

LA-UR-

10-05431

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Title:

Quarkonium perspectives in CMS

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Intended for:

Invited talk at the workshop "Quarkonium and
deconfined matter in the LHC era"



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Quarkonium perspectives in CMS

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The unprecedented center of mass energies available at the LHC offers unique opportunities for studying the properties of the strongly-interacting QCD matter created in Pb+Pb collisions at extreme temperatures and very low parton momentum fractions. With its high precision, large acceptance for tracking and calorimetry, and a trigger scheme that allows analysis of each minimum bias Pb+Pb event, CMS is fully equipped to measure di-muons in the high multiplicity environment of nucleus-nucleus collisions. Such probes are especially relevant for these studies since they are produced at early times and propagate through the medium, mapping its evolution.

This talk presents the capabilities of the CMS experiment to study di-muons production in Pb+Pb collisions. In particular, we show that CMS has very good detection conditions for the studies of J/ψ and Υ productions, with an excellent dimuon mass resolution and a rather good acceptance. The silicon tracking of CMS will allow to identify displaced vertices in order to disentangle primary and secondary J/ψ s.

The early corresponding p+p measurements will be reviewed as they will serve as baseline for the heavy-ions measurements. The performance capability of CMS for understanding quarkonium physics in the dimuon decay channel will be illustrated with Monte Carlo studies and, hopefully, with some preliminary measurements of dimuon mass distributions in the J/ψ and Υ mass windows, from pp interactions at 7 TeV. Preliminary $\Upsilon(1S)$ pT spectra might also be available.