TRR 142
Tailored Nonlinear Photonics

TRR Guest Scientist Lecture / Seminar

Date/Time: Thursday, 22.11.2018 / 12:15 Uhr
Location: TU Dortmund University, Otto-Hahn-Str. 4
Room P1-02-110

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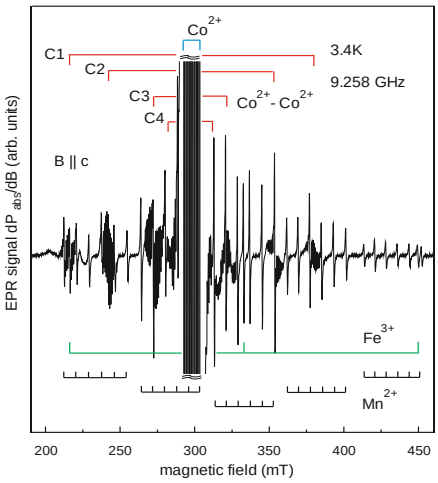
Pulsed EPR in wide band gap semiconductors

Abstract:

Diluted magnetic semiconductors (DMS) are widely used nowadays for testing new concepts for semiconductor devices. However, the interaction mechanism to produce the magnetic order in transition metal doped II-VI compounds is not completely understood yet. These systems are interesting for basic studies of spin-lattice relaxation and magnetism in semiconductors.

Here, we report the magnetic properties of heavily transition metal doped (ZnO:Co and GaN:Fe) semiconductors probed by use of Fourier Transform-Electron Paramagnetic Resonance (FT-EPR).



Spin-lattice relaxation processes in such DMS are investigated in the phonon-bottleneck regime. It is shown that the low temperature spin-lattice relaxation occurs through the direct process in which energy is transferred from the transition metal spins to a narrow band of hot microwave phonons with frequencies within EPR line-width.

Fig.1 EPR spectrum of the Co^{2+} dimers in ZnO when magnetic field is applied along the c-axis. The low-field and high-field allowed $\Delta M_S = \pm 1$ transitions due to the interaction of $^{59}Co^{2+}$ ions are shown by the cropped lines.

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