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Plasma Self-organization in Moderately High Pressure Capacitively Coupled RF Discharge. ANTON KOBELEV, Applied Materials, Inc., Global Development Center, Russia, KALLOL BERA, JOHN FORSTER, Applied Materials, Inc., ALEXANDER SMIRNOV, Applied Materials, Inc., Global Development Center, Russia — Numerical simulation and experimental study of plasma self-organization in rf capacitively coupled discharge consisting of conductive plate with the rows of holes or slots between powered and return electrodes have been performed. It has been observed experimentally that there is a set of holes with increased luminosity in an almost periodic manner separated by darker holes in Ar discharge at 13.56 MHz at moderately high pressure (a few Torr). Two-dimensional Ar and He plasma simulations have been performed using electron kinetic model with non-local approach for multiple slots in the conductive plate. The result for Ar plasma shows that an initial perturbation of plasma density inside one slot increases, if initial perturbation is two times higher than that inside the rest of slots. The electron current enhances in this one slot that affects neighboring slots. Increase in electron current increases power deposition, and enhances plasma density further in this slot. If plasma density perturbation is increased in three neighboring slots, the perturbations inside all slots except one are damped. The slot with strong plasma density affects up to eight neighboring slots, which is close to periodicity observed experimentally. For He plasma, initial perturbation inside the slot dies down similar to experimental observation.

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