

Joint IQSE AMO and Optics Seminar

Thursday, May 26th, 11:30 CDT, ZOOM&IQSE
seminar room (MPHY 578)

Pizza will be served for IQSE members at 11:00. The talk will start around 11:30

Dr. Dennis Schlippert

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Very Long Baseline Atom Interferometry

Very Long Baseline Atom Interferometry (VLBAI) corresponds to ground-based atomic matter-wave interferometry on large scales in space and time, letting the atomic wave functions interfere after free evolution times of several seconds or wave packet separation at the scale of meters. As inertial sensors, e.g., accelerometers, these devices take advantage of the quadratic scaling of the leading order phase shift with the free evolution time to enhance their sensitivity, giving rise to compelling experiments. With shot noise-limited instabilities better than 10^{-9} m/s² at 1 s at the horizon, the Hannover VLBAI facility may compete with state-of-the-art superconducting gravimeters, while providing absolute instead of relative measurements. Operated with rubidium and ytterbium simultaneously, tests of the universality of free fall at a level of parts in 10^{13} and beyond are in reach. Finally, the large spatial extent of the interferometer allows one to probe the limits of coherence at macroscopic scales as well as the interplay of quantum mechanics and gravity. We report on the status of the VLBAI facility, its key features – the high-flux atomic sources for Rb and Yb, the 10 m magnetic shield, and the low-noise seismic attenuation system – and future prospects in fundamental science.

ZOOM information:

<https://tamu.zoom.us/j/99696662195?pwd=NIFUZFpvamR6YlIBUUZROFVReFhkQT09>

Meeting ID: 996 9666 2195

Passcode: 757350

162.255.37.11 (US West) 162.255.36.11 (US East)

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