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Absolute beam current measurement for slow extracted beams at CERN's North Area facility

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The North Area facility (NA), built in the 1970s at CERN, hosts several secondary beam lines for a large variety of physics experiments: Neutrino Platform, Dark matter, high energy physics, R&D, detector validation etc. 400 GeV/c primary proton beams, extracted from the SPS ring, are split along the transfer lines to fire on 4 targets and serve the users with secondary particles such as e^- , e^+ , muons, pions, hadrons, kaons... Within a typical slow extraction scheme of 4.8 s, one gets a spill intensity of about $4E13$ protons heading to the splitters. Available beam intensity monitors are ageing fast and are accurate up to 10% only, which is not compatible for future high intensity physics programs and new demanding specifications for the beam instrumentation. In the wake of the NA consolidation project, it is proposed to measure the beam intensity with a Cryogenic Current Comparator (CCC). Such devices installed at FAIR (GSI) and in the Antimatter Factory (CERN) have proven to be operational and having a resolution of a few nA. This paper describes the roadmap and challenges to come for the development of the new CCC.

Footnotes

Funding Agency

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Yes

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