Recent results from BRAHMS

R. Debbe[a] for the BRAHMS Collaboration

[a]Physics Dept. Brookhaven National Laboratory

The BRAHMS Collaboration is well advanced into the analysis of data collected from many colliding systems at different energies, during a data collection program that extended from the RHIC commissioning to 2006. The analysis of our measurements will be presented within the context of a rapidly expanding sQGP volume described with a 3+1D hydrodynamic model. The rapidity coverage of the BRAHMS experiment offers a particularly wide window into both the small momentum fraction x of the wave function of one of the colliding systems, and the high x behavior of the other, some of the results discussed here will emphasize one or the other regime. Information about the energy loss in the medium at different rapidities, can be gleaned from the comparisons of inclusive transverse momentum distribution of pions in A+A and p+p collisions. The wealth of data on identified particles collected so far, allows for a comparison of the radial as well as elliptic flow of the expanding sQGP at different rapidities to hydrodynamical models. The systematics of particle production in rapidity space will be studied making use of our measurements in elementary p+p collisions and extending to different energies and initial configurations of A+A systems. A similar thorough study of baryon number transport at RHIC energies is now possible with our measurements of proton and anti-proton distributions and the status of such study will be presented. The high baryon yield at moderate transverse momenta, compared to that of pions, was one of the first puzzling results at RHIC and it is now explained as the result of partonic recombination. Our comparisons between yields of protons and pions at high rapidities can also be related to projectile fragmentation and as such they may offer a window to the projectile wave function at moderately high values of x, especially in our low energy measurements. We will also present further work based on our d+Au measurements where we use pion distributions from different centrality samples of events to study the saturation scale dependence on the number of participating nucleons. Finally, we report on our strangeness production studies with an emphasis on our Au+Au low energy measurements where the baryo-chemical potential extracted at high rapidity is comparable to the one measured at mid-rapidity at SPS.