

Quantum Centres in Diamond

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Abstract. The goal of this project is to create N-, P- and Si-doped diamond structures with a graphene layer on top. We will identify the distribution of the dopants and study the individual dopant atom configurations and their manipulation using atomic-resolution microscopy and spectroscopy techniques. We will further study the evolution of the electronic structure via photoelectron spectroscopy for a wide range of dopant concentrations. The ultimate spectroscopic aim is band structure imaging of nitrogen, phosphorus and silicon dopant in-gap states using angle-resolved photoemission spectroscopy (ARPES) for a wide concentration range of dopants. We will also transform the diamond surface into graphene or thin graphite layers, and investigate the effect of dopants inside diamond on the surface reconstruction. Graphene on diamond can serve as an electrode in quantum sensors and in circuits for spin-dependent photocurrent measurements. First results will be presented.