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Strangeness production in Au+Au collisions at $\sqrt{s_{NN}} = 62.4GeV$

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The BRAHMS experiment [1] have recorded data for Au+Au collisions at c.m. energy of 62.4 GeV. The setup measures charged particles and has excellent identification possibilities ($\pi^{\pm}$, $K^{\pm}$, p and $\bar{p}$) over the widest rapidity range at RHIC, ≈ 1 unit away from the beam rapidity at 62 GeV. This feature enabled us to shed some light on one of the predicted signals of quark gluon plasma, strangeness enhancement.
From the AGS energies up to the highest RHIC energy we observed experimentally an enhancement of the strangeness to pion ratio in nucleus-nucleus collisions compared to the one in p+p collisions with a maximum at the lower SPS energies. At AGS the data was well reproduced by hadronic cascade models [2], e.g. RQMD, while at SPS energies it was claimed that the known "horn" dependence of the K^+/π^+ ratio on $\sqrt{s_{NN}}$ is a consequence of the onset of deconfinement [3].
In the Au+Au at 62.4 GeV collisions, within our acceptance, the $\bar{p}/p$ ratio varies from very high values at mid-rapidity (≈ 0.4) to very small ones at y=3 (≈ 0.015), characteristic to mid-rapidity SPS data. We observed that there is a strong dependence of the K^+/π^+ ratio with the $\bar{p}/p$ ratio when looking at SPS results [4] in mid-rapidity together with our results in different rapidity slices. Although the initial conditions for the collisions at RHIC(62 GeV) and SPS are expected to be substantially different, the compared systems develop the same chemistry which seems to be determined by the baryo-chemical potential.
In this work we will show measured yields of identified particles from the 10% most central Au+Au collisions at 62.4 GeV. We will also show and discuss the rapidity and baryo-chemical potential dependence of the K/π ratios together with comparisons to results from other energies and from theoretical models (UrQMD [5], AMPT [6]).

References

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