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Metastable states and macroscopic quantum tunneling in a cold atom Josephson ring DMITRY SOLENOV, DMITRY MOZYRSKY, Theoretical Division (T-4), Los Alamos National — We study macroscopic properties of a system of weakly interacting neutral bosons confined in a ring-shaped potential with a Josephson junction. We derive an effective low energy action for this system and evaluate its properties. In particular we find that the system possesses a set of metastable current-carrying states and evaluate the rates of transitions between these states due to macroscopic quantum tunneling. Finally we discuss signatures of different metastable states in the time-of-flight images and argue that the effect is observable within currently available experimental technique.

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