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Population of atoms in the output of an atom Michelson interferometer EBUBECHUKWU ILO-OKEKE, ALEX ZOZULYA, Worcester Polytechnic Institute — A cloud of Bose-Einstein condensate (BEC) sitting at the center of a weakly confining trap in an atom Michelson interferometer is split into two clouds that travel along different paths. The two clouds evolve and accumulate relative phase between them due to field of interest, confining potential and interatomic interactions. At the end of the interferometric cycle, the two clouds are recombined and the population of atoms found in the cloud at rest and the moving clouds depends on the relative phase. We derive an expression for the probability of counting any number of atoms within each cloud after recombination, study the dependence of the probability on the relative phase and relate our findings with experiments.

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