

The Beams and Applications Seminar Series

Numerical Modeling of Field-Enhanced Photoemission from Metals and Coated Materials

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Naval Research Laboratory

Bldg. 401, rm A1100 (special location)

Tuesday, December 6, 1:30 pm

Host: J. Lewellen, ASD

In this talk, we shall provide an introduction to the theory of electron emission (both field and thermal, but in particular photo) to describe the various technologies. Of particular interest is the photoemission process, as photocathodes are critical components of Free Electron Lasers, where the quality and characteristics of the electron beam are of paramount importance. Laser-induced photoemission, especially from high intensity lasers under high fields, is complicated by all of the emission processes we shall discuss, but also is affected by laser heating and electron transport in bulk materials. To increase Quantum Efficiency (ratio of electrons out to photons in), often use is made of low work function coatings (alkali metals) that makes conditions at the surface quite important. The models we have developed are designed to account for conditions at the surface, the mechanisms that affect electron transport through the bulk material, and complications due to the surface barrier. The goal is to predict current distribution and quantum efficiency depending on material and laser characteristics. The predictions of the photoemission model in terms of emitted current and quantum efficiency are compared to our experimental QE measurements of and to findings in the literature.

For more information visit

<http://www.aps.anl.gov/asd/physics/seminar.html>

Visitors from off-site please contact Chun-xi Wang
(wangcx@aps.anl.gov, 630-252-4968) to arrange for a gate pass.

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