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Femtoscopy with Lévy sources

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Exploring the space-time extent of particle production is an important goal of heavy-ion physics, and substantial effort has been made in order to understand the underlying physics behind the experimental observations of non-Gaussian behavior. In experiments, femtoscopic (momentum) correlations are utilized to gain information about the space-time geometry of the particle emitting source. Various experiments from SPS through RHIC to LHC measure Bose-Einstein quantum-statistical correlations. While early on the Gaussian assumption worked well when extracting source parameters, with precise data of today more advanced assumptions have to be used. This strongly affects our understanding of the collision energy dependence of source parameters, and relatedly the equation of state: a non-monotonic behavior in source widths may be overshadowed (or, to the contrary, caused) by the mixing of change in shape and in size. In this talk we review recent measurements, present several possible physical explanations (including critical behavior, anomalous diffusion and resonances) and their implications on various stages of evolution as well as the search for the critical endpoint of QCD.

Category

Theory

Collaboration (if applicable)

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