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Ionization Instabilities in Bounded and Infinite Microwave Plasma SERGEY DVININ, Moscow State University, OLEG SINKEVICH, National Research university (MPEI) — Ionization instability takes place in much kind of discharges. It can be initiated by kinetic [1] and electrodynamic [2] processes. The evolution of the instability from a local source for an infinite [3, 4], and bounded plasma sheet [2] when plasma is excited by a plane wave (at arbitrary incident angle) or by a surface wave is considered. It is shown that electrodynamic instability can take place in cases where at least two electrodynamic modes can propagate in the medium, and one of which can be excited in a resonant manner. In an unbounded medium, the instability will always convective, while in a bounded plasma, absolute instability is possible if the dimensions exceed an integer number of half-waves of the resonant mode. In the cylindrical geometry, perturbations with a violation of the azimuthal symmetry of the plasma are observed at higher electron densities due to a lower critical number value. Phenomenological models of the nonlinear stage of instabilities development are proposed. The possibility of observing of this type of instability in low-pressure plasma reactors is discussed. For a spatially limited system, the results of the calculations show good agreement with experiment. [1]B.S. Kerner**,** V.V. Osipov**.** Autosolinons. Springer-science+Business Media B.V. 1994, 671 p. **[2]**S. Dvinin et al. Sov. Phys.: Fizika Plazmy, 9, 1983, 1297. [3]D.L. Bobroff, H.A. Haus. J. Apple. phys., 1967, **38**, 1, p. 390. [4]A. Bers. Handbook of Plasma Physics vol. 1. Ed. A.A. Galeev and R.N. Sudan, North-Holland Publishing Company, 1983, 451–517.

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