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Dust acoustic instability in a strongly coupled dusty plasma M. ROSENBERG, University of California, San Diego, G.J. KALMAN, Boston College, P. HARTMANN, Wigner Research Centre for Physics, Budapest, Hungary, J. GOREE, The University of Iowa — Dusty plasmas are plasmas containing charged micron to sub-micron size dust grains (solid particulates). Because the grains can be multiply charged and are much more massive than the ions, the presence of dust can lead to novel waves such as the dust acoustic wave, which is a compressional wave that can be excited by a flow of ions that is driven by an electric field. Moreover, the large dust charge can result in strong Coulomb coupling between the dust grains, where the electrostatic energy between neighboring grains is larger than their thermal (kinetic) energy. When the coupling between dust grains is strong, but not large enough for crystallization, the dust is in the strongly coupled liquid phase. This poster theoretically investigates the dust acoustic instability, which is driven by sub-thermal ion flow, in a three-dimensional dusty plasma in the strongly coupled liquid phase. It is found that strong coupling enhances the instability. The application is to microgravity experiments with dusty plasma planned for the PK-4 and PlasmaLab instruments, which are in development for the International Space Station. Microgravity conditions enable the preparation of dust clouds under these sub-thermal ion flow conditions by avoiding the need for strong electric fields to levitate the dust grains

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