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Anomalous response of lossy plasmas immersed in metamaterial structure in the microwave range OSAMU SAKAI, TAKUYA SHIMOMURA, Kyoto University, KYOTO UNIVERSITY TEAM — Microwave response of a plasma metamaterial which is a periodic array composed of lossy microplasmas and magnetic micro resonators was investigated experimentally. We generated microplasmas whose real part of permittivity was negative with significantly large imaginary part, and in their vicinity magnetic resonators were installed which showed complex-value macroscopic permeability. When microwaves at several GHz were transmitted through this metamaterial, signals from the receiver in the cases of plasma generation decreased and sometimes *increased*, which depends on the discharge gas condition that leads to change of imaginary part of permittivity. In particular, enhanced transmission of microwaves when lossy plasmas were generated would be an anomalous response if metamaterial functions were not effective.

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