Abstract Submitted
for the OSS16 Meeting of
The American Physical Society

**Interplay of Equipartition and Energy Absorption in Anharmonic Chains with Heated Ends** CHRISTOPHER WATENPOOL, DONALD PRIOUR, Youngstown State University — Whereas vibrational modes in the case of a purely harmonic chain do not interact, thereby preventing equilibration, in principle equipartition becomes feasible if one includes anharmonic terms in the potential. In this vein, we use $V(x) = \alpha x^2 + \beta x^4$. Nevertheless in the case of isolated chains, and in spite of the anharmonicity, the Fermi Pasta Ulam (FPU) phenomena hinders progress toward equipartition at lower temperatures where only long wavelength modes are initially excited. Generically, for large chains, the dominant scaling is $\tau_{\rm eq} = AN^{\eta}$ with $\eta$ being a scaling exponent. Using the Langevin thermostat prescription applied locally to both ends of the chain, we determine the extent to which allowing energy exchange with a large heat reservoir alters equilibration; while preliminary efforts indicate a modification of the prefactor $A$, we seek to determine if there are temperature regimes where $\eta$ is altered relative to the case of the isolated chain. Having recently observed a temporary but long lived absorption of energy by the system with a concomitant elevation of the chain temperature, we discuss the extent to which the anomalous temperature increase is linked to FPU related effects.

Christopher Watenpool
Youngstown State University

Date submitted: 17 Mar 2016 Electronic form version 1.4