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## Cryogenic Current Comparators –from Lab to Beamlines

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Cryogenic Current Comparators (CCCs) for beamlines are instruments for the measurement of the intensity of charged particle beam with the following advantages: non-destructive, resolution down to nA, bunched (AC) and un-bunched (DC) beam, metrological traceability to the unit Ampere. This is achieved by exploiting low temperatures (4.2 K) and superconducting/quantum effects.

After a long phase of laboratory development and testing on accelerator rings and transport sections at GSI, CCCs are now being gradually installed and accepted as a permanent measurement system. Significant experience has been gained, especially from the first permanent installation at the CERN Antiproton Decelerator. Important parameters for the CCC sensor can now be determined in advance through the dedicated design of the instruments components. Thus, optimized performance is achieved for different application settings. One key factor for long-standing and low-impact operation is the beam cryostat. Now, maintenance-free standby time of it exceeded the milestone of 6 months. Thus, digital signal processing is becoming more and more significant. This work summarizes the key milestones and describes the upcoming installations in transport sections in the FAIR project and at CERN North Area.

Summary

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