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# Combinants and correlation functions in nuclear collisions: some intriguing properties of multiplicity distributions

Multiplicity distributions in e+e- and proton-proton collisions analyzed via the combinants method exhibit oscillatory behavior of the modified combinants. The possible sources of these oscillations and their impact on our understanding of the multiparticle production mechanism were discussed [1-5]. The set of combinants, Cj provides a similar measure of fluctuations as the set of cumulant factorial moments, Kq, which are very sensitive to the details of the multiplicity distribution and were frequently used in phenomenological analyses of data. However, while cumulants are best suited to the study of the densely populated region of phase space, combinants are better suited for the study of sparsely populated regions because the calculation of Cj requires only a finite number of probabilities P(N<j). The observed oscillations of the modified combinants are of physical origin and are not experimental artifacts. Modified combinants evaluated from models exhibit oscillatory behavior, though the oscillation period differs from experimental data [6].
In this presentation, we discuss how this approach can be used in nuclear collisions. We demonstrate how correlation functions can be related to combinants and illustrate how the information about just the sign of these correlation functions can be used in analyses of multiplicity distributions in nuclear collisions. It is argued that measuring couplings of the genuine multi-particle correlation functions could provide cleaner information on possible non-trivial dynamics in heavy-ion collisions.

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## Category

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## Collaboration (if applicable)

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