

Detection system for the measurement of the hyperfine splitting in muonic hydrogen

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Muonic hydrogen is a bound state of a negative muon and a proton. The energy levels of muonic hydrogen are very sensitive to the nuclear structure. By means of laser spectroscopy, we are aiming to measure the ground-state hyperfine splitting to extract the two-photon exchange contribution and the Zemach radius of the proton at the Paul Scherrer Institute. This experiment requires a detection system capable of an efficient measurement of MeV-energy X-rays produced by heavy muonic atoms populated after the laser excitation. Moreover, the system is designed to minimise the false identification of regular muon-decay events. We will present Monte-Carlo simulations and measured performance of the detection system.

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