

DESIGN OF AN SRF GUN FOR POLARIZED ELECTRON BEAMS

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Abstract

The use of an RF electron gun with a magnetized cathode in place of a DC gun for ILC may reduce the requirements for emittance damping rings. Maintaining adequate lifetime of the necessary cathode material requires vacuum levels in the 10^{-11} torr range. While vacuum levels around the 10^{-9} torr range are common in a normal conducting RF gun, the cryogenic pumping of the cavity walls of a superconducting RF (SRF) gun may maintain vacuum in the range needed for GaAs cathode longevity. Advanced Energy Systems, Inc. is collaborating with Brookhaven National Laboratory to investigate the generation of polarized electron beams using a SRF photocathode gun. The team is developing an experiment to study the quantum lifetime of a GaAs cathode in a SRF cavity and investigate long term cavity performance while integrated with a cesiated GaAs cathode*. In addition to the experimental investigation, a design is being developed that is compatible with the production of high aspect ratio polarized electron beams. The mechanical and physics aspects of this design will be discussed.

* J. Kewisch, *et al.*, Presentation at PAC09.

**CONTRIBUTION NOT
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