HK 4 Physik mit schweren Ionen

Zeit: Freitag 14:00–16:00 Raum: TU MA041

Gruppenbericht

HK 4.1 Fr 14:00 TU MA041

Kaon and antikaon production at 1-2AGeV at SIS energies[*] — •Mateusz Płoskoń — GSI Darmstadt, Germany

A survey of experimental data on kaon and antikaon production in Au+Au and Ni+Ni collisions at beam energies between 1 and 2AGeV measured by the KaoS collaboration, will be discussed. Investigations featuring the production cross sections, the multiplicities, the inverse slope parameters and the angular distributions of the mesons in comparison with the transport calculations provide interesting information on their production mechanism and the in-medium potentials[1]. The anisotropy of the azimuthal emission pattern of K^+ has been regarded as an evidence for a repulsive kaon-nucleon potential in the nuclear medium[2]. The observation of different azimuthal emission patterns for K^+ and K^- obtained from Ni+Ni at 1.93AGeV[3] as well as the results on the elliptic flow of kaons and antikaons as a function of their transverse momenta obtained with the recent Au+Au at 1.5AGeV measurement will be presented.

[*] Supported by BMBF and GSI

[1] A.Förster, F. Uhlig et al., PRL 91 (2003) 152301
[2] Y.Shin et al., PRL 81 (1998) 1576
[3] F.Uhlig, A.Förster et al., submitted

Gruppenbericht

HK 4.2 Fr 14:30 TU MA041

Production and Flow of Strange Particles in FOPI — •Markus Merschmeyer for the FOPI collaboration — Physikalisches Institut der Universität Heidelberg, Philosophenweg 12, 69120 Heidelberg

Heavy-ion collisions at relativistic energies offer the possibility to study states of hot and compressed nuclear matter. Hadron properties are expected to change within this environment. Prodution yield and phase space distributions of strange particles are two independent tools to probe those in-medium effects. A high-statistics data sample was taken for Ni+Ni at 1.93 AGeV. The 4π production yields and the flow behaviour of reconstructed K^0 and Λ have been studied. Detailed comparisons to microscopic model calculations have been performed. The talk will present results of the analysis of neutral strange particles. Furthermore, the status of the search for double-strange baryons and kaonic clusters is reported.

Supported by BMBF (06HD154) and GSI (HD-HER).

HK 4.3 Fr 15:00 TU MA041

Strangeness production in π-induced reactions with the FOPI detector. — •Mohamed Lotfi Benabderrahmane for the FOPI collaboration — Physikalisches Institut der Universität Heidelberg, Philosophenweg 12, 69210 Heidelberg

Studies of strangeness production and in-medium modifications of hadrons are one of the major goals of modern nuclear physics. In-medium modifications at densities up to 2-3 ρ_0 have been studied in heavy-ion collisions. The concept of density dependent in-medium masses, can be cross-checked at normal nuclear matter density by using π-induced reactions. In August 2004, the FOPI collaboration performed an experiment bombarding targets of Carbon, Aluminum, Copper, Tin and Lead with π^- of 1.15 GeV/c momentum. First results are the inclusive K^0 and Λ production cross sections and their phase space distributions which will be reported.

Supported by BMBF(06HD154) and GSI (HD-HER).

Gruppenbericht

HK 4.4 Fr 15:15 TU MA041

Determination of the Isoscalar and Isovector Equation-of-State in Heavy Ion Collisions* — •H.H. Wolter[1], T. Gaitanos[2], Ch. Fuchs[3], M. Colonna[2], M. Di Toro[2], and R.A. Ionescu[1,4] — [1]Dept. Physik, Univ. of Munich — [2]LNS, INFN, Catania — [3]Inst. Theor. Physik, Univ. of Tübingen — [4]NIPNE, Bucharest

A primary goal of heavy ion collisions at Fermi to relativistic energies has been the determination of hadronic equation-of-state (Eos) as a function of density, temperature, isospin or other flavors. In particular the isovector part has been of much interest recently because of the relevance for the structure of exotic nuclei and astrophysical systems, in particular neutron stars. Rather than test phenomenological Eos's we have extensively investigated fields from relativistic, microscopic theories (Dirac-Brueckner) and recently also consistently the corresponding in-medium crosss sections. We find that generally flow data are reasonably well described, provided non-equilibrium effects in the effective interaction are taken into account. E.g. we are able to describe a recently proposed sensitive measure of the stopping (var_{tl}) as proposed by FOPI. With respect to the density dependence of the isovector part, a crucial question in a relativistic formulation is the existence and importance of an scalar-isovector field. This can be parametrized in terms of a δ-meson, and leads to a stiffer isovector eos. We investigate various differential flow and stopping variables for protons/neutrons as well as for $\pi^\pm$ to find sensitive quantities to the isovector eos.

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HK 4.5 Fr 15:45 TU MA041

High resolution Runge-Kutta tracking for kaon reconstruction — •Alexander Sadovsky for the HADES collaboration — Research Center Rossendorf Institute of Nuclear and Hadron Physics PF 51 01 19 D-01314 Dresden Germany

The High Acceptance Di-Electron Spectrometer (HADES), installed at SIS/GSI, Darmstadt, can also be used for studies of hadron production in heavy ion collisions. The investigation of charge kaon production needs high resolution tracking and understanding of the detector performance. The Runge-Kutta tracking algorithm was used to improve the quality of K^+ identification. The status of our K^+ production analysis in C+C reactions at beam energy of 2 AGeV will be presented. A possible extention of the method is to study more complex resonances, where the large phase space coverage of HADES detector plays an important role.

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