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Experimental characterization of dual-frequency capacitively coupled plasmas YONG-XIN LIU, Dalian University of Technology, XIAO-SONG LI, WEN-QI LU, YONG-NIAN WANG — Dual-frequency (DF) capacitively coupled plasma (CCP) is of great interest in various industry applications due to its capability of controlling the ion flux and ion energy to the electrode surface independently. A GEC-like reactor was built in the Plasma Simulations and Experiments Group recently, to character the effects of controllable parameters on the plasma properties in DF-CCP. The driving frequency is 60 MHz and 0.8-3 MHz, respectively, the electrode spacing is adjustable within 1-6 cm and a four-way gas feed allows gas mixtures of Ar, O2, CF4 and N2. We have adopted a newly developed complete floating double probe, an optical emission spectrometer and quadruple mass spectrometer to character the DF-CCP. We have performed spatially resolved measurements of the ion density, the electron temperature and the light emission in DF-CCP discharges, and investigated the influence of discharge parameters in various working gases on the ion energy distributions. In particular, our recent measurements confirmed for the first time the existence of the so-called collisionless electron bounce-resonance heating.

Yong-Xin Liu
Dalian University of Technology

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