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# Quarkonium production as a function of charged-particle multiplicity in pp and p–Pb collisions with ALICE at the LHC

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Heavy flavour production measurements in hadron collisions serve as testing ground of perturbative QCD (pQCD) calculations. Quarkonia, bound states of heavy quark-antiquark pairs, are unique tools to test both perturbative and non-perturbative aspects of QCD. In particular, the heavy-quark pair production process is described by pQCD while the formation of the bound state is non-perturbative.
In addition, heavy flavour production at the LHC energies is affected by multiparton interactions (MPI). Such events, where several interactions at the parton level occur in a single collision, also need to be taken into account in the models.
Four decades after the discovery of the J/$\psi$, the main mechanism behind quarkonia production is still unclear. Other observables, going beyond cross section or polarization measurements, such as the associated production of quarkonia, double J/$\psi$ production, or quarkonium production as a function of charged-particle multiplicity, are expected to provide additional constraints on the theoretical calculations.

In this contribution, associated quarkonium production measurements with ALICE at the LHC are presented. Final results on the production of J/$\psi$, $\psi(2S)$ and $\Upsilon(nS)$ as a function of charged-particle multiplicity at forward rapidity in pp collisions at $\sqrt{s}$ = 13 TeV and p–Pb collisions at $\sqrt{s}$ = 5.02 and 8.16 TeV are discussed. They are compared to similar published ALICE measurements of J/$\psi$ production at midrapidity in pp collisions at $\sqrt{s}$ = 13 TeV, as well as with model calculations.
The status of the measurement of the non-prompt J/$\psi$ fraction at midrapidity as a function of charged-particle multiplicity is also shown. Preliminary results for the double J/$\psi$ production cross section in pp collisions at $\sqrt{s}$ =13 TeV are also presented.

## Submitted on behalf of a Collaboration?

Yes

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