

Particle number fluctuations in an interacting two-component Bose-gas

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Abstract

We consider a mixture of interacting bosons of two types (e.g., pions and kaons) with an approximately fixed number of particles. Such a system can be formed at later stages of heavy-ion collisions at SPS energies. The final momentum distributions of mesons require the inclusion of finite chemical potentials, which for pions could reach a rather large value close to the critical value of the Bose-Einstein condensation (BEC). The proximity of the system to the BEC critical point would manifest itself in an increase of the pion number fluctuations. Hints for such an enhancement were observed by NA49 collaboration [1]. In Refs. [3,4] We have shown that the nonperturbative account of particle interaction is important especially in the vicinity of the critical point, rendering fluctuations finite. We extend this approach to the case of two interacting boson types and calculate mixed variances, skewnesses and kurtoses of boson number fluctuations. Also, we investigate fluctuations of particle ratios. Contributions from resonances rho meson and K^* resonances are included.

Keywords: pion gas, pion and kaon interactions, fluctuations, Bose-Einstein condensation

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