Abstract Submitted
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MEMS-based, RF-driven, compact accelerators[1] A. PERSAUD, P. A. SEIDL, Q. JI, I. BREINYN, W. L. WALDRON, T. SCHENKEL, Berkeley Lab, 1 Cyclotron Road, Berkeley, CA 94720, K. B. VINAYAKUMAR, D. NI, A. LAL, ECE, Cornell University, 120 Phillips Hall, Ithaca, NY 14853 — Shrinking existing accelerators in size can reduce their cost by orders of magnitude. Furthermore, by using radio frequency (RF) technology and accelerating ions in several stages, the applied voltages can be kept low paving the way to new ion beam applications. We make use of the concept of a Multiple Electrostatic Quadrupole Array Linear Accelerator (MEQALAC) and have previously shown the implementation of its basic components using printed circuit boards, thereby reducing the size of earlier MEQALACs by an order of magnitude. We now demonstrate the combined integration of these components to form a basic accelerator structure, including an initial beam-matching section. In this presentation, we will discuss the results from the integrated multi-beam ion accelerator and also ion acceleration using RF voltages generated on-board. Furthermore, we will show results from Micro-Electro-Mechanical Systems (MEMS) fabricated focusing wafers, which can shrink the dimension of the system to the sub-mm regime and lead to cheaper fabrication. Based on these proof-of-concept results we outline a scaling path to high beam power for applications in plasma heating in magnetized target fusion and in neutral beam injectors for future Tokamaks.

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