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Characteristics of an energy selective mass spectrometer with a Bessel-Box type energy filter CHRISTIAN SCHULZE, Institute of Experimental and Applied Physics, Kiel University, Germany, ZOLTAN DONKO, Institute for Solid State Physics and Optics, Wigner Research Centre for Physics, Hungary, JAN BENEDIKT, Institute of Experimental and Applied Physics, Kiel University, Germany — Ions are responsible for the majority of plasma surface interactions. Due to its high scientific interest and widespread use in commercial applications, the precise measurement of ion energy distributions (IED) for specific ion species is essential for their understanding and control. In contrast to other ion diagnostics, energy selective mass spectrometry (ESMS) allows energy and mass selectivity under the drawback of suffering from distortions like chromatic aberration and energy dependent acceptance angles. Therefore, ESMS is typically used for qualitative measurements only. Here, results of ion trajectory simulations are presented that show the focusing behavior of the ion lens system and transmission characteristics of the Bessel-Box energy filter. A guideline to set ion lens voltages in order to minimize distortions is provided. Additionally, measured IEDs are compared with the angular and energy resolved ion flux provided by 1D-PIC simulations.

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