Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Dust confinement and dust acoustic waves in a magnetized plasma[1] A. PIEL, T. TROTTENBERG, D. BLOCK, Christian-Albrechts-University, D-24098 Kiel, Germany — Systematic laboratory experiments on dust acoustic waves require the confinement of dust particles. Here we report on new experiments in a magnetized plasma region in front of an additional positively biased disk electrode in a background plasma which is generated in argon at 27MHz between a disk and grid electrode. The plasma diffuses through the grid along the magnetic field. The three-dimensional dust distribution is measured with a horizontal sheet of laser light and a CCD camera, which are mounted on a vertical translation stage. Depending on magnetic field and discharge current, cigar or donut-shaped dust clouds are generated, which tend to rotate about the magnetic field direction. Measurements with emissive probes show that the axial confinement of dust particles with diameters between 0.7-2 μm is achieved by a balance of ion-drag force and electric field force. Dust levitation and radial confinement is due to a strong radial electric field. Dust acoustic waves are destabilized by the ion flow or can be stimulated by a periodic bias on the disk electrode. The observed wave dispersion is compared with fluid and kinetic models of the dust acoustic wave.

[1]Supported by DFG-TR24/A2

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Date submitted: 21 Jul 2005 Electronic form version 1.4