Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Neimark-Sacker bifurcation and evidence of chaos in a discrete dynamical model of walkers AMINUR RAHMAN, New Jersey Institute of Technology — Bouncing droplets on a vibrating fluid bath can exhibit wave-particle behavior, such as being propelled by the waves they generate. These droplets seem to walk across the bath, and thus are dubbed *walkers*. These walkers can exhibit exotic dynamical behavior which give strong indications of chaos, but many of the interesting dynamical properties have yet to be proven. In recent years discrete dynamical models have been derived and studied numerically. We prove the existence of a Neimark-Sacker bifurcation for a variety of eigenmode shapes of the waves from one such model. Then we reproduce numerical experiments and produce new numerical experiments and apply our theorem to the test functions used for that model in addition to new test functions. Further evidence of chaos is shown by numerically studying a global bifurcation.

Aminur Rahman
New Jersey Institute of Technology

Date submitted: 19 Jul 2015   Electronic form version 1.4