

Experiments with CsBr Coatings on Metals

J.R. Maldonado (SLAC) et al.

EuroFEL Cathode Workshop

Lecce, Italy

March 2011

CsBr/Metal*

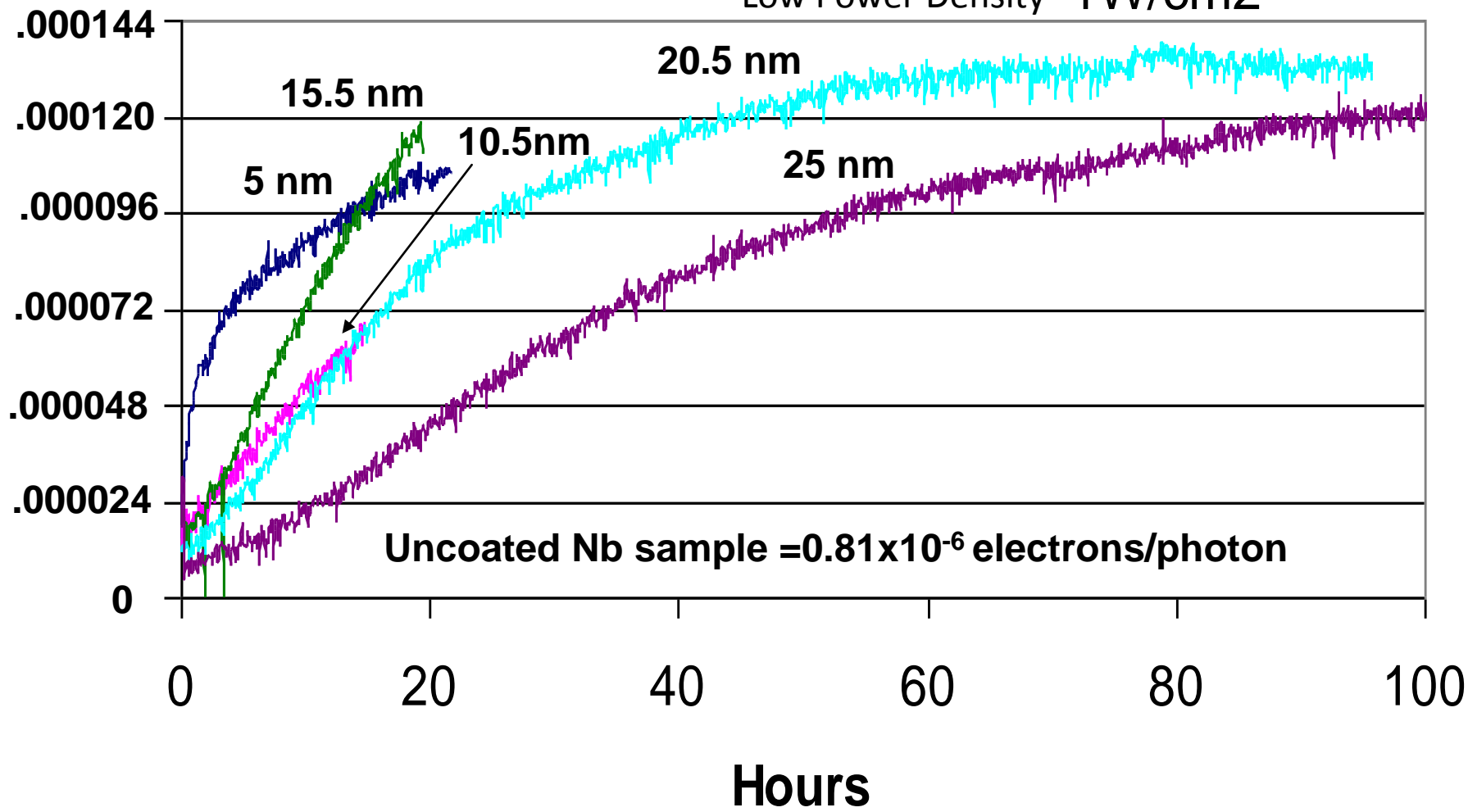
- Demonstrated Great Improvements of QE on Cr, Mg, Cu, Au, Al, Nb with long lifetime.
- CsBr based photocathodes are very robust supporting momentary exposure to air (re-activation in vacuum can be performed with a table top 257nm laser).

