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Net-proton number fluctuations at the QCD critical point

Fluctuations of the net-proton number can be measured experimentally and thus provide important information about the matter created during heavy ion collisions. Especially, these quantities may give clues about the conjectured QCD critical point. We discuss the beam-energy dependence of ratios of first four cumulants of the net-proton number, obtained using the phenomenologically motivated model in which critical mode fluctuations couple to protons and anti-protons. We find that our model is able to qualitatively capture both the monotonic behavior of the lowest-order ratio seen in the experimental data from the STAR Collaboration as well as the non-monotonic behavior of higher-order ratios. The dependence of our results on the coupling strength and location of the critical point in the (μ, T) plane is also discussed.

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