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Features of Electromagnetic Field Excitation in a Capacitive RF Discharge SERGEY DVININ, Moscow State University, OLEG SINKEVICH, National State University (MPEI), DAVLAT SOLIKHOV, ZAFARI KODIRZODA, Tajik National University — A low-pressure capacitive RF discharge ($\nu << \omega$) with large electrodes, excited by an electromagnetic field, is considered. Under these conditions, the discharge is supported by surface waves propagating along three-layered structure metal – sheath – plasma – sheath – metal [1] and evanescent waves. The features of field representation as series of surface and higher order evanescent waves in multilayer structures containing regions with positive and negative permittivities are discussed. It is shown that the resonances of a long line in such a discharge are significantly modified due to the excitation of evanescent modes (an example is the geometric resonance of the plasma and sheath [3]), and, at high frequencies, plasma and empty waveguide evanescent modes (surface waves) excited at the lateral plasma boundary. The features of the natural waves, connected with asymmetry of sheathes and the inhomogeneity of the plasma density distribution in the radial and axial directions are considered. The results of analytical calculations are compared with the numerical impedance and spatial field structure calculation using the Comsol Multiphysics. [1]M.A. Lieberman, J.P. Booth, P. Chabert et al. Plasma Sources Sci. technol., 2002, 11, 283. [2]P.Chabert. J. Phys. D: Appl. Phys., 2007, **40**, R63. [3]J. Taillet American Journal of Physics, 1969, 37, 423.

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