

Performance of ALICE detector and electronics under first beam conditions

Friday, September 24, 2010 9:00 AM (20 minutes)

ALICE (A Large Ion Collider Experiment) is a general purpose heavy-ion detector at the CERN LHC, addressing the physics of strongly interacting matter and the quark-gluon plasma in nucleus-nucleus collisions. ALICE has been recording physics data since the first proton-proton collisions at LHC as reference for the heavy-ion programme and to address physics topics for which it is complementary to the other LHC detectors. This talk will provide a description of the ALICE experiment as it is running to date. Global readout performance, subsystems performance, stability and reliability of instrumentation will be addressed. Selected topics related to tuning and calibration of the ALICE subsystems to ensure reliable triggering and data taking will be discussed

Summary

ALICE (A Large Ion Collider Experiment) is a general purpose heavy-ion detector running at the CERN LHC that focuses on QCD, the strong interaction sector of the Standard Model. It is designed to address the physics of strongly interacting matter and the quark-gluon plasma in nucleus-nucleus collisions. Besides running with Pb ions, ALICE will record data from collisions with lighter ions, lower energy runs and dedicated proton-nucleus runs. ALICE experimental programme includes recording proton-proton collisions data to collect reference measurements for the heavy-ion programme and to address QCD topics for which ALICE is complementary to the other LHC detectors.

The experiment consists of 18 detector systems each characterized by specific technology choice and design constraints. The most stringent requirement for ALICE detectors is the capability to handle the extreme particle multiplicity anticipated in central Pb-Pb collisions. The different subsystems were optimized to provide high-momentum resolution as well as excellent Particle Identification (PID) over a broad range in momentum, up to the highest predicted multiplicities.

ALICE has been recording p-p collisions since the first ones delivered by the LHC. This contribution aims to provide a description of the ALICE experiment, with emphasis on instrumentation related topics, as it has been operating up to date since the beginning of the LHC 7 TeV p-p collisions programme (March 2010).

A description of the detectors and of the central systems constituting the ALICE apparatus will be given. Distinctive characteristics of ALICE triggering and DAQ systems will be presented including a discussion of the overall readout performance.

The actual performance with p-p collisions of a selection of detectors will be reviewed and compared to the initial requirements. Stability and reliability of electronics and related services will be addressed with examples from the experience.

Stable and reliable operation of the entire experiment as a unit device for data taking requires addressing a number of topics, partially common to the other LHC experiments. Examples are the alignment in time of first level trigger sources, the fine tuning of the ALICE master clock with respect to bunch crossings at the interaction point, the monitoring of collision rates.

Solutions being used in ALICE for these needs will be presented.

Primary author: Dr AGLIERI RINELLA, Gianluca (CERN)

Presenter: Dr AGLIERI RINELLA, Gianluca (CERN)

Session Classification: TOPICAL DAY: Performance of LHC detector and electronics under first beam conditions