

Quantum Technologies within INFN: status and perspectives



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Optical links for atomic gravity sensors

Atomic gravimeters are the most precise absolute gravity sensors. A main feature of atom interferometers is the ability to perform differential measurements, in gradiometric configuration, with almost perfect suppression of vibration noise. So far this has been achieved on baselines of the order of the meter. By combining optical metrology and atom optics methods, the OLAGS program will develop coherent optical links between atomic sensors over long distances, to increase the sensitivity to gravitational gradient and its temporal variations. Long baseline differential gravity measurements can find application in the search for Dark Matter from ultralight fields and in the detection of Gravitational Waves. The detection of gravitational anomalies, combined with precise soil displacement measurements, becomes crucial for the characterization of geophysical phenomena e.g. hydrology of the aquifers, elastic deformation of rocky bodies, migration of magmatic-hydrothermal fluids.

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