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**Observation of melting in a heated, two-dimensional complex plasma**[1] T.E. SHERIDAN, Department of Physics & Astronomy, Ohio Northern University — The melting transition in a two-dimensional complex plasma has been studied experimentally. The complex plasma is heated by amplitude modulating the rf discharge power with a square wave at the vertical resonance frequency. The vertical motion couples to an in-plane dust-acoustic instability at one-half the driving frequency, thereby increasing the average in-plane kinetic energy (i.e., the effective "temperature") of the system. The "thermodynamic" phase of a complex plasma consisting of $\approx 3900$ $9 - \mu$m diameter particles has been characterized for increasing levels of amplitude modulation at constant neutral pressure (35 mtorr Ar) and constant average rf power using the bond-orientational correlation function, defect densities, the Lindemann ratio and the pair correlation function. A melting transition showing clear evidence for hexatic and liquid phases is observed.

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