

## Platform Development for Diamond Quantum and Photonic Technologies

Supervisors: Professor Mark Newton and Dr Ben Green

Group: Diamond

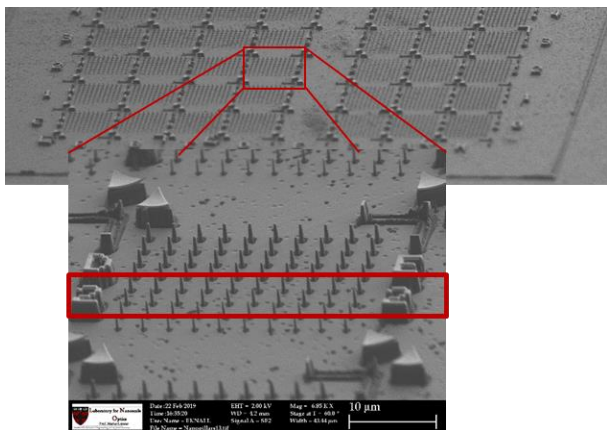
Funding: Fully funded PhD studentship (48 months) for UK or EU students.

Start date: October 2019. Application deadline: ongoing

The ability to optical initialisation, manipulation and readout of spin state of the nitrogen vacancy (NV<sup>-</sup>) defect in diamond at room temperature has ensured that this defect is recognised as one of the most promising systems for quantum magnetic/electric field as well as temperature sensing and a range of other quantum technologies. Recent advances in diamond synthesis and processes for nano/micron scale device fabrication have demonstrated the potential of diamond photonic devices to increase light-matter interaction and sensor performance. Significant further progress requires accurate nano-scale positioning of the quantum defects, and importantly development of the base material and device processing to reduce the defects in the bulk and on the surface that today limit the performance to well below that which is possible.

This project focuses on developing the quantum diamond platform, through combining understanding of defect physics with a range of processing methodologies to routinely produce diamond membranes with thicknesses <500 nm, containing arrays of colour centres with quantum properties approaching those of the bulk. Such platforms will enable a range of sensor technologies with room temperature single molecule sensing and spectroscopy being one of the ultimate goals.

The project involves both experimental and theoretical research (full training provided) and collaboration with international academic and industrial partners. The start date for the project will be 1st October 2019. You should have obtained, or be about to obtain a First or Upper Second Class UK Honours degree in Physics, or a related subject, Alternatively, applicants with equivalent qualifications gained outside the UK will also be considered.



Nano pillars fabricated into a diamond surface to increase detection of optical emission from single defects in diamond

The successful applicant will join a team of over 10 academics and 20 PhD students in the departments of Physics, Chemistry, Engineering and the Warwick Manufacturing Group all researching into different aspects of Diamond Science and Technology. Warwick has excellent facilities for characterisation and processing of diamond, as well as the fabrication of micro/nano diamond devices and an exceptionally strong record of successful collaboration with industry.

For further information please contact: Mark Newton ([m.e.newton@warwick.ac.uk](mailto:m.e.newton@warwick.ac.uk)) or [DST.Admin@warwick.ac.uk](mailto:DST.Admin@warwick.ac.uk).