Abstract Submitted
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A transportable absolute Quantum Gravimeter employing Bose-Einstein condensates[1] SVEN ABEND, NINA HEINE, MARAL SAHELGOZIN, JONAS MATTHIAS, Institut fuer Quantenoptik, Leibniz Universitaet Hannover, WALDEMAR HERR, LUDGER TIMMEN, JUERGEN MUELLER, Institut fuer Erdmessung, Leibniz Universitaet Hannover, ERNST M. RASEL, Institut fuer Quantenoptik, Leibniz Universitaet Hannover — The transportable Quantum Gravimeter QG-1 is designed to acquire absolute values for local gravity, while maintaining long-term stability and providing the capability for mobile deployments. The device utilizes atom interferometry with Bose-Einstein condensates (BECs). The BECs act as ideal test masses when released into free fall and can be precisely controlled. In general, all atom gravimeters share the characteristic of not suffering from wear and tear of a corner cube and thereby inherently suppress the need for recalibration of the device. Additionally, employing magnetically lensed BECs in contrast to thermal atoms used in the current generation of atom gravimeters significantly reduces the expansion rate of the ensemble and thereby the systematic uncertainties related to wavefront aberrations and the Coriolis force. In order to apply these advantages for mobile operation a compact atom- chip setup providing a high BEC flux, a fiber based frequency doubled telecom laser system and compact electronics were developed. We focus on the principle of operation including the recent progress and the perspectives to overcome the leading order limitations of state-of-the-art atom gravimeters.

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