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**Comparison of different methods for the measurements and calculations of Capacitively Coupled Plasmas electrical characteristics** GIAN-NIS TSIGARAS, Plasma Technology Laboratory - Department of Chemical Engineering - University of Patras, NIKOLAOS SPILIOPOULOS, Department of Physics - University of Patras, ELEFThERIOS AMANATIDES, DIMITRIOS MATARAS, Plasma Technology Laboratory - Department of Chemical Engineering - University of Patras, PLASMA TECHNOLOGY LABORATORY - DEPARTMENT OF CHEMICAL ENGINEERING - UNIVERSITY OF PATRAS TEAM — Despite the steps forward in the plasma processing of materials, there are still open issues concerning the design of plasma systems and the effective control of plasma parameters. In this work, a comparison between different methods for the measurement and calculation of discharge electrical characteristics is presented. The measurements were accomplished in a laboratory scale cylindrical 13.56 MHz CCP reactor and three different methods were tested: (a) A two port network based technique (b) A distributed element model method and (c) A method based on the solution of the wave equation. The differences between the results of these techniques are discussed in terms of the assumptions that are adopted in each of them. Moreover, the effect of electrode geometry on plasma electrical and microscopic properties was investigated. Two different electrodes were used and changes on the power transfer, plasma current and impedance were monitored together with variations of spatiotemporal emission in 13.56 MHz Ar discharges. Finally, the calculated delivered power error as a function of small measured errors for each method is presented.

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