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Preliminary measurement of ion heating in a weakly-coupled complex (dusty) plasma JEREMIAH WILLIAMS, Wittenberg University, EDWARD THOMAS, LYDIA MARCUS, Auburn University — In previous [J. Williams, et al., Phys. Plasmas, 14, 063702 (2007)] and ongoing [Thomas, et al. and Merlino, et al. (this session)] experimental studies, it has been observed that the kinetic temperature of the microparticle component of a weakly-coupled complex (dusty) plasma, CDP, is significantly larger than the other plasma components (electrons, ions and background neutrals), a result that is consistent with previous measurements of the kinetic temperature for a plasma crystal in a fluid-like state. While there are no direct theoretical predictions to explain the mechanism responsible for heating the microparticle component to the observed temperatures in a weakly-coupled CDP, there have been a number of mechanisms proposed to explain the observations involving the plasma crystal. Among the most promising of these mechanisms is an instability triggered by ions streaming past the dust particles. In this presentation, we present preliminary experimental results examining the possible role played by the ions in heating the microparticle component of a weakly-coupled CDP. This work is supported by NSF Grant PHY-0354938.

Jeremiah Williams
Wittenberg University

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