



Contribution ID: 74

Type: **Mini Oral and Poster**

A Frequency Division Multiplexing Room-temperature Electronics Readout Scheme for TES Calorimeter Arrays

Thursday 25 April 2024 12:35 (20 minutes)

With the progress of material science and thin film preparation technology, the Transition-Edge Sensor (TES) detector-related technologies have been rapidly developed. The TES detector arrays find extensive applications in high-energy physics and nuclear radiation detection. The Frequency Division Multiplexing (FDM) technology is one of the mainstream multiplexing technologies used in TES readout that reduces thermal load. This paper presents the principle of the TES for applications in astrophysics and particle physics. Then, it proposes a room-temperature electronics readout scheme for the FDM readout system of the TES arrays. This scheme enables precise adjustment of the 40-channel TES bias signals so that the TES arrays can operate at the set optimal operating frequency. This scheme achieves high-precision amplification, sampling, processing, and feedback of TES signals. In the feedback algorithm, the logic resources of FPGA are used to achieve accurate phase compensation.

Minioral

Yes

IEEE Member

No

Are you a student?

Yes

Authors: LIU, Jianguo (University of Science and Technology of China (CN)); Dr WANG, Yu (University of Science and Technology of China); Mr SHANGGUAN, Peike (University of Science and Technology of China); Mr WANG, Qian (Department of Astronomy, Tsinghua University); FENG, Changqing (University and Science and Technology of China); LIU, Shubin (University of Science and Technology of China)

Presenter: LIU, Jianguo (University of Science and Technology of China (CN))

Session Classification: Poster B

Track Classification: Real Time Diagnostics, Digital Twin, Control, Monitoring, Safety and Security