

## Effect of the $K^+$ in-medium potential on $K^+$ production in heavy ion collisions

Tuesday 22 May 2018 15:00 (1 hour)

$K^+$  meson production in nucleus-nucleus collisions at energies near the kaon production threshold energy were investigated within the quantum molecular dynamics (QMD) model based on the covariant kaon dynamics. We analyzed the rapidity dependence of the direct flow  $v_1$  and the elliptic flow  $v_2$  of  $K^+$  meson, and the transverse momentum ( $p_T$ ) dependence of  $v_1$  for the  $K^+$  meson in Ni + Ni collisions at 1.91 AGeV, and compared the results with the FOPI data. The cross section of  $K^+$  production as a function of the laboratory momentum in polar angles  $32^\circ$ ,  $40^\circ$ ,  $48^\circ$ , and  $60^\circ$ , respectively, from Au + Au collisions at incident energy 1.5 A GeV, Ni + Ni collisions at incident energy 1.93 A GeV and C + C collisions at incident energy 1.8 A GeV were also analyzed and compared to the KaoS data. We observed that the kaon in-medium potential obviously affects the  $K^+$  production in nucleus nucleus collisions. After taking into account the  $K^+$  in-medium potential and using the soft equation of state, the theoretical results are in good agreement with the experimental data.

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**Session Classification:** A012: High Energy Physics (Poster)

**Track Classification:** High Energy and Particle Physics