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Characterization of Field-Emission from Silicon Nano Cathodes

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Field emission cathodes are capable of providing electron beams with appealing brightness required for, e.g. the development of compact accelerator-based light sources to serve as injector for high-gradient accelerating structures (e.g. dielectric laser accelerators). A collaboration between Northern Illinois University and the Argonne Center for Nanoscale Materials, has recently developed field-emission cathodes consisting of arrays of nanocones. This paper discusses the recent results to test these cathodes using a DC gun. We will especially present the the measured I –V characteristic curves and transverse beam distributions of the emitted electron beams and compare our results with numerical simulations.

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