Abstract Submitted
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Towards enhanced gravimetry with an optical cavity.[1] WANDERSON PIMENTA, MARIO GONZALEZ, MA. SOLEDAD BILLION, ALEJANDRA LOPEZ-VAZQUEZ, GEORGINA OLIVARES-RENTERA, JOHN FRANCO-VILLAFANE, EDUARDO GOMEZ, Univ Autonoma de SLP — Gravimetry uses Ramsey's separate field method with Raman transitions to accurately measure gravitational forces. Each atom interferes only with itself in the traditional gravimetry, giving an uncertainty that decreases as N-1/2 with N the number of atoms. An improved signal would be obtained using particles with higher mass. Our goal is to achieve collective interferometry, so that all atoms contribute coherently to the signal giving a better scaling of the uncertainty (as N-1). The present work gives a detailed description of the new atomic trap for collective interferometry in our laboratory. The vacuum system consists of a metal chamber with multiple windows for optical access connected to a combination of sorption and ion pumps. We use reentrant windows to avoid eddy currents generated by abrupt changes in the current of the coils. The optical components are mounted directly on the vacuum chamber using a cage system and we send the light through optical fibers. We monitor the atoms with a double relay imaging system to suppress background light. All the system is mounted in a passive isolation system to minimize vibrations.

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