

## Cryogenic Current Comparators – basics and the next generation

*Tuesday, 20 September 2016 10:15 (25 minutes)*

The presentation starts with the basic principle of the Cryogenic Current Comparator (CCC) as a high-sensitive, non-destructive monitoring tool for charged beams with nA-intensities. It will be shown that superconducting is essential to get the outstanding performance, and the main superconducting parts like the toroidal pick-up coil, the shielding, the DC-matching-transformer, the Superconducting Quantum Interference Device (SQUID) and also the flux-concentrator and flux-compensator will be illustrated.

The second part of the presentation shows the progress in the development of the next CCD generation with eXtended Dimensions (CCC-XD) for larger beamline diameters planned for the new FAIR accelerator facility at GSI. The new, specially designed nanocrystalline flux concentrator enables low-noise operation and a high system bandwidth of up to 200 kHz. The niobium shielding is extended in its geometric dimensions and will effectively suppress ( $< -200$  dB) disturbing magnetic fields of the beamline environment. A completely new SQUID sensor with Josephson junctions with sub- $\mu\text{m}$  dimensions offers the lowest possible noise-limited current resolution in combination with a good suppression of external disturbances. Complete with a new cryostat the CCC-XD will be ready for testing in the CRYRING at GSI in spring 2017.

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**Session Classification:** SPARC Instrumentation