



## SiM-X: Silicon microcalorimeters for high-precision X-ray spectroscopy of highly-charged heavy ions at FAIR

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High-precision X-ray spectroscopy of highly-charged heavy ions provides a sensitive test of quantum electrodynamics in very strong Coulomb fields, and is, therefore, an established subject within the program of the new international heavy ion research facility FAIR (Facility for Antiproton and Ion Research) [1]. To improve the precision of such experiments, silicon microcalorimeters have been applied successfully at the GSI Helmholtz Center for Heavy Ion Research in experiments to determine the 1s Lamb Shift of hydrogen-like heavy ions [2,3].

In these experiments, it was shown that for application at FAIR further steps in detector preparation are mandatory, namely larger detector solid angle, especially for the

investigation of rare or short-lived nuclides use of absorbers for high x-ray energies around 50-100 keV in combination with absorbers for low x-ray energies around 5-10 keV on the same detector array improvements in readout electronics as well as data acquisition.

The contribution will present the design of a new detector array with larger solid angle and discuss the technical challenges for the application at the FAIR facility. An overview of potential applications, i.e. Lamb shift measurements, spectroscopy of inner-shell transitions or the determination of nuclear charge radii, will be presented.

[1] <http://www.fair-center.de>

[2] V. A. Andrianov et al., Journal of Low Temperature Physics 151 (2008) 1049

[3] S. Kraft-Bermuth et al., Journal of Low Temperature Physics 167 (2012) 765