A magnetometer using optically active defects in a solid state material
(14/05/2019)

A magnetometer using optically active defects in a solid state material
The present invention relates to a magnetometer (100) using optically detected magnetic resonance (ODMR), where a solid state material (10), such as diamond, with an ensemble of paramagnetic defects, such as nitrogen vacancies centers NV, is applied. An optical cavity (20) is optically excited by an irradiation laser (25) arranged therefore. A coupling structure (30) causes a microwave excitation (Ω) of the paramagnetic defects, and a permanent magnetic field (40, B_C) causes a Zeeman splitting of the energy levels in the paramagnetic defects. A probing volume (PV) in the solid state material is thereby defined by the spatially overlapping volume of the optical excitation by the irradiation laser (25), the coupling structure (30) also exciting the defects, and the constant magnetic field. The magnetometer then measures an unknown magnetic field by detecting emission (27), e.g. fluorescence, from the defects in the probing volume (PV) from the double excitation of the defects by the irradiation laser, and the coupling structure exciting these defects.

General information
Publication status: Published
Organisations: Quantum Physics and Information Technology, Department of Physics
Contributors: Huck, A., Ahmadi, S., El-Ella, H., Andersen, U. L.
Publication date: 2019

Publication information
IPC: G01R33/323
Patent number: WO2019002576
Filing date: 03/01/2019
Priority date: 29/06/2017
Priority number: EP20170178726
Original language: English
Electronic versions:
WO2019002576A1.pdf