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On the influence of parasitic capacitances on the ion energy bombardment in a large-area multi-frequency CCP[1] STEFAN RIES, JULIAN SCHULZE, PETER AWAKOWICZ, AEPT, Ruhr University Bochum, AEPT TEAM — In this work, a large-area capacitively coupled multi-frequency plasma chamber (electrode diameter: 500 mm; gap: 35 mm) is used to investigate its capability for a better control of plasma processing in the industry. The basic idea is to use the electrical asymmetry effect (EAE) by varying the phase shift between the two lower frequencies (13.56 and 27.12 MHz) in order to control the ion energy onto the grounded substrate electrode without any effect on the high ion flux generated by 60 MHz. The ion flux and the ion energies onto the grounded substrate are measured with a retarding field analyzer. By measuring the voltage signal and using a 1D-model [1] to describe the EAE, a symmetry parameter much lower than 1 was found, which reveals a very geometrically asymmetric plasma condition. Hence the range of ion energy variation by changing the phase is much lower than it needs to be to generate remarkably changes in the film properties. Further investigations have exhibited a parasitic capacitive coupling between the powered electrode and the grounded shield that surrounds the powered electrode. In conclusion, advanced experiments to confine the plasma between both electrodes were conducted that lead to a broader ion energy variation. [1] E. Schüngel, et.al., Plasma Proc. Polym., 14, 1600117 (2017)

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