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Axial Double core CCC for FAIR

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The Cryogenic Current Comparator (CCC) is a superconducting device based on an ultrasensitive SQUID magnetometer (fT range). Measuring the beam's azimuthal magnetic field, it provides a calibrated non-destructive measurement of beam current with a resolution of 10 nA or better, independent from ion species and without tedious calibrations procedure. The non-interceptive absolute intensity measurement of weak ion beams (< 1 µA) is essential in heavy ion storage rings and in transfer lines at FAIR. With standard diagnostics, this measurement is challenging for bunched beams and virtually impossible for coasting beams.
To improve the performance of the detector a new type of CCC using an alternative magnetic shield geometry has been developed. The so-called 'axial'geometry will allow for much higher magnetic shielding factor, an increased pick-up area, and an expected lower noise component at low frequencies. Thanks to a specially developed cascade SQUID system the axial CCC will have an improved bandwidth, strongly increasing the utilize spectrum of the detector. The use of two high magnetic permeability cores working in parallel allows to have an higher signal to noise ratio especially at low frequency.
Hereby the first test of the new detector in the controlled environment in Jena and in the GSI cryostat will be presented. Furthermore the test of the device on the beam-line at GSI will be shown, where the detector have been used to perform analysis of slow extracted beams as it will be used in FAIR. The results collected shows as the DCCC is an optimal solution for the measurement of slow extracted beam of low intensity and it's capability as a detector for FAIR.

Summary

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