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Cryogenic Current Comparator (CCC): absolute beam current measurement in the order of nA

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The Cryogenic Current Comparator (CCC) is able to provide a calibrated non-destructive measurement of beam current with a resolution of 10 nA or better. The non-interceptive, absolute intensity measurement of weak exotic ion beams (< 1 μA) is essential in heavy-ion storage rings and in transfer lines, as the ones in FAIR. With traditional diagnostics this measurement is challenging for bunched beams and virtually impossible for coasting beams. The CCC is able to provide reliable values of beam intensity for current of this order of magnitude or lower, independently of beam bunching, ion species and without tedious calibration procedures. The test of the CCC in the heavy-ion storage ring CRYRING@ESR at GSI confirmed its viability, and suggested several improvements to the detector hardware. Therefore, an upgrade of the CCC system was performed and tested in laboratory environment. A review of these improvements will be presented, with a deeper discussion of the improvements and of the next steps for the development of the final version of the CCC for FAIR.

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Footnotes

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