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Precision measurement of "Big G" on the International Space Station[1] ELIZABETH ASHWOOD, DOGA MURAT KURKCUOGLU, Georgia Southern University, CHARLES CLARK, Joint Quantum Institute, MARK EDWARDS, Georgia Southern University — Recent measurements of Newton's universal gravitational constant ("Big G") using atom interferometric methods have increased the uncertainty in the value of this important fundamental constant[2]. One natural venue for performing a new atom interferometry measurement of Big G is the Cold Atom Laboratory to be deployed to the International Space Station (ISS) in 2017. We use simulation tools based on the Lagrangian Variational Methods (LVM) to simulate rapidly a variety of different atom–interferometry (AI) schemes that could be implemented in the CAL on the ISS. The atom chip present in the CAL is capable of producing potentials in H–trap, T–trap, and Z–trap configurations. We present simulation results for several candidate AI schemes running in various atom–chip potentials with a source mass present and absent. These AI schemes are designed to avoid errors in estimating Big G due to, among other things, shaking of the ISS and shot–to–shot variation of the number of atoms in the condensate. We provide an error budget and assess the feasibility of performing a precision measurement in the CAL.

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[2]See, e.g., S. Schlamminger, *Nature* **510**, 478 (2014)

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