



Contribution ID: 468

Type: **Oral presentation to parallel session**

The Data Acquisition System for DarkSide-50

Monday 14 October 2013 16:25 (20 minutes)

The DarkSide-50 dark matter experiment has recently been constructed and commissioned at the Laboratori Nazionali del Gran Sasso (LNGS). The data acquisition system for the experiment was jointly constructed by members of the LNGS Research Division and the Fermilab Scientific Computing Division, and it makes use of commercial, off-the-shelf hardware components and the artdaq DAQ software toolkit.

This toolkit provided many core functions for the data acquisition system, including data transfer, event building, process control, system performance monitoring, and the framework for data compression and online data quality monitoring. Using the toolkit, experiment-specific functionality for reading out the commercial digitizers, trigger cards, and time-to-digital converters was developed, as were the experiment-specific data compression algorithms and data quality monitoring software.

We will present the overall design and implementation of the DarkSide-50 data acquisition system, the advantages of using the artdaq toolkit, the experiment-specific components that were developed, and the performance of the system.

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Session Classification: Data Acquisition, Trigger and Controls

Track Classification: Data acquisition, trigger and controls