

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Super-resolution high sensitivity AC Magnetic Field Imaging with NV Centers in Diamond ERIK BAUCH, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA, JEAN-CHRISTOPHE JASKULA, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, Massachusetts 02138, USA, ALEXEI TRIFONOV, Ioffe Physical-Technical Institute RAS, Saint Petersburg, Russia, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, Massachusetts 02138, USA — The Nitrogen-Vacancy center in diamond (NV center), a defect consisting of a nitrogen atom next to a missing atom, has been successfully applied to sense magnetic field, electric field, temperature and can also be used as fluorescence marker and single photon emitter. We will present super-resolution imaging of NV centers and simultaneous sensing of AC magnetic fields with high sensitivity. To demonstrate the applicability of super-resolution magnetic field imaging, we resolve several NV centers with an optical resolution smaller than 20 nm and probe locally the gradient of an externally applied magnetic field. Additionally, we demonstrate the detection of magnetic field signals from ^1H protons with subdiffraction image resolution. We will also show that our super-resolution magnetometer will benefit from a new readout method based on a spin-to-charge mapping that we have developed to increase the readout contrast.

Jean-Christophe Jaskula
Harvard-Smithsonian Center for Astrophysics,
60 Garden Street, Cambridge, Massachusetts 02138, USA

Date submitted: 30 Jan 2015

Electronic form version 1.4