Generating Localized Nonlinear Excitations in the Fermi-Pasta-Ulam-Tsingou chains. ALEXANDRA WESTLEY, SURAJIT SEN, University at Buffalo, Dept. of Physics — Here, we will discuss properties of energy trapping in the decorated Fermi-Pasta-Ulam-Tsingou (FPUT) mass-spring chains with quadratic and quartic coupling terms. It is well-known that the FPUT system admits highly localized nonlinear excitations (LNE) which are stable for long periods of time. We seek to generate these LNEs at will by creating regions in the chain of stiffer or softer springs, or by placing mass impurities throughout. We will show that NLEs tend to coalesce in regions of stiff springs from random perturbations throughout the system. These locations may serve as extremely powerful energy traps or heat sinks in certain materials. Furthermore, we will demonstrate that this process occurs by means of trapping solitary (or anti-solitary) waves into tight spaces.

Alexandra Westley
University at Buffalo, Dept. of Physics