Centrality measurement and the centrality dependence of dN/dη at mid-rapidity using the PHOBOS detector

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Abstract

The unbiased determination of the number of collision participants is an essential component for heavy ion physics measurements. The determination of this quantity and the centrality of AuAu collisions at $\sqrt{s_{NN}} = 130$GeV with the PHOBOS detector at RHIC will be presented. These quantities are determined based on the measurement of the spectator neutrons with the zero degree calorimeters and based on the measurement of the produced particles at $3.0 < |\eta| < 4.5$ with the scintillator paddle counters.

The measurement of the primary charged particle multiplicity as a function of centrality provides essential information on the interplay of hard and soft processes. Recent calculations show substantial variations of the centrality dependence of particle production. In particular, the multiplicity per participant pair decreases with centrality in the EKRT model with saturation of produced semi-hard gluons. Non-saturation models (e.g. HIJING) predict an increase of this quantity.

Primary charged particle multiplicity at mid-rapidity as a function of the number of participants in AuAu collisions at $\sqrt{s_{NN}} = 130$GeV will be presented. The data will be discussed in comparison to data from lower energy collisions and model predictions.