

## Dynamics of muonium in silicon under photoexcitation, studied via their precession signatures

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We report studies of the precession signatures of  $\text{Mu}_{BC}^0$ ,  $\text{Mu}_T^0$  and  $\text{Mu}^+/\text{Mu}^-$  in silicon under illumination from 10 K to room temperature. The precession signature allows one to unambiguously extract the influence of light on the different muonium centers.

In undoped silicon, the primary effect of the optical excitation is to athermally generate a significant concentration of free carriers. At a particular temperature, these optically generated carriers make possible additional dynamical processes such as charge state fluctuations, spin-exchange scattering, and site changes of muonium. These dynamics are primarily observed as enhancements of the relaxation rates of the precession signals. We summarize the optically induced dynamics associated with muonium in Si, including how it is influenced by the temperature of the sample and the intensity of the illumination. Studies which combine applied electric fields with illumination will also be presented.