

Spin polarization induced by optical and microwave resonance radiation in a Si vacancy in SiC: A promising subject for the spectroscopy of single defects

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Abstract

Depending on the temperature, crystal polytype, and crystal position, two opposite schemes have been observed for the optical alignment of the populations of spin sublevels in the ground state of a Si vacancy in SiC upon irradiation with unpolarized light at frequencies of zero-phonon lines. A giant change by a factor of 2-3 has been found in the luminescence intensity of zero-phonon lines in zero magnetic field upon absorption of microwave radiation with energy equal to the fine-structure splitting of spin sublevels of the vacancy ground state, which opens up possibilities for magnetic resonance detection at a single vacancy. © 2007 Pleiades Publishing, Ltd.

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