Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Probing the coherent oscillations of the electron-nuclear spin system of Ga paramagnetic centers in GaAsN by band-to-band photoluminescence. ANDREA BALOCCHI, SAWSEN AZAIZIA, HELENE CARRERE, THIERRY AMAND, XAVIER MARIE, Inst Natl des Sci Appl, VICTOR IBARRA-SIERRA, CARLOS SANDOVAL-SANTANA, Univ. Aut. Metrop. Azcapotzalco, Mexico city, Mexico, VLADIMIR KALEVICH, EUGENEOUS IVCHENKO, LEONID BAKALEINIKOV, Ioffe Physical-Technical Institute, 194021 St. Petersburg, Russia, ALEJANDRO KUNOLD, Univ. Aut. Metrop. Azcapotzalco, Mexico city, Mexico — Optically or electrically detected magnetic resonance techniques are consistently employed for manipulating and probing the defect spins through the hyperfine interaction, or to identify the defect chemical nature. Here, we demonstrate a novel detection scheme of the hyperfine interaction features of gallium paramagnetic centers in GaAsN based on the measurement in the time domain of the coherent electron-nuclear spin oscillations through the band-to-band photoluminescence. A pump and probe photoluminescence experiment leads to the measurement of the hyperfine constant of the coupled electron-gallium center by directly tracing the hyperfine interaction dynamical behavior. The hyperfine constants, defect configuration and the relative abundance of the nuclei involved can be determined without the need of electron spin resonance techniques and in the absence of any magnetic field. Information on the nuclear and electron spin relaxation damping parameters can also be estimated from the oscillations damping and the long delay decay of nuclear spin memory effect.

Andrea Balocchi
Inst Natl des Sci Appl

Date submitted: 11 Nov 2016 Electronic form version 1.4