

Field Emission Reduction from Large Area High Voltage

Electrodes:

Or

how to build a better gun

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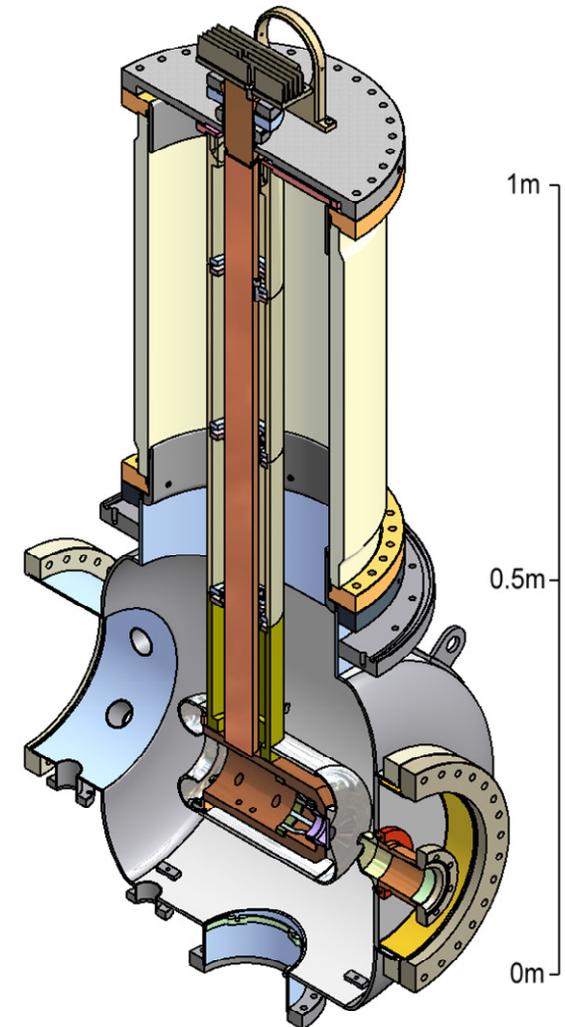


ERL DC Photoelectron Gun

Laser illuminates a NEA gallium-arsenide cathode to generate photoelectrons which are accelerated away from surface by a high DC field (15MV/m) established by 750KV power supply.

In order to achieve the stated goals of the ERL injector we need to be able to achieve 600-700KV in our DC photoelectron Gun, but to this point have been limited by field emission to 300-350KV.

Field emission eventually leads to punch through vacuum leaks in the ceramic. Difficulty and cost of replacing ceramics.



Your Project: Field Emission Reduction

1. New Gun Geometries: Poisson / Opera to gauge viability – reduced surface areas – less emitters
2. Field emission reduction / testing: Materials testing
 - electropolishing / HPR
 - Niobium sample
 - Coatings – dead end?

