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MMC Array to Study X-ray Transitions in Muonic Atoms

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The QUARTET collaboration aims to improve the accuracy of absolute nuclear charge radii of light atoms from Li to Ne up to one order of magnitude through high resolution x-ray spectroscopy of muonic atoms. Metallic Magnetic Calorimeters (MMCs) operated at mK have shown to be ideal detectors in a test experimentat PSI. MMCs are characterized by a high resolving power of several thousand, a stable calibration function and a high quantum efficiency in the energy range of interest. The performance obtained by the MMC array developed for the test experiment is presented along with the effect of Michel electrons interacting and analysis methods developed to identify and eliminate them. Based on those results, a new MMC array has been developed. This new array has been optimized to detect x-rays up to 120 keV and to reduce the effect of Michel electrons. The results obtained in a first experiment will be discussed as well as the impact of the performance on the spectroscopy of muonic B and C.

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