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Fault Detection and Diagnosis Software for LHAASO

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The Large High Altitude Air Shower Observatory (LHAASO) is designed to observe physical phenomena such as cosmic rays, the occurrence of which is unpredictable and therefore requires uninterrupted operation of the experiment system. However, failures are almost inevitable, and in the event of a system failure, the cause of the failure needs to be quickly analysed and repaired. The Fault Detection and Diagnosis software (FDD) was designed to quickly detect and analyse system faults. The software collects real-time operational status information from various components of the experimental system, including detectors, electronics, and data acquisition software. FDD can quickly analyse the cause of faults when they occur, providing timely information to the experimental maintenance personnel. In addition, historical data for a specified time period can be analysed and data reports generated as required. The design requirements of FDD include high throughput, real-time, expandability and reliability. To meet these requirements, the software adopts a distributed architecture, deploying data collection, processing, storage and presentation functions on different nodes. The software consists of the following components: information collection module, automated operation module, fault analysis module, interaction module, and database. The software analyses the collected parameter data through batch processing and gives the cause of failure using automation. The technical validation and prototype implementation of the system has been completed and applied in LHAASO. FDD can quickly and accurately diagnose operational faults, provide effective solutions for experiment operators.

Minioral

Yes

IEEE Member

No

Are you a student?

Yes

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