Forward K^+-Production in Subthreshold pA Collisions with ANKE at COSY

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A central topic of hadron physics is the influence of the nuclear medium on elementary processes. The investigation of positively charged K-meson production is particularly well suited since this meson is relatively heavy so that its production requires strong medium effects. In this context the production of K^+-mesons in proton-nucleus interactions at projectile energies far below and above the free nucleon-nucleon-threshold of 1.58 GeV has been investigated using the ANKE spectrometer at an internal target position of the accelerator COSY-Jülich. Double differential cross sections of K^+ production have been obtained for diamond, copper and gold strip targets and beam energies T=1.0...2.3 GeV. At T=1.0 GeV the complete momentum spectrum of kaons emitted at forward angles (less than 12 degrees) has been measured for the first time.

The main experimental challenge was that at 1.0 GeV the background (of mostly pions and protons) is approximately factor of 10^6 more intense than the signal (kaons). The detection system of ANKE allows to suppress this huge background and to detect K^+-mesons at forward angles in the momentum range p≈200...500 MeV/c. The results will be presented and compared with theoretical predictions based on different assumptions for the reaction mechanism.

* see `http://ikpd15.ikp.kfa-juelich.de:8085/doc/Anke.html`