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Kaon beam studies employing coventional hadron beam concepts and the RF-separation technique at the CERN M2 beam line for the future AMBER experiment

Sunday, 7 May 2023 16:00 (2 hours)

The future AMBER experiment aims to measure the inner structure and the excitation spectra of kaons with a high intensity kaon beam at the CERN secondary beam line M2. One way to identify the small fraction of kaons in the available beam is tagging with the help of differential Cherenkov detectors (CEDARs), whose detection efficiency depends critically on the beam parallelism. In the framework of the Conventional Beams Working Group of the Physics Beyond Colliders Initiative at CERN, several possible improvements of the conventional beam optics have been studied, trying to achieve a better parallelism, investigating especially the reduction of multiple scattering. Additionally, with the aim of increasing the Kaon purity of the beam, a Radio-Frequency separation technique has been also studied. This method exploits the differences in velocity due to the particle mass in the beam, kicking out unwanted particles with the help of two RF cavities. The limitations posed by the beam line for intensity and purity will be presented along with preliminary results of the potential purity and intensity reach of the RF-separated beam. Finally, the RF-separated beam is compared with the conventional hadron beam in terms of potential physics reach.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary author: METZGER, Fabian (European Organization for Nuclear Research)

Co-authors: GERBERSHAGEN, Alexander (Particle Therapy Research Center); BARATTO ROLDAN, Anna (European Organization for Nuclear Research); RAE, Bastien (European Organization for Nuclear Research); KETZER, Bernhard (Universitaet Bonn); MUSSOLINI, Carlo Alberto (Oxford University); BANERJEE, Dipanwita (European Organization for Nuclear Research); PAROZZI, Elisabetta (Universita Milano Bicocca); STUMMER, Florian (European Organization for Nuclear Research); BERNHARD, Johannes (European Organization for Nuclear Research); NEVAY, Laurence (European Organization for Nuclear Research); GATIGNON, Laurent (Lancaster University); DYKS, Luke (Oxford University); VAN DIJK, Maarten (European Organization for Nuclear Research); BRUGGER, Markus (European Organization for Nuclear Research); CHARITONIDIS, Nikolaos (European Organization

for Nuclear Research); SIMON, Pascal (GSI Helmholtzzentrum für Schwerionenforschung GmbH); MURPHY, Robert (European Organization for Nuclear Research); SCHUH-ERHARD, Silvia (European Organization for Nuclear Research); STERGIOU, Vasiliki (European Organization for Nuclear Research)

Presenter: METZGER, Fabian (European Organization for Nuclear Research)

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