SFB/TRR 21 - Seminar
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Daniel Doering

(ARC Centre of Excellence for Quantum-Atom Optics,
Department of Quantum Science,
The Australian National University)

Ramsey interferometry and pumping experiments with an atom laser

Atom lasers are coherent matter waves, generally produced by output-coupling atoms from a trapped Bose-Einstein condensate. For applications in atom interferometry, atom lasers present an intriguing alternative to thermal atom sources. Although the current sensitivity achievable with interferometers using coherent atoms is not comparable to thermal beam machines, mainly due to the lower flux, there are promising ways to utilize the potential of atom lasers for atom interferometry. Improved sensitivity via so called squeezed states is one example where atom lasers offer significant advantages.
In my talk, I will focus on two main results: The achievement of an atom laser Ramsey type interferometer operating close to the shot noise limit and the realisation of a pumped atom laser. Shot noise limited operation of our interferometer is a significant step towards observing variances below the classical limit and therefore squeezed states. Alternatively to these states with sub-classical noise, interferometric sensitivity can be improved by increasing the flux of the atomic source. In order to increase the average flux of an atom laser, one ideally wants it to operate continuously, requiring a coherent replenishment mechanism for the BEC which is the source of the atom laser. I will present results both on the continuous and the pulsed regime of such a pumping process.

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Universität Stuttgart, NWZII, Raum 3.123
Pfaffenwaldring 57, 70569 Stuttgart

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