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Performance of the ALICE muon trigger system in Pb–Pb collisions

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ALICE (A Large Ion Collider Experiment) is the LHC experiment dedicated to the study of heavy-ion collisions at very high energy, where the formation of the Quark Gluon Plasma (QGP) is expected.

Heavy flavor production is one of the key observables for the study of QGP.
In ALICE, charmonium and bottomonium states are identified in the forward rapidity region via their muonic decays, by means of a dedicated muon spectrometer.

A trigger system allows selecting events with high transverse momentum (pT) muons, while rejecting low pT background muons from pion and kaon decays.

The trigger system is composed by four planes of 18 resistive plate chambers (RPC) each (for a total surface of 140 m^2 and 21000 electronics channels).
The RPC are equipped with orthogonal copper strips of different pitches (1, 2 and 4 cm) for readout.
The front-end electronics is based on a dual threshold discriminator which allows a time resolution better than 2 ns.
The spatial information of the four RPC planes is used to estimate the muon charge and the pT via the relative angle with respect to a straight track from the interaction point. Single and dimuon trigger signals with two different pT cuts (pT >~ 0.5 Gev/c and pT >~ 1 GeV/c) are delivered.

The performance of the detector in Pb-Pb collisions in 2010 and 2011 will be presented, with particular regard to the muon trigger selectivity above each of the two pT cuts. The multiplicity of detected muon tracks per event, versus centrality and transverse momentum, will be shown.
The multiplicity of strips and clusters per event versus centrality are analyzed for the determination of the detector occupancy.
The stability of the performance along the duration of the data taking periods (about one month in 2010 and 2011)
will be presented.
A comparison of the results with real simulations will be also shown.

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