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Layer Splitting in a Complex Plasma BERNARD SMITH, TRUELL HYDE, LORIN MATTHEWS, MEGAN JOHNSON, MIKE COOK, CASPER - Baylor University, JIMMY SCHMOKE, CASPER-Baylor University — Dust particle clouds are found in most plasma processing environments and many astrophysical environments. Dust particles suspended within such plasmas often acquire an electric charge from collisions with free electrons in the plasma. Depending upon the ratio of interparticle potential energy to average kinetic energy, charged dust particles can form a gaseous, liquid or crystalline structure with short to longer range ordering. An interesting facet of complex plasma behavior is that particle layers appear to split as the DC bias is increased. This splitting of layers points to a phase transition differing from the normal phase transitions found in two-dimensional solids. In 1993, Dubin noted that as the charged particle density of an initially two-dimensional Coulomb crystal increases the system's layers split at specific charge densities. This work modeled ions in a Paul or Penning trap, but may be applicable to dusty plasma systems as well. This work will discuss this possibility along with splitting observed in the CASPER GEC rf Reference Cell at specific pressures and powers.

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