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Numerical simulation of the spatial structure of the electromagnetic field of microwave discharge in a magnetic trap

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The paper presents the results of computer simulation of the structure of the electromagnetic field of a microwave discharge in a quartz bulb placed in a cylindrical resonator. The plasma is contained by a magnetic trap. The cold plasma approximation was used. The cylindrical resonator is excited through a narrow slot in the side wall. It is shown that in the discharge under study the traditional model of electron-cyclotron resonance in crossed fields is applicable at low electron densities. As the density increases, a wave that propagates from the excitation region in the azimuthal direction is formed. With a further increase in the electron density, the absorption coefficient of the wave decreases, and the angular distribution of the field represents a standing wave.

Keywords: ECR discharge, open magnetic trap, plasma simulation, cold plasma approximation, Comsol Multiphysics.

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