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Observation of plasma hole transition induced by microwave power modulation SHINJI YOSHIMURA, MASAYOSHI TANAKA, NIFS — Spontaneous formation of stationary vortex structure with density depletion, or *plasma hole*, has been observed in a cylindrical magnetized plasma. We have so far reported the flow velocity field, the vorticity distribution and the strong electric field resulting from the breaking of quasi-neutrality condition. The detailed transitional behavior of plasma hole formation is not entirely revealed yet. Here we report the results on microwave power modulation experiments to investigate the detailed change in density, plasma potential and flow velocity field of the plasma hole. Temporal evolutions of those quantities were measured by using a Langmuir probe, an emissive probe and a directional Langmuir probe. By increasing the microwave power to a certain threshold value, the density depletion characterizing the hole structure was formed along the central axis of the cylindrical plasma. The plasma potential started building up a bell-shaped distribution simultaneously, resulting in ExB rotation of the plasma. It should be emphasized that a definite inward-directed flow, which implies an anomalous viscosity of the plasma, was observed. A general relation between radial flow and viscosity is derived through the analysis of ion fluid equation, suggesting a possible means of determination of viscosity coefficient.

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