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The ground state hyperfine splitting in muonic hydrogen (Hyper-mu) experiment at PSI

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The Hyper-mu experiment at PSI aims at the first measurement of the ground state hyperfine splitting in muonic hydrogen (μp) with an accuracy of 1 ppm. Such a measurement would lead to the extraction of the two photon exchange, encoding the proton Zemach radius and polarizability, with an unprecedented relative uncertainty.

Toward the measurement of the ground state hyperfine splitting in μp , we develop a unique pulsed laser system with the aim of delivering 5mJ pulses at a wavelength of 6.8 μm randomly triggered on the detection of muons. We report on the latest laser development within the experiment, the several developments of the detection system that was carried out and the optimization of the experimental parameters to obtain a successful resonance signal.

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