

Abstract Submitted
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Validity of Moments of the Dynamic Structure Factor in a Dusty Plasma¹ VITALIY ZHURAVLYOV, JOHN GOREE, Univ of Iowa — The dynamic structure factor, $S(k, \omega)$, can be used in scattering diagnostics of tokamak and ionospheric plasmas to measure plasma parameters and in theory of strongly coupled plasmas. The dynamic structure factor reveals time and length scales for two types of motion: wave-like and random thermal. Theoretical models that describe $S(k, \omega)$ depend on the so-called frequency moments. We plan to address the validity of these moments for an experiment and a simulation.* The physics of strongly coupled plasmas can be studied experimentally using a dusty plasma. An advantage of dusty plasmas is that the motion of polymer microspheres can be analyzed using video microscopy. An experiment is planned, with a 2D monolayer of microspheres levitated in an RF plasma, to measure $S(k, \omega)$. We use laser heating to maintain the monolayer at a constant temperature, under liquid-like conditions with no shear flow. The motion of microspheres is recorded by a scientific video camera. Image analysis yields the particle positions, which are the inputs for calculating $S(k, \omega)$. For comparison to this experiment, we are also performing a 2D molecular dynamics simulation.

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Vitaliy Zhuravlyov
Univ of Iowa

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