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Characterization of the Muonium Defect in Cz-Si_{0.09}Ge_{0.91} BRENT CARROLL, ROGER LICHTI, Texas Tech University Department of Physics, PHILIP KING, STFC ISIS Faculty, GURKAN CELEBI, Istanbul University Department of Physics, KIM CHOW, University of Alberta Department of Physics, ICHIRO YONENAGA, Tohoku University Institute of Materials Research — The Muonium (Mu) [0/-] transition energy level is predicted to become valance band resonant in the Silicon Germanium alloy system for a Ge content of roughly 92%. The comparison of observations from various Muon Spin Research (MuSR) techniques indicate a Mu signal consistent with a shallow acceptor state. We report our MuSR measurements of diamagnetic and paramagnetic Muonium states in Czochralski grown Si_{0.09}Ge_{0.91} as part of an on-going effort to characterize the Mu shallow acceptor as well as testing the prediction of a universal Hydrogen (Muonium) defect level. Muonium states have been examined by means of Transverse Field (TF), Longitudinal Field (LF), and Radio Frequency (RF) MuSR techniques that provide information on Mu charge states, hyperfine distributions, and motional properties. Characterization of the ubiquitous H defect is important in the development of high mobility components of novel transistors and optoelectronic devices based on SiGe alloy heterojunctions.

Brent Carroll
Texas Tech University Department of Physics

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