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The ground state hyperfine splitting in muonic hydrogen experiment (HyperMu) at PSI

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The HyperMu experiment at PSI aims at the first measurement of the ground state hyperfine splitting in muonic hydrogen (μp) with 1 ppm precision using pulsed laser spectroscopy. This accuracy allows for a precise extraction of the proton structure contributions, including the Zemach radius and the proton polarizability. To measure the ground state hyperfine splitting in μp, we are developing a unique pulsed laser system designed to deliver 4 mJ pulses at a wavelength of 6.8 μm, randomly triggered upon muon detection. 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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