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HiBeam-T: A TPC with pixel readout for heavy-ion beam monitoring

In this paper, the HiBeam-T, a time projection chamber (TPC) for monitoring the position and profile of heavy ion beams in a real-time manner, has been designed. This gaseous detector features its readout with an array of forty Topmetal-II- CMOS pixel sensors, each of which has 72×72 pixels with a size of $83 \mu\text{m} \times 83 \mu\text{m}$. The detector part consists of the charge drift and charge collection regions, separated by a gating grid. The readout electronics consists of three readout control modules and one clock and synchronization module. This Hibeam-T has a sensitive area of $20 \times 20 \text{ cm}^2$, and it can acquire the one-dimensional beam position and profile every second. A test with a continuous $80.55 \text{ MeV/u } 12\text{C}^{6+}$ beam shows that the measurement resolution to the beam center could reach $17 \mu\text{m}$.

Minioral

Yes

IEEE Member

No

Are you a student?

No

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