1106-34-867 **Pietro-Luciano Buono*** (luciano.buono@uoit.ca), Faculty of Science, 2000 Simcoe Street North, Oshawa, Ontario L1H 7K4, Canada, **Daniel C. Offin**, Department of Mathematics and Statistics, Queen's University, Kingston, Ontario , Canada, **Mark Lewis**, Department of Mathematics and Statistics, Queen's University, Kingston, Ontario , Canada, and **Mitchell Kovacic**, Department of Mathematics, Simon Fraser University, Burnaby, BC , Canada. *Stability analysis and bifurcations of the Hip-Hop orbit and beyond.*

I will begin by discussing recent results obtained with M. Lewis, D. Offin (Queen's) and M. Kovacic (UOIT) about the Hip-Hop orbit of the Newtonian 2N-body problem. The Hip-Hop orbit (in reduced space) is a periodic solution with time-reversing and spatio-temporal symmetries and in fact, we have shown that it is a brake orbit. I will also present the analytical proof of linear instability of the Hip-Hop orbit using Maslov index methods. I will show numerical simulations of the Hip-Hop orbit as the energy is varied which exhibits a sequence of symmetry-breaking bifurcations and discuss avenues for classifying those bifurcations. I will then present an extension of the methods used for the Hip-Hop orbit to the problem of instability of periodic orbits with spatio-temporal reversing symmetries obtained via minimization methods in Hamiltonian systems. (Received September 08, 2014)