

Phase shift in an atom interferometer induced by the additional laser lines of a Raman laser generated by modulation

Olivier Carraz, Renée Charrière, Malo Cadoret, Nassim Zahzam, Yannick Bidel, Alexandre Bresson

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The use of Raman laser generated by modulation for light-pulse atom interferometer allows to have a laser system more compact and robust. However, the additional laser frequencies generated can perturb the atom interferometer. In this article, we present a precise calculation of the phase shift induced by the additional laser frequencies. The model is validated by comparison with experimental measurements on an atom gravimeter. The uncertainty of the phase shift determination limits the accuracy of our compact gravimeter at 8.10^{-8} m/s². We show that it is possible to reduce considerably this inaccuracy with a better control of experimental parameters or with particular interferometer configurations.

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