* J. Maldonado et al., JAP **107**,013106(2010)
J. Maldonadao et al., PRST-AB **11**,060702(2008)

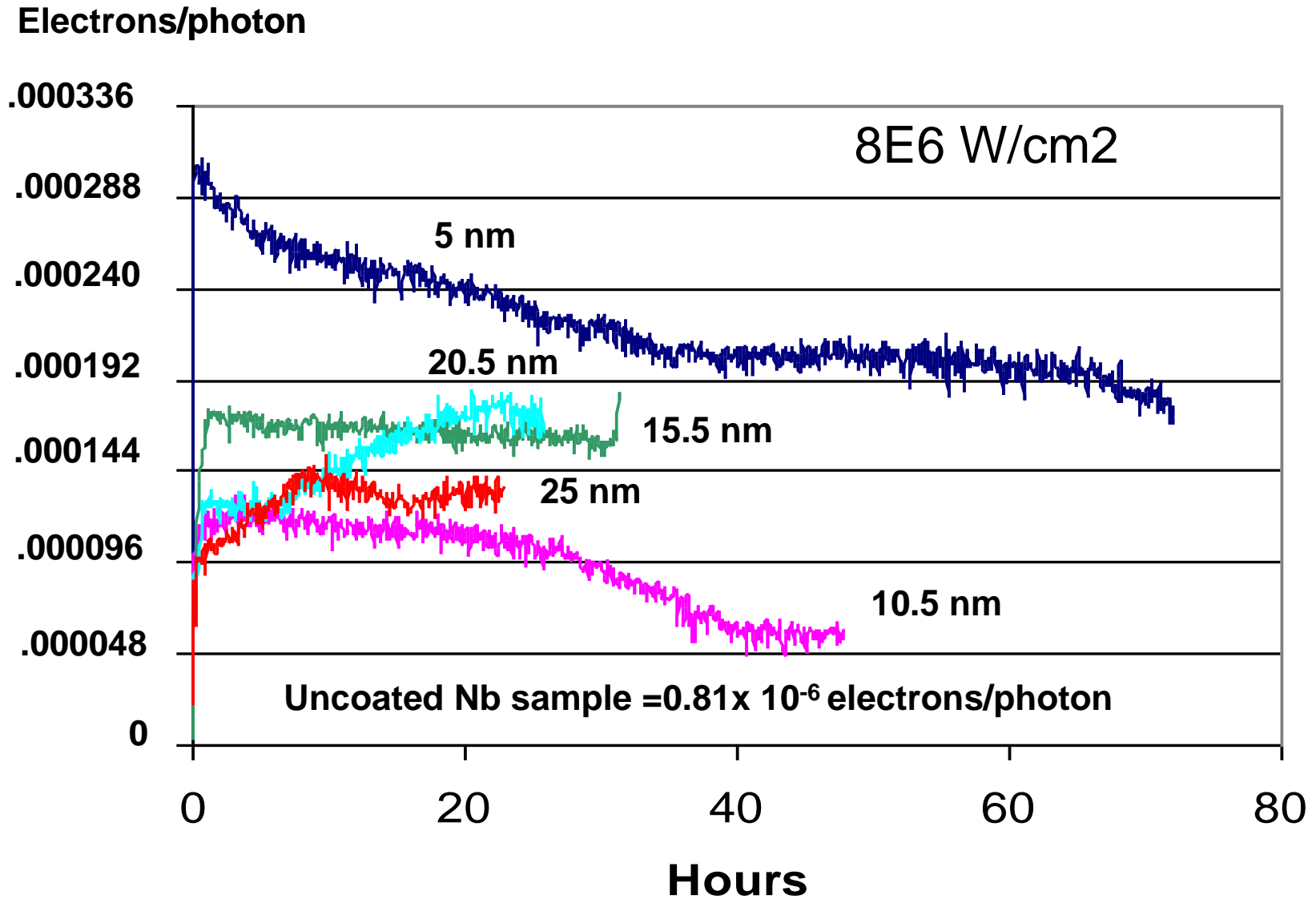
Thickness dependence of QE in Nb

Electrons/photon

Low Power Density 1W/cm²

