Quarkonium production in heavy ion collisions at the LHC

Dr. Ginés Martínez

Subatech, Nantes (Frankreich)

The collision of heavy ions (HIC) at unprecedented energies in the CERN LHC has open a new era in the study of the QCD matter at high temperature. Among the copious phenomena in HIC, quarkonium (bound stated of heavy quark and anti-quarks as charm or beauty) production is one of the key observables to study the Quark-Gluon Plasma (QGP).

In this seminar, after a brief introduction to the heavy ion physics, I will review the experimental results obtained at the LHC experiments on quarkonium. QCD lattice predicts the disappearance of quarkonium states inside the QGP due to the colour screening mechanism, while the high density of heavy quarks in central Pb-Pb collisions at LHC energies would allow for quarkonium production in later states of the QGP evolution. Results obtained by the experiments since the beginning of the LHC HI era are extremely rich and they provided answers to the question concerning the interplay between suppression and regeneration scenarii. The understanding of quarkonium production in p-Pb collisions is a must to sharpen up the scenario of quarkonium production in HIC and the interconnections with the properties of the QGP. After a review of quarkonium results in p-Pb collisions, I will focus on the puzzling results concerning the Psi(2S) over J/psi relative suppression, up to 50% in central p-Pb collisions at backward rapidities. I will review the potential physics processes that could explain these observations and I will prospect for future experimental measurements that will allow to disentangle the role of these processes. Last but not least, I will review the results on quarkonium photo-production in UPC and the exciting observation of coherently photo-produced J/psi in peripheral Pb-Pb nuclear collisions at the LHC.