Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Oblique dust density waves[1] ALEXANDER PIEL, OLIVER ARP, KRISTOFFER MENZEL, MARKUS KLINDWORTH, Christian-Albrechts-Universitaet Kiel — We report on experimental observations of dust density waves in a complex (dusty) plasma under microgravity. The plasma is produced in a radio-frequency parallel-plate discharge (argon, $p = 15$Pa, $U = 65\mathrm{V}_{pp}$). Different sizes of dust particles were used (3.4 μm and 6.4μm diameter). The low-frequency ($f \approx 11$Hz) dust density waves are naturally unstable modes, which are driven by the ion flow in the plasma. Surprisingly, the wave propagation direction is aligned with the ion flow direction in the bulk plasma but becomes oblique at the boundary of the dust cloud with an inclination of $\approx 60^\circ$ with respect to the plasma boundary. The experimental results are compared with a kinetic model in the electrostatic approximation [1] and a fluid model [2]. Moreover, the role of dust surface waves is discussed.

[1] M. Rosenberg, J. Vac. Sci. Technol. A 14, 631 (1996)
[2] A. Piel et al, Phys. Rev. Lett. 97, 205009 (2006)

[1]Supported by DLR grant 50WM0339 and DFG grant TR-24 A2.

Alexander Piel
Christian-Albrechts-Universitaet Kiel

Date submitted: 22 Jul 2007 Electronic form version 1.4