1035-70-50 **Mason Alexander Porter*** (mason@caltech.edu), 24-29 St Giles', Oxford, OX1 3LB, England.
Wave Propagation in Phononic Crystals.

A simple setup for the study of nonlinear wave propagation in solids is provided by one-dimensional (1D) nonlinear phononic crystals consisting of chains of interacting spherical particles that deform elastically when they collide. This system provides an ideal setting to study the interplay between nonlinearity and periodicity. In this talk, I will discuss the propagation of highly nonlinear solitary waves in phononic crystal dimers (periodic chains of two different types of beads) using experiments, numerical simulations, and theoretical analysis. My collaborators and I have found excellent agreement between experiments and numerics in a model with Hertzian interactions between adjacent beads, which in turn agrees very well with a theoretical analysis of the model in the long-wavelength regime that we derive for heterogeneous environments and general bead interactions. Our analysis encompasses previously-studied examples as special cases and also provides key insights on the influence of the dimer lattice on the properties (width and propagation speed) of wave solutions of the nonlinear partial differential equation governing the long-wavelength dynamics. (Received June 23, 2007)