

Investigation of the cause and establishment of a suppression method of Fake Hits generated in the readout circuit board of sPHENIX-INTT silicon detector

Tuesday 25 April 2023 17:40 (20 minutes)

In April of this year, the sPHENIX experiment began at Brookhaven National Laboratory (BNL) in the United States, measuring the properties of a quark-gluon plasma (QGP) state created by colliding gold atoms accelerated by the Relativistic Heavy Ion Collider (RHIC). The sPHENIX Japan group (Nara Women's University, Rikkyo University, and RIKEN) is responsible for developing and constructing the INTT detector, one of three tracking detectors to be implemented in sPHENIX. INTT is a detector that discriminates accurate hits with excellent time resolution and reconstructs particle trajectories. The INTT consists of 56 silicon ladders assembled and is an assembly of silicon ladders assembled into a two-layer barrel shape. When the ladder was used to collect and analyze the data, it was observed that hits observed "unphysical data" were contaminated in the data accumulated. The "unphysical data" differ species from so-called noise from their behavior. The noise is typically concentrated in the small ADC deposit region, while the ADC of the "unphysical data" seems arbitrary. Here, we call them Fake Hits. This study aims to investigate the cause of these Fake Hits and establish a method to suppress them.

Theory / experiment

Experiment

Group or collaboration name

sPHENIX

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Session Classification: Poster Session

Track Classification: Electromagnetic probes