

Abstract Submitted  
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**Structure of a shock front in a complex (dusty) plasma** DMITRY SAMSONOV, SERGEI ZHDANOV, GREGOR MORFILL — Shock waves with a Mach number  $M=3.4$  were studied experimentally in a two dimensional complex (dusty) plasma. The structure of the shock was resolved at a kinetic level, i.e. motion of every particle was traced and macroscopic parameters such as dust number density, kinetic temperature and particle flow velocity were determined. We obtained a complex plasma by immersing  $8.9 \mu\text{m}$  sized monodisperse microspheres into a capacitively coupled radio-frequency discharge. The grains formed a monolayer hexagonal lattice levitated in the plasma sheath above the disk electrode. They were illuminated with a laser sheet and imaged with a digital video camera at 1000 frames/s. An excitation pulse was applied to the wire placed below the lattice plane. The disturbance propagated into the lattice apparently melting it. The particles were identified in each frame and tracked from one frame to the next to determine their positions and velocities. Using this data we attempt to reconstruct the equation of state of a Yukawa system at the phase transition. A molecular dynamics simulation reproduced the experimental results.

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