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Transition Dynamics for Muonium in Silicon Germanium Alloys GANGA JAYARATHNA, ROGER LICHTI, PATRICK MENGYAN, Texas Tech University, YASAR CELEBI, Istanbul University, BRITTANY BAKER, Texas Tech University — We use longitudinal field muon spin relaxation technique to observe charge-state and site-change transitions of muonium in $\mathrm{Si}_{1-x}\mathrm{Ge}_x$ samples (x = 0.45, 0.77, 0.81, 0.84, and 0.94). We primarily focus on modeling the temperature and field dependence of the relaxation data to investigate the donor and acceptor ionization energies, paramagnetic hyperfine frequencies and charge-state/ site-change cycles. We compare donor/acceptor energies from relaxation data to those from asymmetry fits and verify assignments of specific dynamics to each observed relaxation feature and access energy values not previously determined. Previous studies have shown that the T-site muonium acceptor level enters the valence band near x = 0.92. We find separate muonium acceptor states with muonium trapped at a Si within the tetrahedral $\mathrm{Si}_{n}\mathrm{Ge}_{4-n}$ cage region and propose a new charge cycle that involves valence band resonant states.

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