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A Hadron Blind Detector for the PHENIX experiment at RHIC
TAKAO SAKAGUCHI, Brookhaven National Laboratory, PHENIX COLLABORATION — The thermal dileptons emitted from a hot and dense nuclear matter are an important probe to understand the quark deconfinement transition because they reflect the initial temperature and the degree of freedom of the matter. The measurement of dileptons is, however, very challenging due to a huge combinatorial background. With the present set-up of the PHENIX detector, a signal to background ratio is expected to be $\sim$1/500, and therefore an efficient rejection of the background is necessary. The background mainly arises from random combinations of electrons and positrons originating from dalitz decays of neutral pions and conversion photons. A Hadron Blind Detector (HBD) is planned to be installed close to the beam pipe inside the PHENIX detector to identify and reject such electrons by looking at Cherenkov light emitted by them. The detector consists of a 50cm long radiator and triple-GEM detector modules with pad readout. The detector is operated in pure-CF4 in a windowless configuration. A CsI photo-cathode is evaporated onto the top GEM of each stack, which converts Cherenkov photons into photoelectrons. The whole detector system covers 3/4 of full azimuth and rapidity of $|y|<0.45$. In the RHIC year-2006 run, a prototype HBD with limited acceptance was successfully installed, and tested using particles emerged from p+p collisions at $\sqrt{s}$ =200GeV. The basic characteristics of GEMs in the detector and the overall performance of the detector will be presented and discussed.

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