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Precision measurement of muonium hyperfine splitting at J-PARC SOHTARO KANDA, Graduate student, J-PARC MUHFS COLLABORATION — Muonium is the bound state of a positive muon and an electron. Because neither muon nor electron has internal structure, muonium's ground state hyperfine splitting (MuHFS) can be the most precise probe for the test of the bound state QED and for the determination of the ratio of magnetic moments of muon and proton. At J-PARC, we plan to perform a precision measurement of the MuHFS via microwave spectroscopy of muonium. Muonium is formed in Kr gas target and state transition between energy levels is induced by microwave resonance. Spectroscopy of the muonium states can be performed by measurement of positron asymmetry from muonium decay. Precision of the most recent experimental result (LAMPF1999) was mostly statistically limited. Hence, improved statistics is essential for higher precision of the measurement. Our goal is to improve accuracy by an order of magnitude compared to the most recent experiment. In order to achieve the goal, we utilize J-PARC's highest-intensity pulsed muon beam (expected intensity is 1×10^8 μ^+/s), highly segmented positron detector with SiPM (Silicon PhotoMultiplier), and an online/offline muon beam profile monitor. In this presentation, we discuss the experimental overview and development status of each components.

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