

## **Production of NV centers for new application**

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Several fascinate new applications are developed the last years using NV centers in diamond. One example are dynamic nuclear polarization which has the potential to enhanced the NMR or MRT technology by orders of magnitudes.

Ion implantation is only the first step towards the creation of devices based on NV centres in diamond. Producing artificial NV defect centres using nitrogen implantation also requires repairing the crystal implantation defects, creating the N-V bonds and stabilizing the NV charge state. This is commonly done by annealing the samples in a vacuum furnace at a temperature between 800 and 1000°C. New methods like post irradiation, subsequent overgrowth to bury the shallow NV centres, or a surface treatment are able to optimize the properties of the centers.

Defect engineering is as well as important as the implantation procedure to create artificial NV centres on demand. The lecture will discuss new experimental results concerning the production and diffusion of vacancies and NV centres, as well as Fermi level pinning, and finally show recent applications.