



Cooperative particle motion in complex (dusty) plasmas

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Strongly coupled complex (dusty) plasmas give us a unique opportunity to go beyond the limits of continuous media and study various generic processes occurring in liquids or solids at the kinetic level. A particularly interesting and challenging topic is to study dynamic cooperativity at local and intermediate scales. As an important element of self-organization, cooperative particle motion is present in many physical, astrophysical and biological systems. As a rule, cooperative dynamics, bringing to life 'abnormal' effects like enhanced diffusion, self-dragging, or self-propelling of particles, hold aspects of 'strange' kinetics. The synergy effects are also important. Such kind of cooperative behavior was evidenced for string-like formations of colloidal rods, dynamics of mono- and di-vacancies in 2d colloidal crystals. Externally manipulated 'dust molecules' and self-assembled strings in driven 3d particle clusters were other noticeable examples. There is a certain advantage to experiment with complex plasmas merely because these systems are easy to manipulate in a controllable way. We report on the first direct observation of microparticle cooperative movements occurring under natural conditions in a 2d complex plasma.