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J/□ and □(2S) production as a function of charged-particle multiplicity at the LHC with ALICE experiment

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Lattice QCD predicts the formation of the quark-gluon plasma (QGP) at extreme conditions of temperature and energy density, a state of matter where quarks and gluons are no longer
confined inside hadrons. The study of QGP is carried out by different experiments, e.g ALICE experiment, at the large hadron collider (LHC), where two ultra relativistic beams of proton or heavy ions are collided to recreate the conditions in which the QGP is formed. Originally, the QGP was expected to be produced only in A–A collisions. However, recent measurements in small collision systems (pp and p–Pb collisions) at high multiplicity have revealed some observations that are usually interpreted as signs of QGP formation in A–A collisions. The formation of small QGP droplets or the influence of multiple parton interactions are among the possible explanations for these features. The correlation of particle production, quarkonia as an example, with the charged particle multiplicity helps to understand such behaviour.
Quarkonium production, a bound state of a heavy quark and an anti-quark pair, presents an important tool to understand the QGP as it is produced during the initial stages and experiences the full evolution of the collision. The suppression of quarkonium production in A–A collisions with respect to pp collisions has been observed at RHIC and LHC energies. Quarkonium production is also studied in p–A collisions in order to determine whether the origin of this suppression is the QGP or the influence of cold nuclear matter (CNM).
This presentation will show the measurements of J/Ψ and Ψ(2S) production as a function of charged-particle multiplicity in pp and p–Pb collisions with ALICE experiment at the LHC.

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