Where do the nucleons go at RHIC: Rapidity dependent net-proton distributions in central Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV

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One of the major goals of RHIC at BNL is to create and explore the highly excited baryon-poor region left behind by the projectiles with small rapidity loss in heavy-ion collisions at very high energy. Various theoretical models predict different net-baryon (baryon $-$ anti-baryon) density distributions as a function of rapidity since it depends on how the dynamics of baryon number transport is simulated. It is also sensitive to the re-scattering process assumed by the model. To discriminate those models, measurements of net-baryon density distributions as a function of rapidity are necessary.

The BRAHMS experiment at RHIC uniquely measures identified charged hadrons over a broad range of rapidity and transverse momentum with two movable spectrometers. We present the first measurement of rapidity dependent net-proton (proton $-$ anti-proton) yields at several rapidities ($0 \leq y_{\mathrm{p}} \leq 3$) in central Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. The results are compared with theoretical model predictions.