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Nitrogen-vacancy in diamond for Solid-state quantum computing

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Abstract content
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Nitrogen-vacancy in diamond for Solid-state quantum computing

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Abstract

Ever since the inception of the quantum computing idea, many technologies for its realization have been tried. The fundamental intention is to implement and manipulate a two-dimensional quantum mechanical unit of information that is termed a quantum bit (qubit). In this context during the past decade, solid-state fluorescing defects have drawn huge interest. Specifically, the nitrogen-vacancy centre in diamonds has been seen as a prominent candidate for the realization of single photon emission, quantum computing and magnetic field sensor, as it is being explored as a qubit. This is due to the individual addressability, capacity for optical spin polarization and the spin coherence time of milliseconds at room-temperature. Thus, the control of the NV centers in diamond is crucial for applications as defects with spin properties close to the surface of diamond are needed.
Here, we report on an on-going study on the enhancement of NV centre creation in diamond using the method of ion implantation. The influence of the surface onto the created NV centers and their electronic spin is investigated. All the samples being used in this study are analyzed by optical techniques to identify the presence of NV centers in the samples and to identify dark spots suitable for ion implantation.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

PhD

Main supervisor (name and email)
and his / her institution

Francesco Petruccione, petruccione@ukzn.ac.za, University of KwaZulu-Natal

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