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Readout electronics for the gamma detector of the HIRFL-CSR External Target Facility

The Cooling Storage Ring of the Heavy Ion Research Facility in Lanzhou (HIRFL-CSR) is constructed to study nuclear physics, atomic physics, interdisciplinary science, and related applications. The External Target Facility (ETF) is located at the main ring of the HIRFL-CSR. The gamma detector of the ETF is built to measure online gamma-rays with energies below 5 MeV in the center-of-mass frame of fast-moving reaction products. The readout electronics of this gamma detector have been designed and commissioned. The readout electronics consists of thirty-two Front-End Cards (FEC), thirty-two Readout Control Unit (RCU), one Common Readout Unit (CRU), one Synchronization & Clock Unit (SCU), and one Sub Trigger Unit (STU). With the real-time peaking finding algorithm implemented in the RCU, the data volume can be significantly reduced. In addition, trigger algorithms are implemented to improve detection efficiency. Test results show that the readout electronics' integral nonlinearity (INL) is less than 1%, and the energy resolution of measuring the Co60 source is better than 5.5%. This paper will discuss the design and performance of this readout electronics.

Minioral

Yes

IEEE Member

No

Are you a student?

Yes

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