

Abstract Submitted
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Gravity Surveys Using a Mobile Atom Interferometer XUEJIAN

WU, Rutgers University, Newark — Measuring gravity is important in geodesy for e.g. hydrological monitoring and mineral exploration. Though atomic gravimeters have become the most sensitive way to measure absolute gravity in well-controlled conditions, the performance of field-operation atomic gravimeters is constrained due to their relatively complex and fragile apparatus. We demonstrate field-operation of a mobile atomic gravimeter for time-variable gravity measurements and gravity surveys. In the laboratory, tidal gravity variation is measured with a sensitivity of $37 \text{ ng}/\sqrt{\text{Hz}}$ and a long-term stability of better than 2 ng , revealing the gravitational ocean loading effect on the local tide in the San Francisco Bay. In gravity surveys on the Berkeley hills, absolute gravity is measured with a sensitivity of $\sim 500 \text{ ng}/\sqrt{\text{Hz}}$ and precision of $\sim 60 \text{ ng}$, obtaining the density of the subsurface rocks from the vertical gravity gradient. This work paves the way for bringing field-operation atomic gravimeters to geodesy.

Xuejian Wu
Rutgers University, Newark

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