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## Experiment 1: “Quantum Demonstrator” : Quantum-effect magnetic sensor based on NV- centers in Diamond

*Saturday 1 October 2022 11:00 (3 hours)*

Experiment 1: “Quantum Demonstrator”: Quantum-effect magnetic sensor based on NV- centers in Diamond With Stefan Kubsky and colleagues, from the Surface Laboratory at Synchrotron Soleil (France) and Prof. Jan Meier (via video, Felix Bloch Institute, University of Leipzig, Germany)

A compact diamond-based device will be explained, set-up and used as a versatile and highly sensitive magnetic sensor via optical pumping and read-out in the visible. It is based on NV- centers implanted into diamonds (from Quantum Technologies, Leipzig) behaving as quantum objects –usable for quantum computing at room temperature if addressed individually.

The session starts with a comprehensive introduction to the basic physical properties of NV- centers (20-30min).

Jan Meijer completes with in-depth explanations and discussion (~20-30 min). A short live demonstration of a free quantum-computer simulation code (Qiskit) can be envisaged as well.

Hands-on part: Participants will conceive, assemble and run three experiments (light source, Q-sensors, optical spectrometers, computer, software) in sub-groups (~90+ min).

Different situations will be tested and students will be invited to present their discoveries on the properties of these sensors.

Get your hands on this emerging field of physics and technology !

**Presenter:** KUBSKY, Stefan (SOLEIL)