Identified hadron production in d+Au and p+p collisions at RHIC

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The rapidity dependence of the inclusive transverse momentum (p_T) spectra of identified hadrons from d+Au collisions with respect to p+p interactions at RHIC energy provides a clean probe to disentangle different aspects of the collision dynamics, such as the soft/hard parton scattering at the initial stage of collision and the final-state hadronization. One can study nuclear effects via the nuclear modification factor

$$R_{dAu} = \frac{d^2N^{d+Au}/dp_Tdy}{\langle N_{bin}\rangle d^2N^{p+p}_{inel}/dp_Tdy},$$

and its dependence on rapidity which may shed light on two different effects at the initial stage of the collision, namely multiple scattering and parton saturation. Particle ratios, like K/π, p/π, as well as the like-particle ratios at different rapidities provide insight into the hadro-chemistry of the system. The net-proton distributions are instructive for understanding the collision scenario, e.g. the baryon transport mechanism.

The BRAHMS experiment has measured the p_T spectra of charged pions, kaons and protons/anti-protons over a large rapidity range ($-0.2 < y < 3.5$) in d+Au (min-bias and 3 different centralities from run03 data) and p+p collisions (from run05 data) at $\sqrt{s_{NN}} = 200\,GeV$. R_{dAu} has been constructed and shows a mass and rapidity dependence as compared to R_{CP}, and also R_{dAu} is to be compared with various models, especially at forward rapidity (small x region). The p_T spectra have been fitted to power-law, exponential in m_T and Boltzmann functions for pions, kaons and protons respectively. The rapidity dependence of the integrated yields and the ratios (K/π, p/π) will also be shown. The net-proton rapidity distribution ("stopping") in p+p and d+Au will be compared to model expectations.

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