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Pulsating Instability of a Bose-Einstein Condensate in an Optical Lattice UTTAM SHRESTHA, JUHA JAVANAINEN, U. of Connecticut — We find numerically that in the limit of weak atom-atom interactions a Bose-Einstein condensate in an optical lattice prepared in an unstable steady state may develop a pulsating dynamical instability in which the atoms periodically or quasiperiodically collect into a pulse and then disperse back to the unstable initial state. We obtain the parameter regime for the pulsations using Bogoliubov type analysis. A qualitative explanation of the quasiperiodic behavior is given by drawing from an analogy with a double-well system. Simple arguments give both a qualitative and a quantitative description of the pulsations.

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