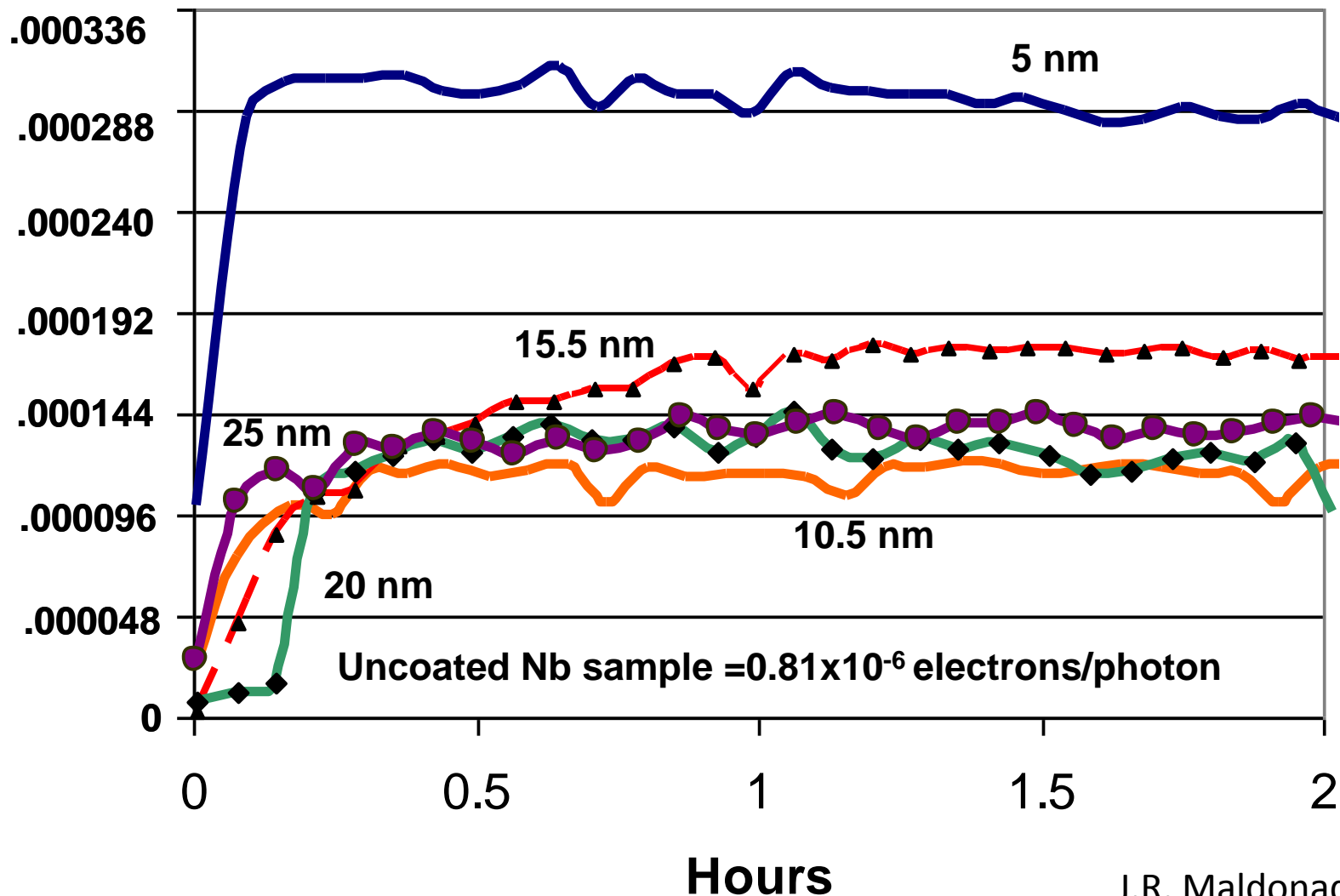


Behavior of Nb at high Power density

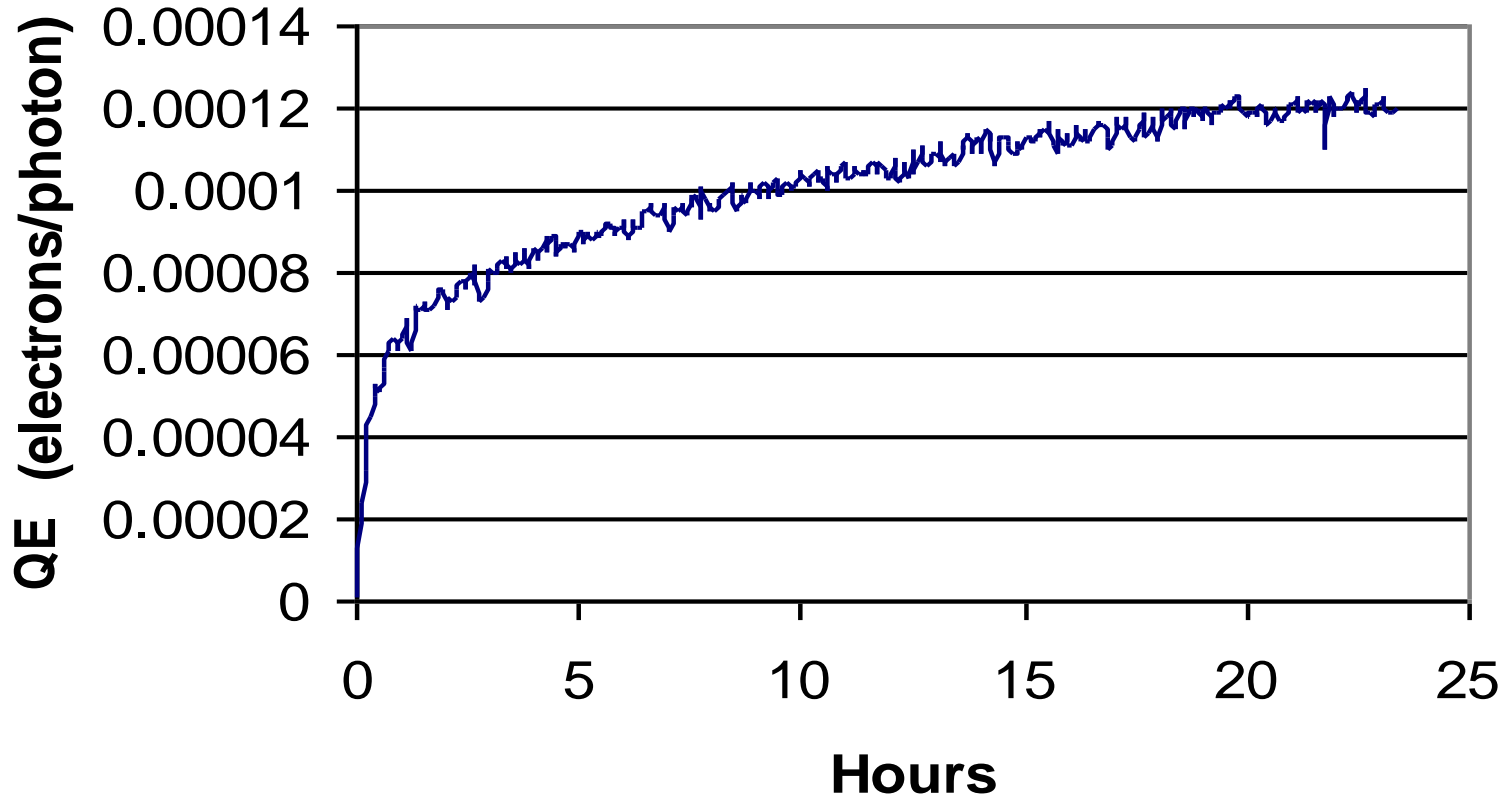


Activation Time of a few minutes at High Power Density

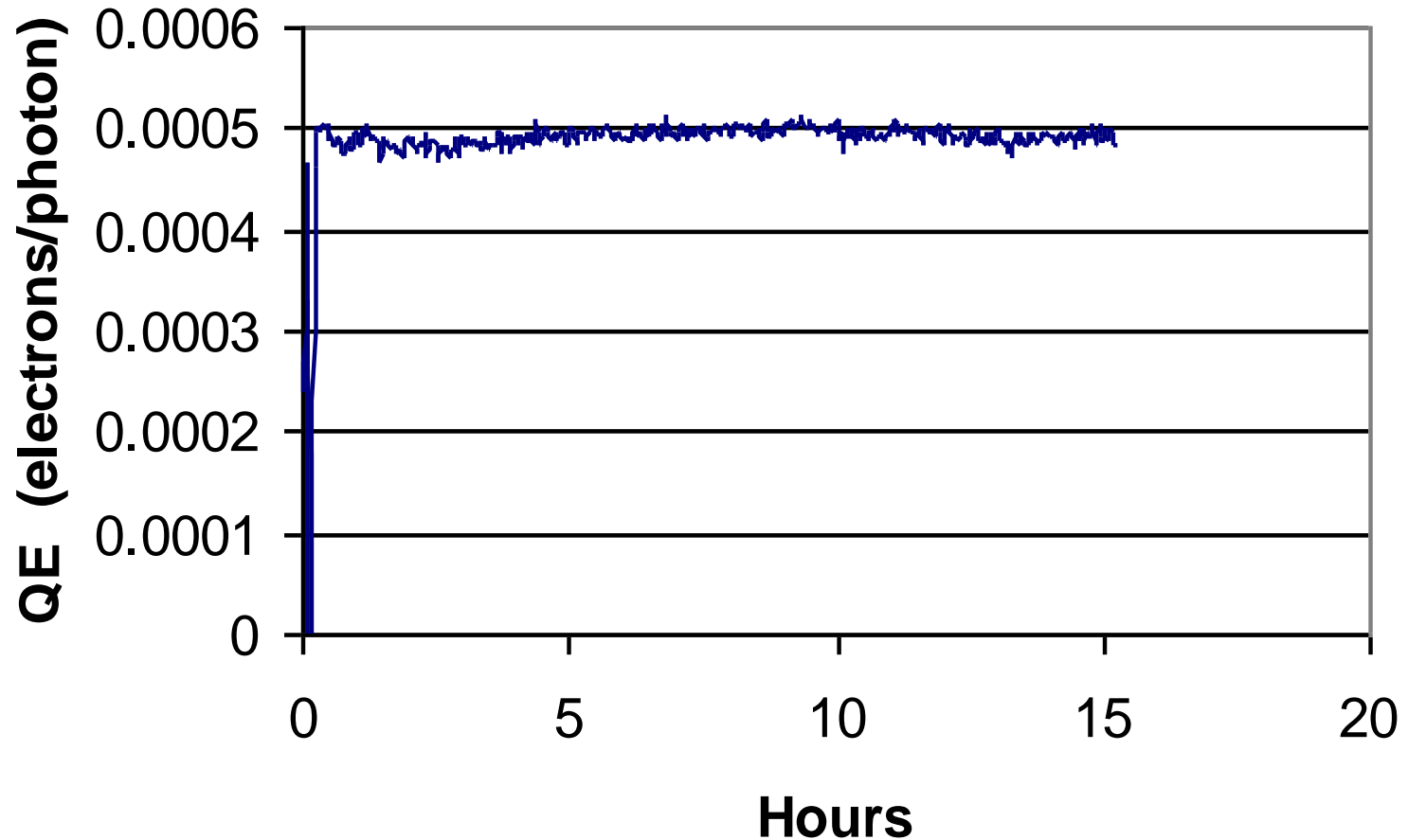
Electrons/photon



Low power density $\sim 0.63 \text{ W/cm}^2$ on a 5 nm thick CsBr/Nb



Improvement in QE observed in a 5nm thick CsBr/Nb sample at high power density (8×10^6 W/cm²).



Present CsBr/substrate Work

- Demonstrate fast pulse operation and activation for accelerator applications using a Cu substrate
- Fabrication of nanometer size electron sources with small energy spread utilizing plasmon enhanced light transmission