

maXs: Microcalorimeter Arrays for High-Resolution X-ray Spectroscopy atGSI/FAIR

C. Pies^a; S. Schäfer^a · S. Heuser^a ·
S. Kempf^a, A. Pabinger^a, J.-P. Porsta^{a, b},
P. Ranitsch^a, N. Foerster^a, D. Hengstler^a,
A. Kampkötter^a, L. Gastaldo^a, T. Wolf^a,
A. Fleischmann^a, C. Enss^a

Abstract - Highly-charged heavy ions like U91+ provide unique conditions for the investigation of relativistic and quantum electrodynamical effects in strong electromagnetic fields. We present two x-ray detectors developed for high-resolution spectroscopy on highly-charged heavy ions. Both detectors consist of metallic magnetic calorimeters (MMCs) forming linear eight-pixel arrays. The first detector, maXs-20, is developed for the detection of x-rays up to 20 keV with an energy resolution below 3 eV. The second device, maXs-200, is designed for x-ray energies up to 200 keV with an energy resolution of 40 eV. The results of characterization measurements of both detectors will be shown and discussed. Furthermore, we present a prototype MMC for soft x-rays with improved magnetic flux coupling. In first characterization measurements the energy resolution of this device was 2.0 eV (FWHM) for x-rays up to 6 keV.

Keywords - MMC, metallic magnetic calorimeters, low-temperature detectors, x-ray detectors, QED effects in ions

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