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Dynamics of Bose-Einstein condensates in double wells MARKKU JÄÄSKELÄINEN, PIERRE MEYSTRE, OSC, University of Arizona — We study the dynamics of Bose-Einstein condensates in double- well potentials following a sudden change from close to the Mott insulator regime to the superfluid regime (for repulsive interactions) or from a superfluid to a superposition state (for attractive interactions). We study both the case of symmetric trapping potentials and the effects of an symmetry due to an external field. We visualize the dynamics of the system in phase space using a quasi-probability distribution that allows for an intuitive interpretation of the various types of ynamics. For repulsive two-body interactions the visibility of the interference fringes that result from the superposition of the two condensates following a stage of ballistic expansion exhibits a collapse of coherent oscillations onto a background value whose magnitude depends on the amount of squeezing of the initial state. Strong attractive interactions are found to stabilize the dynamics of the relative number dynamics in the two wells.

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