**Diagnostics of a Laboratory Platform for studying Electron Beam Driven Turbulence in Dusty Plasma**

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The diagnostics of a novel laboratory platform [1] dedicated to study turbulence in plasma crystals, induced by an electron beam of 8 to 15 keV is presented [2]. High-speed imaging [4] is used for visualizing the plasma crystal made of dielectric microparticles levitated in plasma. A Faraday cup is used to determine the electron beam current while the beam profile is seen on Ph screens. The image sequences acquired by a fast CCD, while illuminating the microparticles with a 20 mW laser diode, are further processed through Particle Image Velocimetry technique to obtain the velocity field of the microparticles. The platform, seen in figure 1, consists of three units connected in-line and vacuumed at different pressure levels. A hollow- anode plasma source is used to produce the free electrons [5]. The second unit is the electron extraction and focusing made by electromagnetic circular coils at pressures below 10-4 Torr and the third unit is an RF-driven dusty plasma in plane-parallel electrodes geometry where the plasma crystals are obtained at 10-1 Torr . The pulsed electron beam with a profile of a few millimeters is aimed at the plasma crystal that is made of dielectric microparticles levitated in the RF plasma chamber thus setting the microparticles in chaotic motion and creating turbulent flows in the plasma crystal.

[1] D.Ticos, E. Constantin, ML. Mitu, A. Scurtu, CM. Ticos, A laboratory platform for studying rotational dust flows in a plasma crystal irradiated by a 10 keV electron beam, Scientific Reports 13:940 (2023)

[2] C. Ticoş ,D.Ticos,JD Williams, Pushing microscopic matter in plasma with an electron beam, Plasma Physics and Controled Fusion62/2 (2019)

[3] C. Ticoş, D. Toader, M. Munteanu, N. Banu, A. Scurtu (2013), High-speed imaging of dust particles in plasma. Journal of Plasma Physics,79(3), 273-285. doi:10.1017/S0022377812000967