Seminarium Astrofizyczne

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ul. Pasteura 7; sala 404

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Open charm measurement with a new silicon vertex detector for the NA61/SHINE experiment at the CERN SPS

The study of open charm meson production is an efficient tool for detailed investigations of the properties of hot and dense matter formed in nucleus-nucleus collisions. In particular, charm mesons are of vivid interest in the context of the phase-transition between confined hadronic matter and the quark-gluon plasma. Recently, the NA61/SHINE experiment was supplemented with a Small-Acceptance Vertex Detector (SAVD), motivated by the importance and the possibility of a first direct measurements of open charm mesons in heavy ion collisions at SPS energies.

A first exploratory data taking of Pb+Pb collisions at 150A GeV/c with SAVD was performed in 2016, and a D^0 signal was extracted in it's $D^0 \rightarrow \pi^+ + K^-$ decay channel. This was the first, direct observation of open charm in nucleus-nucleus collisions at the SPS energies. In 2017, a large statistic data set was taken for Xe+La with the SAVD at the beam momenta of 150A, 75A and 40A GeV/c well as Pb+Pb at 150A GeV/c in 2018; these as data are currently under intense analysis.

The physics motivation behind the open charm measurements at the SPS energies will be discussed. The concept of the SAVD hardware and the status of the analysis will be shown, discussing challenges related to the reconstruction in SAVD. Also, the future plans of open charm measurements in the NA61/SHINE experiment after 2021 related to the upgraded version of the Vertex Detector will be presented.

Serdecznie zapraszam,
Agnieszka Majczyna