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ϕ(1020) meson production in nucleus-nucleus collisions at 1.9A GeV: centrality dependence and contribution of ϕ decay to K^- spectra

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Collaboration

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Abstract content

Production of ϕ mesons in nucleus-nucleus collisions around 2A GeV, below 2.6 GeV threshold in nucleon-nucleon system, is a rare process to which non-trivial multi-step channels contribute apart from the Fermi motion effects. The measurements carried out by the FOPI Collaboration at 1.9A GeV for symmetric Al+Al and Ni+Ni systems allow for the first time to investigate the important aspects of the ϕ meson production, namely:
(i) the feeding of the ϕ meson decays to the K^- spectral yield, and
(ii) the centrality dependence of the ϕ meson yield and the ϕ/K^- and ϕ/π^+ ratios.
The results are important for the studies of modifications of the effective masses of kaons inside the collision zone.
A simple two-source model of K^- emission allows to extract the spectra of kaons originating directly from the collision zone, which are ready to be compared to the transport model predictions.
[1] K. Piasecki et al. (FOPI Collaboration), Phys. Rev. C 91, 054904 (2015)
[2] P. Gasik et al. (FOPI Collaboration), Submitted to Eur. Phys. Jour., arXiv:1512.06988
[3] K. Piasecki et al. (FOPI Collaboration), Submitted to Phys. Rev. C, arXiv:1602.04378

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