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NA61/SHINE experiment upgrade with vertex detector for open charm measurements

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A feasibility study for D_0 meson (Open charm) measurements via its decay into two daughter particles, $D_0 \rightarrow K^+ \pi^-$, in a central Pb-Pb collisions at SPS energies will be presented. To generate the physical input we use AMPT (A MultiPhase Transport model) event generator. We employed the GEANT4 application to describe particle transport through the experimental setup. The study is done assuming the NA61/SHINE experimental setup supplemented with a future vertex detector that allows for precise track vertex reconstruction at the target proximity. This detector will be used ultimately to measure open charm mesons in nucleus-nucleus collisions at energies accessible at the CERN-SPS. The simulation results show that this measurement is feasible. The presentation will discuss the obtained results focusing on the predicted yields of D_0 mesons and the possibilities of differential analysis. It will also address the issue of vertex detector optimization and the emphasis will be put on the prospect of the development of a vertex detector based on CMOS technology.

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