Erratum: Flattening Earth acceleration in atomic fountains [Phys. Rev. A 82, 013622 (2010)]

A. Bertoldi
(Received 12 July 2013; published 29 January 2014)

DOI: 10.1103/PhysRevA.89.019902 PACS number(s): 37.25.+k, 91.10.Qm, 98.35.Ce, 99.10.Cd

The multimass system proposed in Sec. IV of the article does not cancel the interferometric phase noise generated by the interplay between the Earth gravity gradient and the atomic dynamics fluctuations. The configuration was based on the wrong assumption that the interferometric phase is determined by the local acceleration at the positions where the atomic ensemble interacts with the beam splitter and deflection pulses. Instead, the phase results from the positions of the atomic cloud at the time of the interrogation pulses; these positions depend on the cloud initial dynamics and on the gravity acceleration along the whole atomic trajectories during the interferometric sequence.

A mitigation technique for the gravity gradient induced noise alternative to flattening the acceleration over the entire interferometric region could use a mass to passively stabilize the interferometric phase against fluctuations of the initial cloud dynamics [1]. Because of the much lighter compensation mass required, this approach could be adopted in tall interferometers.

I thank Dali Sun who stimulated this revision with his questions.