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Quarkonia measurements by the CMS experiment in pp and PbPb collisions

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CMS is fully equipped to measure hard probes in the di-muon decay channel in the high multiplicity environment of nucleus-nucleus collisions. Such probes are
especially relevant for studying the quark gluon plasma since they are produced
at early times and propagate through the medium, mapping its evolution.
Quarkonia and bottomonia are sensitive to the evolution of the medium. In
particular, the $J\psi$ production in heavy ion collisions has been studied at
different energies and with different collision systems without yet giving a
global picture that is fully understood. Measuring the charmonium production at
the LHC energies in PbPb collisions will help constraining predictions, in
particular those expecting high recombination of prompt J/Psi or
suppression in hot medium. We will review CMS J/Psi measurements in pp
collisions at √sNN=7˜TeV, which allow precision studies of quarkonia
production and serve as a reference for the observation of hot nuclear effects.
CMS is able to distinguish non-prompt J/psi from prompt J/psi in PbPb
collisions, and will present the prompt J/psi production cross-section in
PbPb inclusively and as a function of transverse momentum, rapidity and number
of nucleons participating in the collision. Finally, we compare the B fraction
measured in PbPb collisions with that measured in pp at various energies. The
LHC centre-of-mass energy allows copious Y production in PbPb
collisions. Detailed measurements of bottomonium will help characterize the
dense matter produced in heavy-ion collisions beyond what was accessible at
RHIC (mostly) with charmonia. The full spectroscopy of quarkonium states has
been suggested as a possible thermometer for the QGP. With its excellent dimuon mass resolution, CMS has measured the three Y states in pp collisions.
With the 2010 PbPb data sample, CMS has observed the Y(1S) as well as
excited states. The $\Upsilon(1S)$ cross-section is presented as a function of
transverse momentum, rapidity and centrality, and excited state. Suppression of
the excited state in PbPb will be discussed.

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