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Measurement of muonium hyperfine splitting at J-PARC

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We are planning a measuremnt of the ground state hyperfine structure of muonium at J-PARC/MLF. Muonium is a hydrogen-like bound state only consist of leptons, and its HFS is a good probe for testing QED theory. The muon mass and magnetic moment which are fundamental constants of muon have been so far determined by the muonium HFS experiment at LAMPF. The high intensity beam soon to be available at J-PARC allows one order of magnitude more accurate determination of those constants, which also plays an important role in the new measurement of anomalous magnet monment. Muonium atoms are formed by electron capture reaction with Krypton gas. The microwave resonance is observed by measurement of positron asymmetry from muonium decay. We present the current status of apparatus development and simulation study.

Autor: Herr TANAKA, Kazuo (Graduate School of Arts and Sciences, University of Tokyo, RIKEN)

Co-Autor: MU-HFS COLLABORATION, M. Aoki (o), Y. Fukao (k), Y. Higashi (t), T. Higuchi (t), H. Iinuma (k), Y. Ikedo (k), K. Ishida (r), M. Iwasaki (r), R. Kadono (k), O. Kamigaito (r), S. Kanda (t), D. Kawall (m), N. Kawamura (k), A. Koda (k), K. M. Kojima (k), K. Kubo (i), Y. Matsuda (t), T. Mibe (k), Y, Miyake (k), T. Mizutani (t), K. Nagamine (k), K. Nishiyama (k), T. Ogitsu (k), R. Okubo (k), N. Saito (k), K. Sasaki (k), K. Shimomura (k), P. Strasser (k), M. Sugano (k), M. Tajima (t), D. Tomono (u), H. A. Torii (t), E. Torikai (y), A. Toyoda (k), K. Ueno (k), Y. Ueno (t), A. Yamamoto (k), M. Yoshida (k) (University of Tokyo (t), KEK (k), RIKEN (r), Osaka University (o), ICU (i), Kyoto University (u), University of Yamanashi (y), University of Massachusetts (m))

Vortragende(r): Herr TANAKA, Kazuo (Graduate School of Arts and Sciences, University of Tokyo, RIKEN)

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