



SFB/TRR 21 - Colloquium

2. December 2011, Stuttgart

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Quantum metrology with atomic ensembles: entanglement-enhanced magnetometry and the Heisenberg limit.

Quantum Metrology uses entanglement and other quantum resources to improve the sensitivity of interferometric measurements. Strongly-interacting light-matter systems, or "quantum interfaces," offer several routes to improved sensitivity, including quantum non-demolition measurements, squeezing-enhanced optical readout of atomic sensors, and interaction-based measurements. I will describe recent experimental work that applies these quantum techniques in optical magnetometry, including sensitivity enhancements using optical entanglement, generation of squeezed states in magnetically-sensitive atomic ensembles, and interaction-based spin measurements that scale better than the so-called "Heisenberg limit" of sensitivity.

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