

Suppression of μ^+ depolarization by fast magnetic fluctuations at avoided level crossings for Ho^{3+} ions in CaWO_4

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Abstract

© 2018 American Physical Society. We use transverse field muon spin rotation to probe the low field dynamics of Ho^{3+} ions imbedded in a single crystal host matrix of CaWO_4 . The Ho^{3+} ions at sites with the full tetragonal symmetry of the crystal have avoided level crossings of hyperfine sublevels of the ground crystal-field doublet, resulting in measurable changes in the both the AC susceptibility and transverse field muon depolarization rate. The host material has primarily nonmagnetic nuclear species and no magnetic ions, and so the muon is shown to be a direct nonresonant probe of pronounced changes of relaxation rates of the coupled electron-nuclear excitations of Ho^{3+} at avoided level crossings.

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