

Abstract Submitted  
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**A Self-Consistent Description of Dust Interactions in Space and Nano-structured Plasmas** STEVEN BEKHOR, Michigan Plasma Physics Research Institute — The effect of nano/micro-structures and dust voids on the dispersion relations and the overall dynamics of plasma waves has numerous applications in the study of laboratory and space plasmas such as planetary rings and lunar and asteroidal dust. In particular, elastic Coulomb collisions with dust particles and charging interactions affect the overall particle balance of the plasma species and must be investigated self-consistently. Furthermore, in the low-frequency limit, a comprehensive theory must account for the dynamics of both electrons as well as ions, especially in strongly collisional regimes where the use of the full Braginski equations is warranted. In the current treatment, the fluid equations are developed to address a large class of problems involving space plasmas and nanofabrication. It so happens that dust charging results in a new channel of power dissipation that may explain numerous phenomena in such complex self-organized thermodynamically open systems. Numerous examples are presented and the stage is set for future numerical efforts.

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