Centrality Dependence of Mid-Rapidity Charged Particles as measured by PHOBOS

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Abstract

One of the important goals of the PHOBOS experiment is to characterize the global features of particle production in nucleus-nucleus collisions at RHIC. An interesting observable is the primary charged particle multiplicity as a function of centrality. This measurement provides essential information on the interplay of hard and soft processes. Recent calculations show substantial variation of the centrality dependence of particle production for different physics scenarios, while reproducing the measured result for the most central data.

In particular, if saturation of produced semi-hard gluons occurs, then the multiplicity per participating baryon pair is expected to stay constant with centrality. Non-saturation models (e.g. HIJING) on the other hand predict an increase of this quantity.

The PHOBOS detector is well suited to address this issue and potentially distinguish between different models of particle production. Primary charged particle multiplicity at mid-rapidity as a function of the number of participating nucleons in $\sqrt{s_{NN}} = 130$ GeV Au+Au collisions will be presented. The data will be discussed in comparison to data from lower energy collisions and model predictions.

Preprint submitted to Elsevier Preprint *20 December 2000*