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Plasma activation caused by local rf power supply¹ F. SIGENEGER, R. BASNER, D. LOFFHAGEN, INP Greifswald, Germany, H. KERSTEN, IEAP, Christian-Albrechts-Universität, Kiel — The response of a capacitively coupled rf discharge in argon at 13.56 MHz to a local supply of additional rf power at the passive electrode was investigated experimentally and theoretically. The study has been performed at the reactor PULVA-INP which possesses a segmented passive electrode. Its central pixel was driven by an additional rf voltage with the same frequency and phase as the main power supply. The large enhancement of the local power density becomes obvious from the intensive light emission in front of this pixel. Furthermore, the pronounced change of the potential was demonstrated by the sensitive response of microparticles in the sheath. An axisymmetric fluid model of the plasma has been implemented to study the observed phenomenon theoretically. The model comprises particle balance equations of electrons and ions, Poisson's equation and the electron energy balance equation. The results of the model calculations demonstrate the structural change of the potential and the local increase of the electron density and power density in front of the central pixel. The strongly increased excitation rate corresponds to the observed enlargement of the light emission.

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