Volumetric integration of nanodiamonds in optical fiber cores

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Integration of optically-active diamond particles with glass fibers is a powerful method of scaling diamond's magnetic sensing functionality. A novel volume incorporation approach for the integration of nitrogen vacancy centers containing submicron diamond particles with step-index and suspended core optical fibers is discussed. The fiber core is composed of silicate glass nanorods individually dip-coated with crystalline diamond particles containing NV(-) centers suspension. Mapping of physical distribution of the diamond particles embedded in the fiber core revealed uniform distribution of single crystalline diamonds. Magnetic field sensing is validated along with nanodiamond concentration scaling and NV(-) fluorescence coupling to the guided modes.

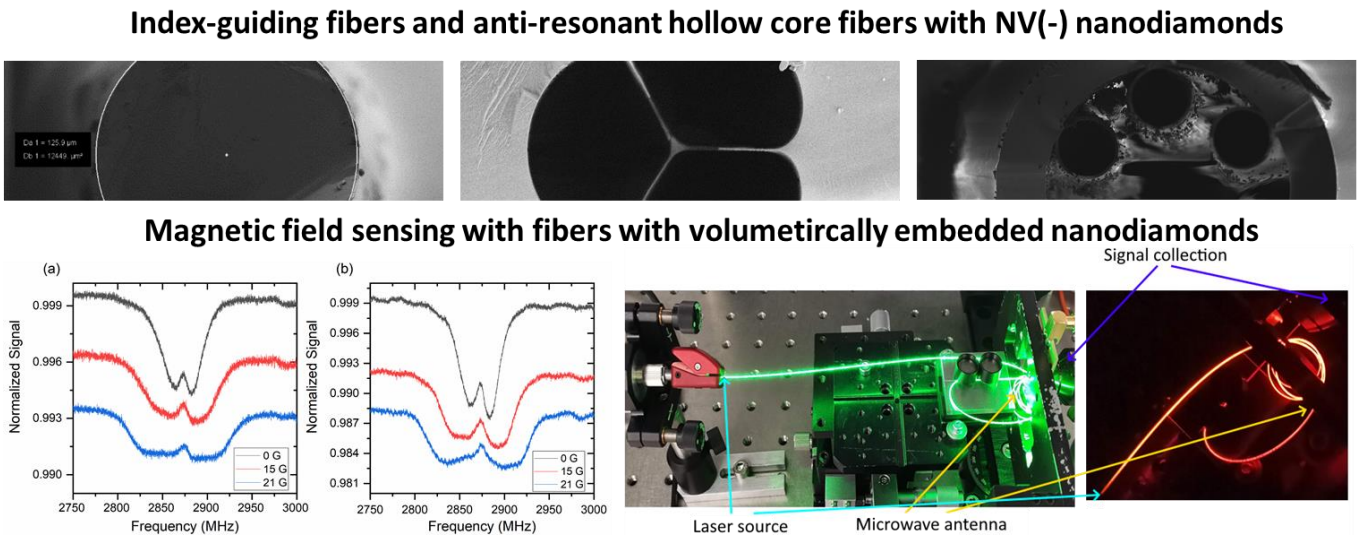

Fig. 1. Step-index and suspended core fibers and an anti-resonant hollow core fiber with NV(-) nanodiamonds volumetrically integrated along their optical cores; ODMR magnetic field sensing experiments with the developed fiber.

Funding. The research was within the TEAM NET programme of the Foundation for Polish Science co-financed by the EU under the European Regional Development Fund, project POIR.04.04.00-00-1644/18.

Biography. Ryszard Buczyński received PhD degrees in physics from Warsaw University of Technology in Poland, and Vrije Universiteit Brussel in Belgium, in 1999. He was a postdoctoral fellow with Vrije Universiteit Brussel and Heriot-Watt University, U.K. He is currently a professor at the Lukasiewicz - Institute of Microelectronics and Photonics and the Faculty of Physics, University of Warsaw. He leads an interuniversity research team Optofuidics and Fibers Optics Group.