

CERN-RRB-2011-091
14 OCTOBER 2011

PRINCIPAL LHCC DELIBERATIONS

31ST MEETING OF THE ALICE RESOURCES REVIEW BOARD
19 OCTOBER 2011

EMMANUEL TSESMELIS
SCIENTIFIC SECRETARY, LHCC

GENERAL

This document summarizes the principal LHCC deliberations concerning ALICE at the Committee's sessions in June 2011 and September 2011.

The LHCC considers that ALICE has made excellent progress in all aspects of the experiment and the Committee congratulates the ALICE Collaboration on its achievements.

CONCERNS FROM THE PREVIOUS ALICE RESOURCES REVIEW BOARD

SUB-SYSTEM	CONCERN	STATUS
Silicon Pixel Detector (SPD)	Loss of pixel channels due to failures in the cooling.	The cooling problem for the SPD is slowly becoming worse, with only 68% of the half staves currently operating. During the 2011-2012 Technical Stop, an attempt will be made to clean the filters employing an ultrasonic probe.
Time Projection Chamber (TPC)	Trips of chambers.	Removing the high voltage capacitors where accessible has solved the trips in the TPC that had destroyed front-end cards.

STATUS OF THE EXPERIMENT

SUB-DETECTORS

A beam loss accident on 28 July 2011 led to major damage to the Silicon Drift Detector (SDD) injector circuits used to calibrate the drift speed. However, calibration is still possible using the remaining circuits combined with alternative calibration methods.

The cooling problem for the SPD is slowly becoming worse, with only 68% of the half staves currently operating. During the 2011-2012 Technical Stop, an attempt will be made to clean the filters employing an ultrasonic probe.

Removing the high voltage capacitors where accessible has solved the trips in the TPC that have destroyed front-end cards. This reduces the stored charge and avoids damage to the front-end electronics. For the inaccessible channels, the high voltage has been reduced by 70V in order to avoid damage until the capacitors can be removed. There is only negligible degradation of dE/dx performance due to the increased cross-talk without the capacitors.

For the Muon System, the alignment is improving, with a current mass resolution at the Upsilon resonance of 150 MeV (approaching the expected 100 MeV). Downtime for the read-out is observed, and is due to locking-up of the CROCUS circuits for unknown reasons. This is an ongoing problem and the Committee requests a presentation from the experts to assess the situation in more detail during the November 2011 LHCC ALICE pre-meeting.

The status of the High Level Trigger (HLT) was discussed. Considerable progress has been achieved during the summer, with significant upgrades of computing power and bandwidth. Stable operation with an efficiency $> 95\%$ has been observed and the system is now in its final verification stage. It is expected to be operational during the remaining proton-proton run time.

OPERATIONS

Recently, ALICE has been experiencing severe problems due to bad vacuum conditions occurring once the beam intensity exceeds a critical threshold. Beam scrubbing has helped to a certain extent, but after a reversal of the ALICE magnet polarity the situation worsened again. For background rates above 500 kHz, the ALICE detector must be turned off. Therefore, for further operation of ALICE in proton-proton collision mode, it is crucial that the vacuum situation at high luminosities be improved. The LHCC requests a quantitative assessment of the observed rates in the TPC and the relation to the vacuum pressure at and around the interaction region IR2. *Since the September 2011 session of the LHCC, these vacuum conditions have improved significantly and the ALICE run conditions are now back to normal.*

Plans for the heavy-ion running were discussed. The ALICE HLT will be used and the integrated luminosity is expected to increase by an order of magnitude compared to the PbPb run in 2010. There are severe constraints on the available run time due to requirements from the LHC schedule (commissioning of the ALICE squeeze, technical stop, and the collimation quench limit measurement). Before PbPb running, a feasibility study of p-Pb collisions will be done as part of machine development.

PHYSICS ANALYSIS

A total of fourteen papers have been published by ALICE and 28 publications are currently in preparation. During the Strange Quark Matter Conference in September 2011, 28 talks have been presented by ALICE. New results both from proton-proton interactions and PbPb collisions have been shown, including the observation of multi-strange baryons, light hypernuclei, heavy flavour production, open charm and J/ψ flow.

ALICE UPGRADE

The Committee discussed the upgrade plans currently under study by ALICE. Four main projects are considered: (i) the Forward Calorimeter (FoCal), a high granularity electromagnetic calorimeter at large pseudorapidities, (ii) an Inner Tracking System (ITS) upgrade, (iii) a forward muon tracker improving the momentum resolution and (iv) the Very High Momentum Particle Identification (VHMPID) detector, a Ring Image Cherenkov (RICH) detector for particle identification at high momenta. ALICE presented timelines for the related studies, involving an internal Letter of Intent for each project, discussing the physics case, feasibility and required resources. The internally approved projects will be part of the Phase I Upgrade Letter of Intent to be presented to the LHCC in spring 2012.