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Einladung

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Physikalischen Kolloquium
Montag, 30.01.2017
16:15 Uhr in N24/H13

Professor Dr. Mark Newton

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Engineering defects in diamond.

It has been shown over the last few years that defects in diamond have great potential for use as quantum sensors and qubits. Full exploitation of their optical and spin properties necessitates that we control their position, orientation and environment to optimise all of the desirable properties simultaneously.

In this talk I will review our understanding of the production, in diamond, of intrinsic defect complexes by irradiation and annealing, the capture of vacancies and self-interstitials by impurities and how even relatively complex defects can be grown-in during synthesis. Even though technologically important defects in diamond, such as the nitrogen-vacancy and silicon-vacancy complexes, can be structurally stable they can exist in different charge states, which are not necessarily stable under optical excitation. The photo/thermo-chromic behaviour of defects in diamond will be reviewed.

New data will be presented on the production of preferentially orientated defect complexes by electron irradiation and/or annealing whilst the sample is subjected to a large (up to 4 GPa) uniaxial stress. Near 100 % preferential orientation can be achieved for a number of different defects. Furthermore, recent results will be presented where uniaxial stress has been used *in-situ* to investigate both the reorientation and the spin relaxation properties of the single substitutional nitrogen centre (N_s^0) in diamond. It will be shown that uniaxial stress can be used to influence spin diffusion and change spin-spin relaxation.

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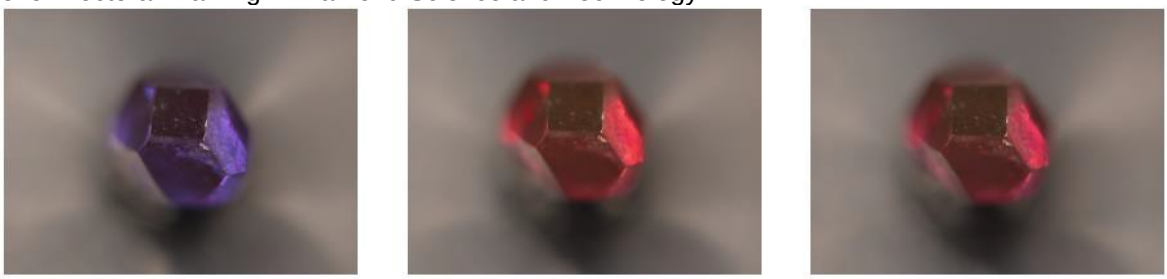

Images of a diamond showing marked photo/thermo-chromic behaviour. Left after heating in the dark at 550° C, middle 2 minutes illumination, and right 2 hours illumination with 100 mW of 405 nm light.

Ab 16.00 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13

Organisation: Prof. Dr. F. Jelezko, Tel. 23750, Host: Prof. Dr. F. Jelezko, Tel. 23750, off.: 23751