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New Large Diameter RF Complex Plasma Device JOHN MEYER, VOLODYMYR NOSENKO, HUBERTUS THOMAS, German Aerospace Center — The Complex Plasma Research Group at the German Aerospace Center (DLR) in Oberpfaffenhofen has built a new large diameter rf plasma setup for dusty plasma experiments. The vacuum chamber is a stainless steel cylinder 0.90 m in diameter and 0.34 m in height with ports for viewing and measurement. A 0.85 m diameter plate in about the center serves as a powered electrode (13.56 MHz) with the chamber walls as the ground. It is pumped on by one of two Oerlikon turbo pumps with a pumping rate of 1100 l/s or 270 l/s. Argon gas is admitted into the chamber by an MKS mass flow meter and pumping is regulated by a butterfly valve to set pressure for experiments. A manual dropper is used to insert dust into the plasma. The dust is illuminated horizontally by a 660 nm 100 mW laser sheet and viewed from above by a Photron FASTCAM 1024 PCI camera. A vertical laser sheet of 635 nm will be used for side imaging. So far, single-layer plasma crystals of up to 15000 particles have been suspended. The particle velocity fluctuation spectra were measured and from these, the particle charge and screening length were calculated. Future experiments will explore the system-size dependence of the plasma crystal properties.

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