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Standard Frequency Reference Error Evaluation for a Transportable Atom Gravimeter¹ JIAFENG CUI, YAOYAO XU, XIAOCHUN DUAN, KUN QI, LELE CHEN, DEKAI MAO, Huazhong University of Science Technology — Based on our former laboratory-confined atom gravimeters, we developed our first generation of the mobile atom gravimeter. Systematic errors on this apparatus have been evaluated to give the absolute gravity value g . A new method to calibrate the standard frequency reference for the atom gravimeter by the instrument itself is described here which has potential application for field measurement. Atomic gravimeters are based on two-photon stimulated Raman transitions. The frequency difference at the atoms hyperfine transition is driven by stable wave generator which is further referenced to a commercial 10MHz frequency standard. Any deviation from 10MHz could cause a gravity measurement error. Inspired by microwave atomic fountain clock, the calibration is done by compare the wave generator output frequency to the atomic transition through Ramsey interaction and then inverse analyze the frequency standard deviation. The Ramsey microwave cavity is replaced by the Raman laser pulses which is more adaptive to our present setup for assessing systematic error for g value. The standard frequency reference is measured to a relative precision of $1E-10$, and the corresponding error is constrained below 1 Gal in our gravity measurement.

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