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Two dimensional analysis of an atom Michelson interferometer RUDRA KAFLE, ALEX ZOZULYA, Worcester Polytechnic Institute — A Bose-Einstein condensate (BEC)- based atom Michelson interferometer is a matter wave interferometer where the splitting of an atomic wave packet from a BEC, and the recombination of the split wave packets take place at the same location. This type of interferometer can be designed with a single reflection pulse, double reflection pulses, or no reflection pulses at all. In an interferometer with no reflection pulses, the atomic wave packets undergo a full cycle oscillation in a weakly confining harmonic magnetic trap before they are finally recombined. If the split condensates have transverse components of initial momenta caused by laser misalignments, etc., the motion of the condensates becomes two dimensional. We study the dynamics of the split condensates in a simple two dimensional model, and analyze the performance of an interferometer in an atom Michelson geometry.

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