

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Two-colour plasma oscillations in a low-barrier BEC Josephson junction L.J. LEBLANC, A.B. BARDON, J. MCKEEVER, University of Toronto, F. PIAZZA, A. SMERZI, Universita di Trento, J.H. THYWISSEN, University of Toronto — The number and phase difference between the two wells of a Bose-Einstein condensate (BEC) in a double-well potential are often described by a two-mode model, which is applicable in the high-barrier limit for weakly coupled wells. We study the dynamics of a ^{87}Rb BEC in a RF-dressed magnetic double well potential with a tunable barrier height, V_b . We prepare a number-imbalanced distribution and observe plasma-like oscillations of phase and number difference between the wells. When $\mu \lesssim V_b$, where μ is the chemical potential, we find a two-frequency characteristic in these oscillations, a behaviour not predicted by the two-mode model. We compare our observations to full 3D time-dependent GPE simulations and present a simple model explaining the origin of this new phenomenon. Our study of these dynamics is important for understanding splitting experiments, in which a barrier is raised to divide a condensate.

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Date submitted: 28 Nov 2009

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