Contribution ID: **334** Type: **Talk**

# 【421】Discrete-time signal processing with NV centers

*Wednesday 1 September 2021 14:00 (30 minutes)*

We developed a spectroscopy method for quantum sensing based on sequential weak measurements to detect the free-induction decay (FID) signal of a single carbon-13 nuclear spin. We showed that such measurements mitigate the unwanted quantum back-action, and provide a number of further advantages, including a large frequency bandwidth and possibility of efficient Fourier Nuclear Magnetic Resonance (NMR) methods. We further extended our strategy to image large nuclear spin clusters with three-dimensional atomic resolution. We demonstrated the detection of up to 29 carbon-13 nuclear spins in diamond, and showed how, by applying information-criteria principles to the detected signals, the three-dimensional atomic positions of nuclei in a diamond lattice can be recovered.

**Primary authors:** Prof. DEGEN, Christian (ETH Zurich); Dr ABENDROTH, John (ETH Zurich); Dr ZOPES, Jonathan (ETH Zurich); Mr HERB, Konstantin (ETH Zurich); CUJIA, Kristian

**Presenter:** CUJIA, Kristian

**Session Classification:** Atomic Physics and Quantum Optics

**Track Classification:** Atomic Physics and Quantum Optics