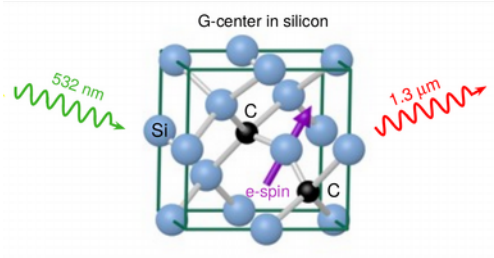
PhD position, ANR Project OCTOPUS

Optically-addressable spin qubits in silicon 28

General informations

Length : 36 months
Starting date : 01/2019
Working time : Full time
Laboratory: IM2NP (NOVA group), Marseilles (France)
Diploma : Master Degree
Supervisor: Marco Abbarchi



The ANR OCTOPUS project includes three French partners: CEA-Grenoble, L2C-Montpellier and the IM2NP-Marseille. It aims at exploring the potential of G-centers in silicon for applications in quantum technologies. This point defect was originally highlighted in carbon-rich Si samples undergoing high-energy irradiation followed by high temperature annealing. A key feature of G-centers is their infrared emission, matching the important optical telecommunications wavelength O-band spreading between 1260-1360 nm. One important task of the project is to **create individual G-centers through ion implantation** in photonic nanostructures based on isotopically purified ^{28}Si samples, which will provide an integrated single photon source in silicon emitting in the telecommunications wavelength range.

At the IM2NP node of the consortium the activities within the NOVA team will include:

1) Generation of the individual G-centers by means of high-energy electron irradiation and mass-filtered focused ion beam implantation.
2) Implementation of atomically smooth, monocrystalline photonic structures via solid state dewetting and top-down techniques (e.g. photolithography, e-beam lithography).

The NOVA team will make available all the infrastructures of its clean-room fully dedicated to Si and Ge epitaxial fabrication and focused ion beam implantation. In addition to this, the group will share the infrastructures of the NANOTECMAT PLATFORM (http://www.im2np.fr/recherche/plateformes.html).

Required Expertise of the candidate

Knowledge: solid-state physics; semiconductor physics, material science; english (good written and spoken); operating systems Windows; programs: Matlab, Origin, Igor, Lab-view.

Operating expertise: Nano-fabrication; clean room facilities; ion implantation; focused ion beam; electron irradiation.

To apply

Please send before 30/11/2018 CV, motivation letter **and two candidate-blind** recommendations letters from previous advisors to Marco Abbarchi: marco.abbarchi@im2np.fr