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**Time resolved measurement of charged particle distributions at electrodes in rf and pulsed plasma discharges** DAVID GAHAN, PAUL SCULLIN, BORIS DOLINAJ, DONAL O SULLIVAN, MIKE HOPKINS, Impedans Ltd — Retarding field energy analyzers (RFEAs) are commonly used to measure the ion energy distribution function (IEDF) in plasma reactors. When deployed on grounded surfaces the RFEA design can be relatively simple due to the absence of large voltages. At biased surfaces the RFEA design is more complex. Filtering techniques need to be implemented to ensure the RFEA floats at the substrate holder potential. In cases where the discharge and/or substrate holder are driven with a pulsed bias the time resolved IEDFs through the pulse cycle are desirable. Time resolved measurements at a pulsed bias surface are more complicated, mainly because of the need to incorporate low pass filters with high input impedance to allow the RFEA to float at the bias potential. Here, we present a summary of the time resolved measurement capabilities of a RFEA in pulsed plasmas. Time resolved energy distributions of charged species are measured at the grounded electrode in capacitively coupled plasmas. The time resolved IEDFs at a biased electrode are also measured. The RFEA body is allowed to float at the bias potential using low pass filters and a novel technique is implemented to allow time resolution of the IEDF during the bias period. Time resolution of 100ns, at frequencies up to 500 kHz is demonstrated.

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