



HiPEP Ion Optics System Evaluation Using Gridlets

By John D. Williams

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 26 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. Experimental measurements are presented for sub-scale ion optics systems comprised of 7 and 19 aperture pairs with geometrical features that are similar to the HiPEP ion optics system. Effects of hole diameter and grid-to-grid spacing are presented as functions of applied voltage and beamlet current. Recommendations are made for the beamlet current range where the ion optics system can be safely operated without experiencing direct impingement of high energy ions on the accelerator grid surface. Measurements are also presented of the accelerator grid voltage where beam plasma electrons backstream through the ion optics system. Results of numerical simulations obtained with the ffx code are compared to both the impingement limit and backstreaming measurements. An emphasis is placed on identifying differences between measurements and simulation predictions to highlight areas where more research is needed. Relatively large effects are observed in simulations when the discharge chamber plasma properties and ion optics geometry are varied. Parameters investigated using simulations include the applied voltages, grid spacing, hole-to-hole spacing, doubles-to-singles ratio, plasma potential, and electron temperature; and estimates are provided for the sensitivity of impingement limits...



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