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Particle Hopping within an Extended Vertical Chain in a Complex Plasma MUDI CHEN, JIE KONG, KE QIAO, JORGE CARMONA-REYES, BRANDON HARRIS, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — Research into the micro-excitations of dust in vertical chain bundles has recently increased due to interest in the generic micro-behaviors of other 2+1 D liquids sharing similar characteristics. This is particularly true for systems providing external field alignment (for example, due to the ion wakefield) of the chain bundle. Most such chain motion is created due to (a) strong vertical interparticle coupling creating particle alignment within the chain, (b) topological constraints arising from the structure of the confinement which can "cage" the motion of the particle, and (c) thermal perturbations and/or local strain-induced stresses which can induce particle hopping and overall chain motion. This paper will discuss the third of these, i.e., the manner in which thermal perturbations and/or local strain-induced stresses can induce particle hopping and overall chain motion. Using a glass box placed on the lower powered electrode of a GEC rf reference cell to provide strong horizontal confinement, a vertical dust chain will be perturbed employing a diode pumped solid state laser (Coherent VERDI). The resulting particle hopping and overall chain motion will be examined theoretically and the manner in which the vertical interparticle force and the overall confinement impacts the underlying physics will be discussed.

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