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Analysis of the coherence time of a Bose-Einstein-condensate interferometer with optical control of dynamics JAMES STICKNEY, WPI, DANA Z. ANDERSON, JILA, University of Colorado and NIST, ALEX ZOZULYA, WPI — Atom interferometers using Bose-Einstein condensate that is confined in a waveguide and manipulated by optical pulses have been limited by their short coherence times. We present a theoretical model that offers a physically simple explanation for the loss of contrast and propose the method for increasing the fringe contrast by recombining the atoms at a different time. A simple, quantitatively accurate, analytical expression for the optimized recombination time is presented and used to place limits on the physical parameters for which the contrast may be recovered.

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