

The 164th HENPIC seminar by Dr. Jianhui Zhu, INFN-Padova (IT), May 12th, 2022, Thursday, 10:30am (Beijing time)

Title of the talk: Heavy-flavor production and hadronisation with ALICE at the LHC

Abstract:

The transition from quarks to hadrons is a fundamental process in nature that can be studied at colliders. Given their mass on the GeV scale, charm and beauty quarks are mainly produced in the hard scattering processes occurring in the early stages of the hadronic collisions. Compared to the hadronization, their production time is negligible, differently from light quarks. Thus, heavy quarks are used as markers to study the hadronization processes.

Recent results at the LHC show a significant enhancement of charmed baryon-to-meson ratios in pp collisions with respect to e^+e^- and e^+p collisions, assessing a possible non-universality of fragmentation functions among collision systems. These results suggest that the presence of surrounding colour charges may significantly influence the charm quark hadronization. Similar to what is expected in the quark-gluon plasma produced in ultra-relativistic heavy-ion collisions, heavy quarks can hadronize by combining with nearby lighter quarks in a process commonly called “coalescence” that modifies the hadro-chemistry expected in a pure fragmentation scenario.

In this seminar, the most recent measurements with the ALICE experiment of charm baryon production (Λ_c^+ , $\Sigma_c^+(0,+,++)$, $\Xi_c^+(0,+)$, Ω_c^0 in pp collisions, and Λ_c^+ in p-Pb and Pb-Pb collisions) and an extension to the beauty sector via the measurement of Λ_c^+ originating from beauty hadron decays will be presented. The comparison with theoretical model calculations will be discussed as well.

A brief introduction of the speaker:

Jianhui Zhu received his joint Ph.D. degree at IMT Atlantique (FR) and Central China Normal University (CN) in 2017, and worked as a postdoc at GSI (DE) for three years. He is currently a postdoc at INFN-Padova (IT). His research focuses on heavy-flavor production and hadronisation, vertex reconstruction with Kalman Filter, development of the online and offline (O2) analysis software framework for upgrade in the ALICE experiment.