**2D limiting current of a finite-width electron pulse in a parallel-plate gap** WEE SHING KOH, Institute of High Performance Computing, Singapore, LAY-KEE ANG, School of EEE, Nanyang Technological University, Singapore, SHIH-HUNG CHEN, Department of Physics, National Central University, Taoyuan, Taiwan, LING-CHIEH TAI, Department of Physics, National Tsinghua University, Hsinchu, Taiwan, LIN WU, School of EEE, Nanyang Technological University, Singapore — The generation of pC-nC electron pulses is an important technique to produce a high-energy electron beam in applications, such as photoinjectors and laser wakefield accelerators. For an electron pulse with a large charge number, the space-charge effect is probably the main factor limiting the maximum charge number that can be packed in a pulse. The 1D space-charge-limited (SCL) current for a short pulse emitted from a planar cathode was first proposed in 2002 [1]. This 1D SCL model is later extended to the quantum, relativistic [2] and multi-dimensional (2D/3D) [3] regimes. In previous models [1-3], uniform electron beam is assumed, but in reality, the injected current of the short pulse is usually non-uniform. Therefore, we present the 2D non-uniform short-pulse model and compare the numerical results with the uniform injection model in Ref. [3]. [1] Á. Valfells, et.al., Phys. Plasmas 9, 2377 (2002). [2] L. K. Ang, et. al., Phys. Rev. Lett. 98, 164802 (2007). [3] W.S. Koh, et. al., Phys. Plasmas, 13, 063102 (2006).

Wee Shing Koh
Institute of High Performance Computing, Singapore