Quantum diamond enabled hyperpolarization under ambient conditions | 6AGS	**Start date:**
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Abstract: The practice of nuclear magnetic resonance (NMR) relies on the generation of spin polarization, which, unfortunately, is often restricted to minute values. Here, we plan to exploit the unique properties of select paramagnetic centers — specifically, nitrogen-vacancy (NV) centers in diamond— to generate massively polarized ensembles of nuclear spins at or near room temperature.
We envision the following main goal:
Sample engineering, spin control techniques and system integration so as to demonstrate efficient polarization transfer from spins in diamond to nuclei in a fluid brought in close proximity.
Over the three years duration of this project, our ***milestones*** are:

1. Proof-of-principle demonstration of NV-driven dynamic polarization of a static fluid.
2. Design, construction, and proof-of-principle demonstration of a chip-integrated 'spin-pump' for fluid polarization and delivery.
3. Verification of polarization transport from the NV centers to the bulk molecules in fluids

Recent results: …..	**Publications:**
• *New set-up for ensemble dynamic nuclear spin polarization.* • *NMR and EPR systems are approved for funding and will be delivered to UULM by Bruker in 2018*	Robust techniques for polarization and detection of nuclear spin ensembles Jochen Scheuer, Ilai Schwartz, Samuel Müller, Qiong Chen, Ish Dhand, Martin B. Plenio, Boris Naydenov, Fedor Jelezko arXiv:1706.01315

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