OMICS International
conferenceseries.com

Nir Bar-Gill, J Laser Opt Photonics 2016, 3:1(Suppl)
http://dx.doi.org/10.4172/2469-410X.C1.002

NV centers in diamond - quantum coherence, noise and nanoscale MRI

Nir Bar-Gill
Hebrew University, Israel

Nitrogen-Vacancy (NV) color centers in diamond provide a unique nanoscale quantum spin system embedded in a solid-state structure. As such they are well suited for studies in a wide variety of fields, with emerging applications ranging from quantum information processing to magnetic field sensing and nano-MRI (Magnetic Resonance Imaging). Importantly, NVs possess unique optical transitions which allow for optical initialization and readout of their quantum spin state. In this talk, I will introduce the field of NV centers, and describe our research into understanding and controlling these systems, with the goal of enabling fundamental research and future applications. I will present the techniques used for manipulation of the NV centers, and for enhancing their quantum coherence lifetime. Specifically, I will describe our recent work on extending the coherence time of arbitrary quantum states, and on spectrally characterizing the noise which limits coherence in shallow NVs. I will then demonstrate how these approaches can be used for magnetic field sensing and nanoscale NMR (Nuclear Magnetic Resonance) and MRI.

Biography

Nir Bar-Gill is an Assistant Professor in the departments of Applied Physics and Physics at the Hebrew University in Jerusalem, Israel. He received his PhD in 2010 from the Weizmann Institute of Science in Israel, following which he spent 3 years as a Post-doctoral fellow at Harvard University, USA. His research focuses on NV centers in diamond, and in particular their relation to quantum information processing, quantum simulation and sensing. He has received several awards, including the Harvard Post-doctoral Award for career development and the Minerva ARCHES award.

bargill@phys.huji.ac.il

Notes: