1060-35-50 **Jeremy Louis Marzuola*** (jm3058@columbia.edu), Department of Applied Mathematics, Columbia U, 200 S.W. Mudd Building, MC 4701, 500 W. 120th St., New York City, NY 10027, and **Michaeil I Weinstein**. *Long time dynamics near the symmetry breaking bifurcation for Nonlinear Schrödinger/Gross-Pitaevskii Equations.*

We consider a class nonlinear Schrödinger / Gross-Pitaevskii equations (NLS/GP) with a focusing (attractive) nonlinear potential and symmetric double well linear potential. NLS/GP plays a central role in the modeling of nonlinear optical and mean-field quantum many-body phenomena. It is known that there is a critical L^2 norm (optical power / particle number) at which there is a symmetry breaking bifurcation of the ground state. We study the rich dynamical behavior near the symmetry breaking point. The source of this behavior in the full Hamiltonian PDE is related to the dynamics of a finite-dimensional Hamiltonian reduction. We derive this reduction, analyze a part of its phase space and prove a *shadowing theorem* on the persistence of solutions, with oscillating mass-transport between wells, on very long, but finite, time scales within the full NLS/GP. The infinite time dynamics for NLS/GP are expected to depart, from the finite dimensional reduction, due to resonant coupling of discrete and continuum / radiation modes. (Received March 10, 2010)