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Dynamic Control of Microwave Plasma Sources for Material Processing by Using Hyper-Simulation YASUYOSHI YASAKA, AKIHIRO TSUJI, Kobe University, Japan — Uniformity of etching or deposition over a wafer is one of the key features for plasma processing with large-size wafers. The uniformity can be measured as a result of a process, and correction or improvement of the uniformity is made by changing device parameters such as power levels, gas flow rates, timings, and so on. Evaluation and control are, however, not combined or unified as a problem of plasma physics. They are assigned as the input and output of a black box of empirical transfer function obtained by expert systems or neural networks. We are going to establish a novel control system based on physics, in which a fluid simulation is used to obtain a power deposition profile necessary to produce the two-dimensional density distribution of desire. A control system of a microwave slot antenna then changes power distribution dynamically according to the output of the simulation. It should be noted that this simulation has inputs and outputs opposite to conventional ones, which, we call hyper-simulation, is one of the novel features of the control system.

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