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【468】Milligram-scale mechanical pendulums: towards the quantum regime

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Bringing milligram-scale mechanical oscillators to the quantum regime for enhanced sensing is currently a very sought after goal. Prospects range from investigation of macroscopic quantum mechanics and exploration of quantum aspects of the gravitational interaction to searches of unknown (fifth) forces. Sufficient isolation and achieving quantum control have remained challenging in this mass regime. We built a 1 mg torsion pendulum and set it in a UHV chamber together with an optoelectronic feedback mechanism allowing control and characterization of the mechanical properties of the pendulum. We measured competitive quality factors for the pendulum and torsion modes, 900000 and 64000, respectively.

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