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## DAQ system for CEPC Vertex detector prototype

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**Abstract:** The discovery of the Higgs boson was a significant milestone in the history of particle physics. In pursuit of more precise measurement of the Higgs boson's properties and interactions, Chinese high-energy physicists proposed the Circular Electron Positron Collider (CEPC) project. The silicon pixel vertex detector, which requires high spatial resolution, low material budget, and radiation hardness, is one of the major technical challenges in the CEPC's preliminary research. Development of CMOS pixel sensors and a silicon pixel detector prototype have been carried out to satisfy the requirements of CEPC vertex detector. Data Acquisition System (DAQ) is an essential component of the silicon pixel detector experiment. To meet the requirements of the silicon pixel detector prototype, a specialized data acquisition system was designed and implemented.

The DAQ system is designed to configure readout electronics and pixel detector sensors, read out data continuously from the electronics boards, verify the data format, and subsequently store the data on a disk. In addition, the system includes a graphical user interface (GUI) that facilitates run control and monitoring, and periodically updates the hit-map. The system's software is developed in Java, with the graphical interface being crafted in JavaFX.

The software has undergone rigorous testing in the laboratory and has been validated during test beam experiments of DESY. The results demonstrate that the software performs reliably and fulfills the data acquisition requirements for the detector prototype.

**Key Words:** Data acquisition system, Silicon pixel vertex detector, Data flow, User interaction

### Minioral

Yes

### IEEE Member

No

### Are you a student?

Yes

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