

Irradiation test of COFFEE2 @ CSNS

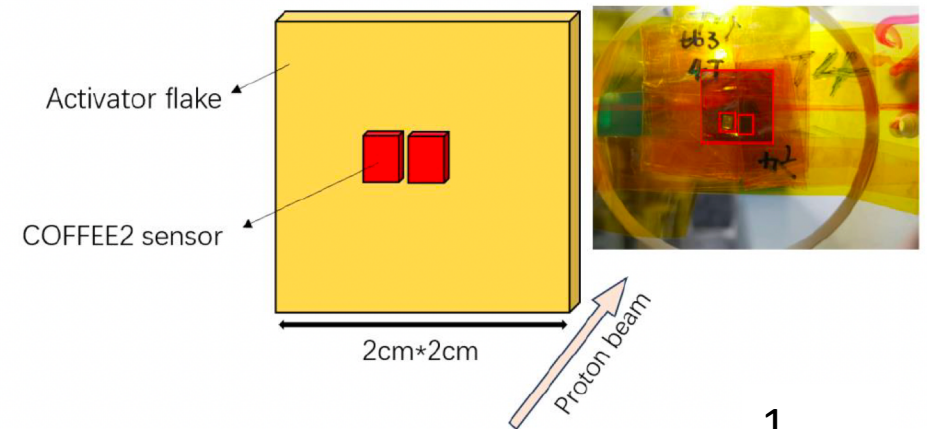
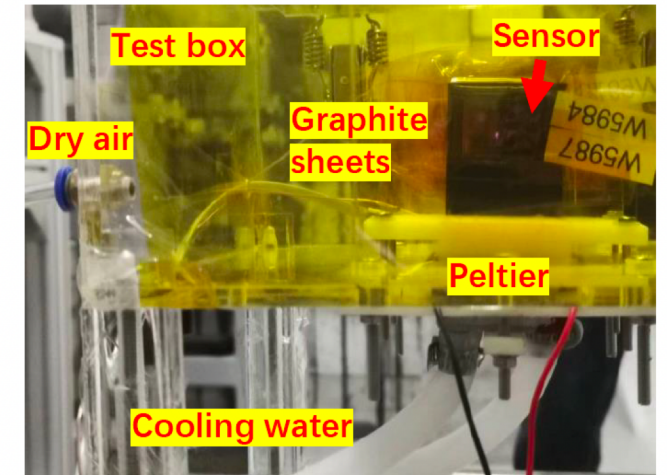
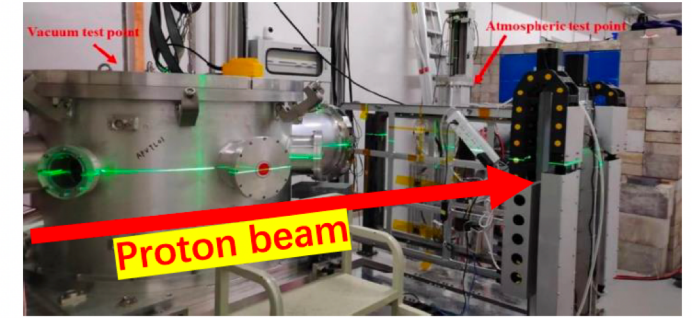
Yiming Li, Zijun Xu, Zhiyu Xiang, Xiaojie Jiang

