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Neutral Wind Effects on 3D-Clusters in RF Plasmas at Low Pressure FRANKO GREINER, JAN CARSTENSEN, LU-JING HOU, ALEXANDER PIEL, IEAP CAU Kiel, Germany, SFB-TR24 A2 TEAM — For the investigation of 2D dust clusters in RF plate reactors the neutral gas pressure is typically around 10Pa. In this regime, the flow is Knudsen like, i.e. the flow regime is between the hydrodynamical and the molecular dynamical flow regime. In this regime, a rotating electrode disk can be used to introduce a shear flow rotation of the neutral gas column. Using 2D dust clusters as high precision velocity detectors we found, that the flow can be described by hydrodynamic equations with no-slip boundary conditions.The fact that viscous neutral gas flows are possible even at low pressure can explain the observation,that the rotation of 2D dust clusters in a magnetic field parallel to the electric field of the plasma boundary, show rotation frequencies which are much higher then predicted. The "standard model" for rotation of dust in a magnetic field by pure ion wind force is based on the assumption, that neutral gas flows are not possible [POP 16, 013702, 2009]. In addition the rotating electrode can be used as a new technique to introduce torque to the dust grains without any drawback of the plasma. This torque can be used to modify horizontal confinement of the dust clusters. In this way the effective screening length in the plasma boundary can be measured without any prior knowledge of the plasma parameters.

Franko Greiner
IEAP CAU Kiel, Germany

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