Opening for a PhD position in Quantum Magnetometers for Imaging the Heart at the University of Nottingham (UK)

This PhD project is aimed at developing highly sensitive methods for detection of magnetic fields with optically pumped magnetometers. The magnetometer will be based on laser-interrogation of room-temperature cesium atomic vapor. The project will include work on designing a prototype magnetometer and optimizing the magnetometer for biomedical imaging of the heart.

The applicant should either have or be about to graduate with a Master's degree in Physics or another relevant field. Previous experience with experimental quantum physics, lasers, optics, data-acquisition, and electronics will be beneficial.

The successful candidate will be part of a young research team lead by Dr. Kasper Jensen. The PhD student will also be part of the "Cold Atom and Quantum Optics Group" at the School of Physics and Astronomy, University of Nottingham, which currently includes 4 faculty members and their teams of postdocs, PhD students, and undergraduate students working on experimental quantum physics.

The PhD project is funded by the Novo Nordisk Foundation. The project will involve collaboration with the research groups of Prof. Eugene Polzik from the Niels Bohr Institute and Assoc. Prof. Bo Hjorth Bentzen from the Department of Biomedical Sciences, both from the University of Copenhagen in Denmark. The successful candidate is expected to have several longer research visits to those groups during the project period (depending on the covid-19 situation).

Interested applicants should send an informal application (including a CV) to the project supervisor Dr Kasper Jensen by email: Kasper.Jensen@nottingham.ac.uk. Applications will be looked at as they come in. A formal application to the University of Nottingham is required at a later stage. Possible start dates for the PhD are: Aug 1st, Sep 1st, Oct 1st in 2021.

Previous work related to this PhD project include:

- K. Jensen et al. *Detection of low-conductivity objects using eddy current measurements with an optical magnetometer.* Phys. Rev. Research **1**, 033087 (2019). arxiv.org/abs/1905.01661
- K. Jensen et al. *Magnetocardiography on an isolated animal heart with a room-temperature optically pumped magnetometer.* Scientific Reports **8**, 16218 (2018). arxiv.org/abs/1806.10954
- K. Jensen et al., *Non-invasive detection of animal nerve impulses with an atomic magnetometer operating near quantum limited sensitivity.* Scientific Reports **6**, 29638 (2016). arxiv.org/abs/1601.03273
- G. Vasilakis et al. *Generation of a squeezed state of an oscillator by stroboscopic back-action-evading measurement.* Nature Physics **11**, 389 (2015). arxiv.org/abs/1411.6289
- W. Wasilewski et al. *Quantum noise limited and entanglement-assisted magnetometry.* Physical Review Letters **104**, 133601 (2010). arxiv.org/abs/0907.2453

Online information:
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University of Nottingham
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