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Single and double reflection Michelson atom interferometers in a weakly-confining magnetic trap RUDRA KAFLE, JAMES STICKNEY, WPI, DANA ANDERSON, JILA, University of Colorado and NIST, ALEX ZOZULYA, WPI — We analyze the operation of a BEC based atom interferometer, where the atoms are held in a weakly-confining magnetic trap and manipulated with diffraction gratings produced by counter-propagating laser beams. A simple analytic model is developed to describe the dynamics of the interferometer. It is used to find the region of parameters corresponding to high values of the interference fringe contrast for both single and double reflection geometries. We demonstrate that for a double reflection interferometer the coherence time can be increased by shifting the recombination time. Finally, we compare the theory with recent experimental realizations of these interferometers and estimate when phase diffusion and finite temperature phase fluctuations become important.

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