

Spin centres in SiC for all-optical nanoscale quantum sensing under ambient conditions

A. N. Anisimov, R. A. Babunts, S. V. Kidalov, E. N. Mokhov, V. A. Soltamov¹⁾, P. G. Baranov

Ioffe Institute, 194021 St. Petersburg, Russia

Submitted 2 June 2016

DOI: 10.7868/S0370274X16140034

Level anticrossing (LAC) spectroscopy was demonstrated on a family of uniaxially oriented spin colour centres with $S = \frac{3}{2}$ in the ground and excited states in a hexagonal 4H-, 6H- and rhombic 15R- SiC polytypes. It was shown that these centres exhibit unique characteristics such as optical spin alignment up to the temperatures of 250 °C. A sharp variation of the IR photoluminescence intensity in the vicinity of LAC with the record contrast was observed, which can be used for a purely all-optical sensing of the magnetic field and tem-

perature without applying radiofrequency field. A distinctive feature of the LAC signal is weak dependence on the direction of the magnetic field that allows one to monitor the LAC signals in the non-oriented systems, such as powder of SiC nanocrystals.

Full text of the paper is published in JETP Letters, v. 104-1.

DOI: 10.1134/S0021364016140010

¹⁾e-mail: victrosoltamov@gmail.com