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**Experiments on Structural Properties of Yukawa balls** OLIVER ARP, DIETMAR BLOCK, ALEXANDER PIEL, IEAP, University Kiel, Olshausenstr. 40-60, 24098 Kiel, Germany, ANDRE MELZER, Institut for Physics, University Greifswald, 17487 Greifswald, Germany — Recently, it was shown that it is possible to confine spherical dust clouds in a plasma [1,2]. It was found that these dust clouds have a crystalline structure which differs notably from the well known fcc, bcc and hcp order in extended crystalline systems. These objects are called 'Yukawa Balls' because of the screened Coulomb interaction between the particles. The experiments show that the particles arrange in nested shells with hcp order on individual shells. This seems to be a unique feature of few-particle systems with strong coupling as it is also reported for trapped laser-cooled ions [3]. Interestingly, the structure in the center of ions clouds changes to bulk order as the ion number and hence the cloud size grows. Here, we present results from experiments on small and large Yukawa balls to discuss whether this can be observed for Yukawa balls as well. Additionally, first experiments are reported which investigate structural changes due to a elliptical deformation of the dust cloud.

[1] O. Arp *et al.*, Phys. Rev. Lett. **93**, 165004 (2004).

[2] O. Arp *et al.*, Phys. of Plasmas 12, 122102 (2005).

[3] D.H.E. Dubin and T.M. O'Neill, Rev. Mod. Phys. 71, 87 (1999).

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