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**Dov N Chelst\*** (dchelst@nj.devry.edu), 630 U.S. Highway One, North Brunswick, NJ 08902-3362. *Statistical Mechanics and Lattice Paths: "Order Decreasing Mappings", Electric Fields, and a Van der Waals Two-Component Plasma.*

The author recently extended the work of J.L. Lebowitz and O. Penrose (1966), providing a rigorous derivation for a one-dimensional charged system that exhibits a liquid-vapor phase transition. The original work of Lebowitz and Penrose derived a similar equation for systems with only short-range interactions along with the long-range van der Waals attraction. Charged systems did not fit within their model. In order to extend their work, one must alter their proof and provide an essentially new ingredient. This new theorem involves a mapping between different sets of lattice paths. In his talk, the speaker will discuss the connection between lattice paths, the one-dimensional electric field and his application to a statistical mechanical problem. In addition, he hopes to indicate how additional information regarding lattice paths might extend his original argument to include other systems of interest. In particular, he has begun to examine two-component models that consist of ions with opposing charges of differing magnitudes. (Received October 04, 2000)