

Photocathode Physics for Photoinjectors 2018



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Many recent efforts to improve the intrinsic emittance of photocathodes have centered on lowering the excess energy of the emitted electrons by using photon energies at or below threshold. However, this comes at the significant expense of quantum efficiency. Thus, for short pulse applications, nonlinear photoemission is a concern, due to the commensurate increase in excess energy in higher order photon processes. Alkali antimonides are an interesting choice to lessen nonlinear effects due to their intrinsically high quantum efficiency. However, they have remained untested under sub-picosecond laser pulses. In this talk, I will present measurements of the non-linearity of photoemission as a function of photon energy from a sodium potassium antimonide photocathode using a ~ 200 fs laser pulse. These measurements could shine some light on the optimal photon energies to use for minimum intrinsic emittance for ultra-fast electron beams.

Presenter: Mr LI, William (Cornell University)

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