TG Spin Squeezing and Non-classical States Overview

TG Leader	Carsten Klempt

TG Activities

- Contribute to CRC DQ-mat TG1
- Contribute to TG Quantum Sensors for geo. observ. and rel. geodesy, TG Optical Clock Networks, TG Tests of Fundamental Physics
- Interact with TG Quantum Computing, TG Open many-body quantum systems, TG Tests of Fundamental Physics
- Develop concepts for the generation, manipulation and detection of spin-squeezed and entangled many-body states
- Explore methods for their transfer to external degrees of freedom
- Devise applications for entanglement-enhanced sensitivities in frequency, magnetic field, and inertial sensing
- Investigate entangled states for tests of fundamental physics: fundamental sources of decoherence and coupling of quantum objects to general relativity

TG Competences/Services

- Expertise on quantum-enhanced measurements
- Efficient description of many-body quantum states
- Magnetic field stabilization
- Accurate atom counting
- Dynamical optical potentials

Involved QF Members

Members	Institution	Relevant Expertise
Carsten Klempt, leader	LUH / DLR-SI	Quantum Atom Optics
Andreas Hüper	LUH	A next-generation Raman system for creating momentum-state entanglement
Alexander Idel	LUH	Quantum Optics with Non-classical States of Matter
Fabian Anders	LUH	Quantum Optics with Non-classical States of Matter
Bernd Meyer	LUH	Quantum Optics with Non-classical States of Matter
Cebrail Pür	LUH	Quantum Optics with Non-classical States of Matter
Mareike Hetzel	LUH	Quantum Optics with Non-classical States of Matter
Martin Quensen	LUH	Quantum Optics with Non-classical States of Matter
Wolfgang Ertmer	LUH/DLR-SI	Ultracold quantum gases and precision metrology

Luis Santos	LUH	Theory of Dynamics of Manybody Quantum Systems
Luis Peña Ardila	LUH	Excited state phase transitions for the generation of entanglement
Polina Feldmann	LUH	Theory of quantum phase transitions for the generation of entanglement
Ernst Rasel	LUH	Quantum sensors
Christian Schubert	LUH/DLR-SI	Atom interferometry
Dennis Schlippert	LUH	Atom interferometry
Naceur Gaaloul	LUH	Theory of many-body physics and atom interferometry
Piet Schmidt	PTB / LUH	Squeezing and non-classical states in trapped ions, precision metrology
Christian Lisdat	PTB	Frequency metrology
Klemens Hammerer	LUH	Theory of quantum optics, coupling to general relativity