Contribution ID: **138** Type: **not specified**

The 228th HENPIC seminar by Dr. Debojit Sarkar (U of Copenhagen)，June 19-2025, Thursday, 15:00 (Beijing time)

Title: Exploring Collective Dynamics in Small Collision Systems with ALICE at the LHC

Abstract:
The observation of collective-like behaviors in pp and p–Pb collisions at LHC energies has sparked debate about the similarities between the dynamics of small systems and heavy-ion collisions. In this talk, we present our latest published results on long-range two-particle azimuthal correlations, utilizing the unique acceptance of the mid- and forward-rapidity detectors in ALICE. Leveraging the excellent particle identification capabilities of ALICE, we measure baryon and meson v2 as a function of multiplicity in pp and p–Pb collisions. A clear baryon–meson v2 grouping (within 1σ) and a significant splitting (~5σ) at intermediate pT are observed in high-multiplicity p–Pb and pp collisions, similar to those seen in heavy-ion collisions. The Hydro-Coal-Frag model, incorporating partonic flow and quark coalescence, best describes the data, while alternative models fail to reproduce the pattern. This finding provides strong evidence of a collectively flowing partonic medium in high-multiplicity pp and p–Pb collisions.
We also investigate the key question of how far down in system size the dynamics of small systems and heavy-ion physics remain similar. The observed baryon–meson v2 grouping and splitting, down to lower multiplicities, suggest that partonic collectivity may persist even in smaller systems. In addition, our latest results on ultra-long-range two-particle correlations (|Δη|>5.0(6.5)), extending down to or below minimum-bias multiplicity in pp and p–Pb collisions, explore the limits of collective medium formation in small systems, providing unprecedented constraints on models aiming to explain collective-like effects in small collision systems.

About the speaker:
Dr. Debojit Sarkar, earned his Ph.D. from VECC, India, in 2017, studying two-particle correlations at ALICE to explore collectivity in small collision systems. Later on, he conducted postdoctoral research at Bose Institute, India, INFN Frascati, Italy, and Wayne State University, USA, focusing on Λ spin polarization at ALICE. Since 2022, he has been a postdoc at the Niels Bohr Institute, University of Copenhagen, investigating collectivity in small system at ALICE. He served as Physics Analysis Coordinator for the ALICE Flow Analysis Group (2023–2024) and currently leads the Azimuthal Correlation Analysis Group. This July, he will join Indian Institute of Technology (IIT) Bombay as an Assistant Professor.

Summary

Presenter: Dr SARKAR, Debojit (University of Copenhagen)