

Abstract Submitted
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Gravity Crystals ALEXANDER BATALLER, North Carolina State University — In the limit of very strong interparticle coupling, plasmas become spatially-correlated and can form long-range order known phenomenologically as Wigner crystallization. In principle, this phenomenon can exist at any energy scale ranging from the dense interiors of white dwarf stars to the coldest man-made objects in laser-cooled ion traps. Although several laboratory examples of Wigner crystallization exist, all efforts have been confined to the microscopic regime and require expensive cutting-edge technology for its study. This talk will present an experimental method for studying Wigner crystallization at macroscopic lengthscales by employing a gravity well as the confining potential. Plasma properties were measured throughout multiple phases of strongly coupled plasma, which included a first-order phase transition to a crystalline state. These “gravity crystals” expand the range of Wigner crystallization by a factor of a million and does so using a versatile and broadly accessible platform.

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