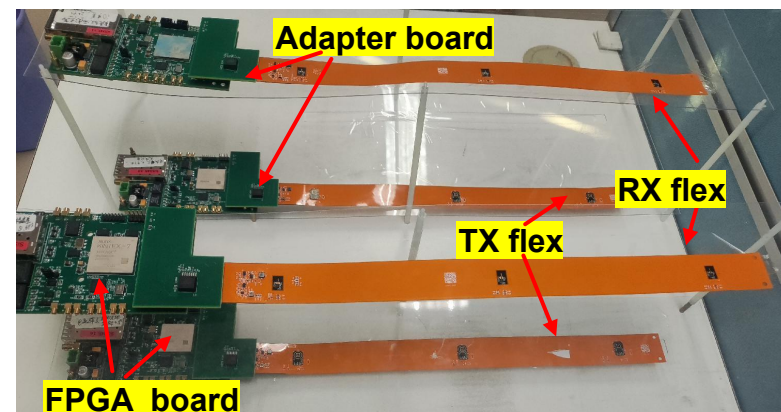
Radial Readout Scheme



MMW module

Performance:

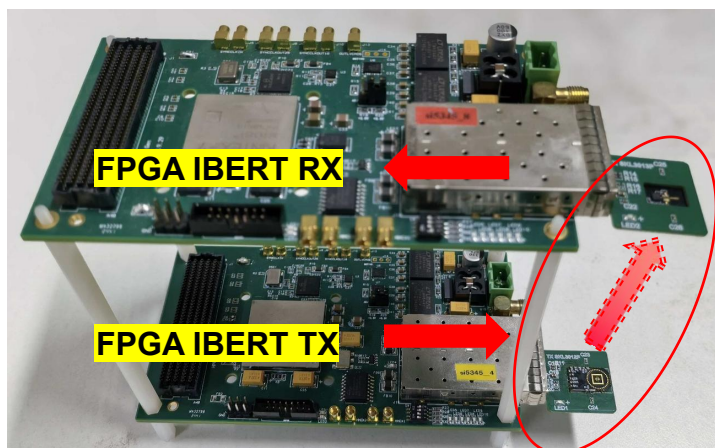
- PCB patch antenna
- PA
- ST60A2
- 67.5cm @ 1.25Gbps
- 22.5cm @ 6.6Gbps
- TID: 7Mrad
- NIEL: $1.2 \times 10^{12} \text{ n}_{\text{eq}}/\text{cm}$



Multi-channel demonstration

Benefit of Wireless

- Reduce the material budget of cables, fibers and connectors,
- More convenient for installation and maintenance.



Module test setup

Technical Parameters

- Architecture: FPGA data source + Flex RF node
- Layout: 2x3 transmission pairs arranged on XY plane
- XY plane spacing: 15 cm
- Z-axis transmission distance: 15–30 cm
- Line rate: 3.125 Gbps
- Bit error rate: $< 1\text{E-}14$