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Ridge in small system as an interference pattern

The physical origins of the collective phenomena observed from small to large systems is an important subject in relativistic heavy-ion physics. Collectivities can be established in two different ways in coherent and incoherent modes of particle emissions, respectively. Possible indications of the coherence in particle emission have been observed in Hanbury-Brown-Twiss (HBT) correlations. However, the role played by the possible coherence in the collectivity is less focused on.

In this work, we study the collectivities in AA and pp collisions in a partially coherent particle(pion)-emitting source model, including an expanding coherent source and a hydrodynamic incoherent source. In particular, the coherent fraction in the model is consistent with the measurement of HBT correlations. We find that the data on transverse momentum spectrum and elliptic anisotropy v_2 in both AA and pp collisions can be well reproduced, resulting from the interplay of the coherent and incoherent modes. Especially, the long-range azimuthal correlations ("ridge") can arise from the coherent component through the interference effect. This ridge structure can be viewed as an interference pattern in momentum space.

Since coherence is more likely to survive in smaller systems due to the less important hot-medium surroundings, this study is expected to provide a new idea for understanding the collective phenomena from small to large systems.

Reference:

[1] Peng Ru, G. Bary, and Wei-Ning Zhang, Pion transverse-momentum spectrum and elliptic anisotropy of partially coherent source, Physics Letters B, 777 (2018) 79-85.

[2] Peng Ru and Wei-Ning Zhang, Long-range azimuthal correlations for partially coherent pion emission in proton-proton collisions, Physics Letters B, 809 (2020) 135699.

Topics

Hydrodynamics and Collective Flows

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