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Very high momentum particle identification detector for ALICE

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Abstract content

The anomalies observed at RHIC for the baryon - meson ratios have prompted a number of theoretical works on the nature of the hadrochemistry in the hadronisation stage of the pp collisions and in the evolution of the dense system formed in heavy ion collisions. Although the predictions differ in the theoretical approach, generally a substantial increase in the baryon production is predicted in the range 10-30 GeV/c. This raises the problem of baryon identification to much higher momenta than originally planned in the LHC experiments. After a review of the present status of theoretical predictions we will present the possibilities of a gas ring imaging Cherenkov detector of limited acceptance which would be able to identify track-by-track protons until 26 GeV/c. The physics capabilities of such a detector in conjunction with the ALICE experiment will be contemplated as well as the triggering options to enrich the sample of interesting events with a dedicated trigger or/and using the ALICE Electromagnetic Calorimeter. The use of the electromagnetic calorimeter opens interesting possibility to distinguish quark and gluon jets in gamma - jet events and subsequently the study of the probability of fragmentation in proton, kaon and pion or triggering on jets in the EMCAL. Such a detector would be identify pions until 14 GeV/c kaons from 9 till 14 GeV/c and protons from 18 till 24 GeV/c in a positive way. Additionally identification of protons by absence of signal is possible from 9-18 GeV/c.

Summary

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