



SPEAKER: Elena Bruna
TITLE: **Probing the Quark Gluon Plasma with Heavy Flavours: recent results from ALICE**
DATE: 29 Aug 2017, 11:00
PLACE: 222-R-001 - Filtration Plant

ABSTRACT

The study of open heavy-flavour physics allows us to investigate the key properties of the Quark-Gluon Plasma (QGP) and the microscopic processes ongoing in the medium produced in heavy-ion collisions at relativistic energies. Heavy quarks are produced in the early stages of heavy-ion collisions and their further production and annihilation rates in the medium are expected to be very small throughout the evolution of the system. Therefore, they serve as penetrating probes that traverse the hot and dense medium, interact with the partonic constituents of the plasma and lose energy.

Understanding the interactions of heavy quarks with the medium requires precise measurements over a wide momentum range in heavy-ion collisions, but also in smaller systems like pp collisions, which also test next-to-leading order perturbative QCD calculations, and proton-nucleus collisions, which are sensitive to Cold Nuclear Matter effects (CNM), such as the modification of the parton distribution functions of nuclei, and parton energy loss in cold nuclear matter.

This talk presents recent heavy-flavour results from ALICE in pp, p-Pb and Pb-Pb collisions and discusses the current state of and next steps towards a characterization of the QGP properties with heavy-flavour probes. In particular, new results from Pb-Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV show a significant modulation of charm production as a function of the azimuthal angle, so-called elliptic flow, which indicates that low-momentum charm quarks take part in the collective motion of the QGP. In addition, a strong modification of the transverse momentum spectra of heavy-flavour particles is observed relative to pp collisions, which is interpreted as an effect of the in-medium energy loss. The impact of these measurements on our understanding of heavy-quark production in heavy-ion collisions will be discussed by comparing results from different collision energies and to expectations from energy-loss models. Results from smaller systems include new measurements on charmed baryon (Λ_c^+ and Ξ_c^0) production in pp collisions at $\sqrt{s}=7$ TeV and p-Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV, as well as multiplicity-dependent studies, which provide information on possible collective effects in high-multiplicity p-Pb events.