CEPC reference TDR tracker meeting

26 Apr 2024

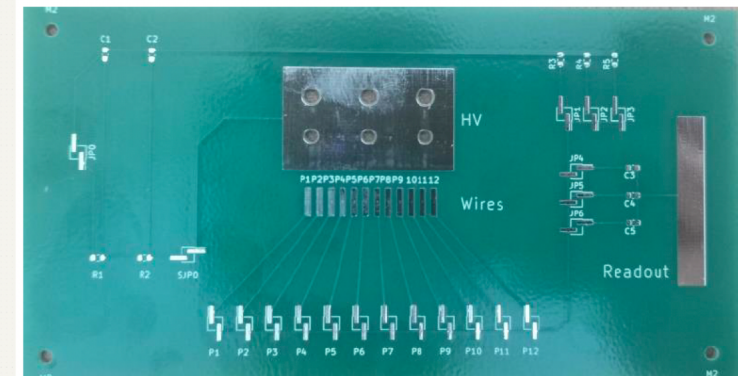
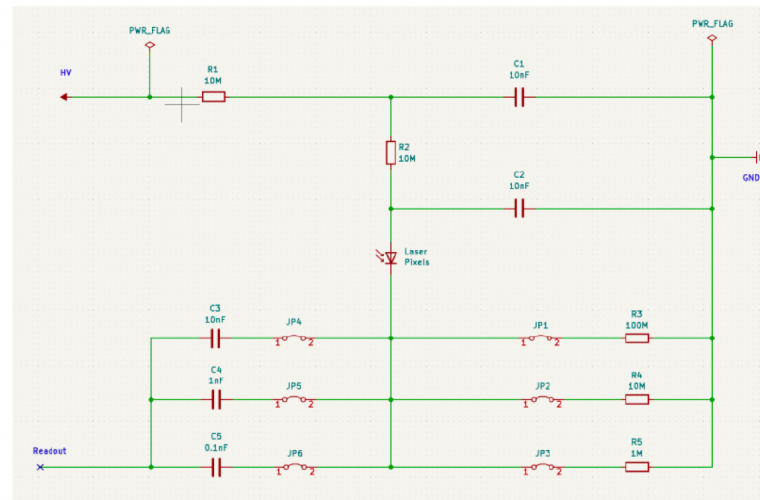
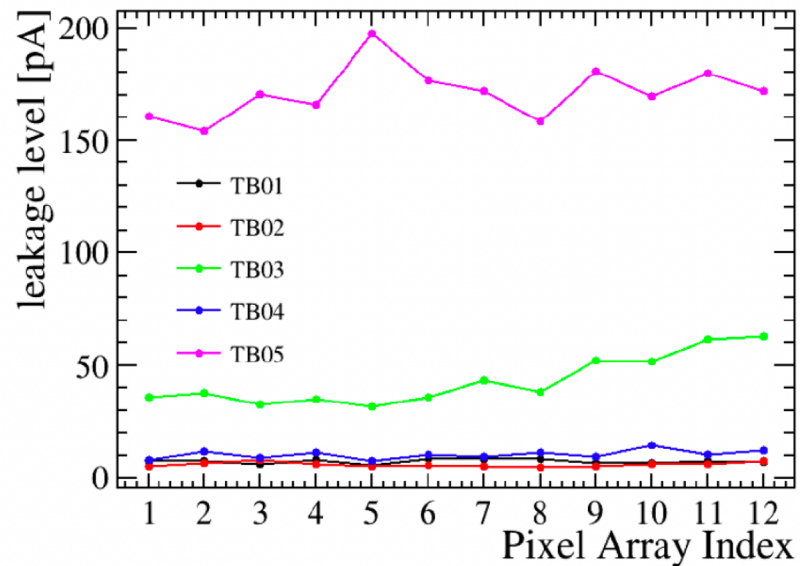
Setup

- Low temperature (1 test point, beam spot $2 \times 2 \text{cm}^2$)
 - -28°C (cooling water + Peltier), dry air prevents freezing
 - Stacked with other samples (Si strip sensor), isolate with Kapton tape, estimated loss of flux $<10\%$
 - Irradiation flux: $7 \times 10^{14} \text{ n}_{\text{eq}}/\text{cm}^2$
 - Annealing condition: 80 min at 60°C
- Room temperature (4 test points, beam spot $3 \times 3 \text{cm}^2$)
 - Irradiation flux: 2×10^{11} , 3×10^{12} , 3.5×10^{13} , $1 \times 10^{14} \text{ n}_{\text{eq}}/\text{cm}^2$
- 2 sensors placed at each test point
 - 1 IV/CV tested + 1 new
- Activator flake were placed at each point to calibrate irradiation flux



Test Plan (IV, CV, CCE)

- After sensors back (2 weeks later), compare IV/CV change
 - For the 5 sensors tested, IV/CV results were consistent in general
 - Large leakage found for 1 sensor (placed at test point with lowest flux)
- Meanwhile, preparing for test setup of charge collection efficiency
 - Take IDE1140 as readout system
 - Verify the signal response with laser first, further test for radioactive source (α , β)



Signal test schematic & test board