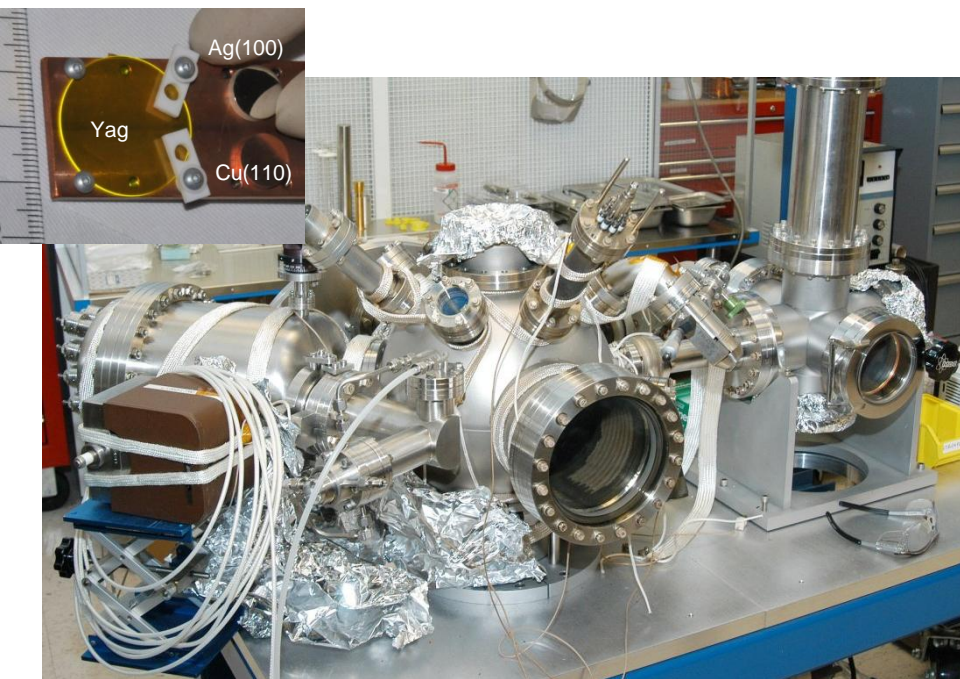


ANL: Photocathodes for ultrahigh brightness sources

- Surface lab – UV ARPES, XPS UHV chambers to be used to characterize photocathode emittance. K. Harkay, R. Rosenberg, M. White (ANL); L. Spentzouris, J. Terry (IIT)
- Explore novel cathode designs theoretically to optimize/minimize emittance. K. Nemeth
- Modify existing cathode properties (e.g. lower work function of Cs_2Te). K. Nemeth (ANL), J. Terdik (U of C)



UV ARPES chamber under commissioning
(designed by R. Rosenberg)

Proc. 2009 PAC (MO6RFP045)

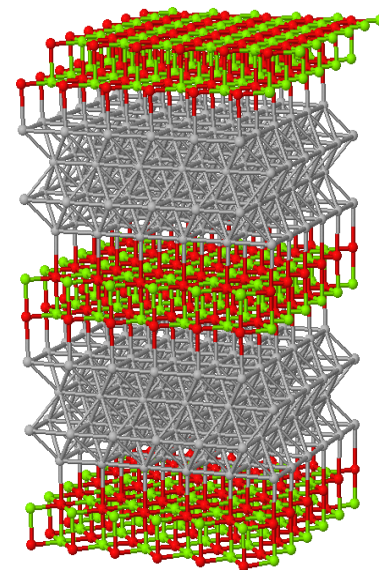
Potential low-transverse-emittance
layered structure: K. Nemeth et al., PRL
104, 046801 (2010).

$\text{MgO}(100)2\text{L}-\text{Ag}(100)4\text{L}-$
 $\text{MgO}(100)2\text{L}$; DFT(PW91)

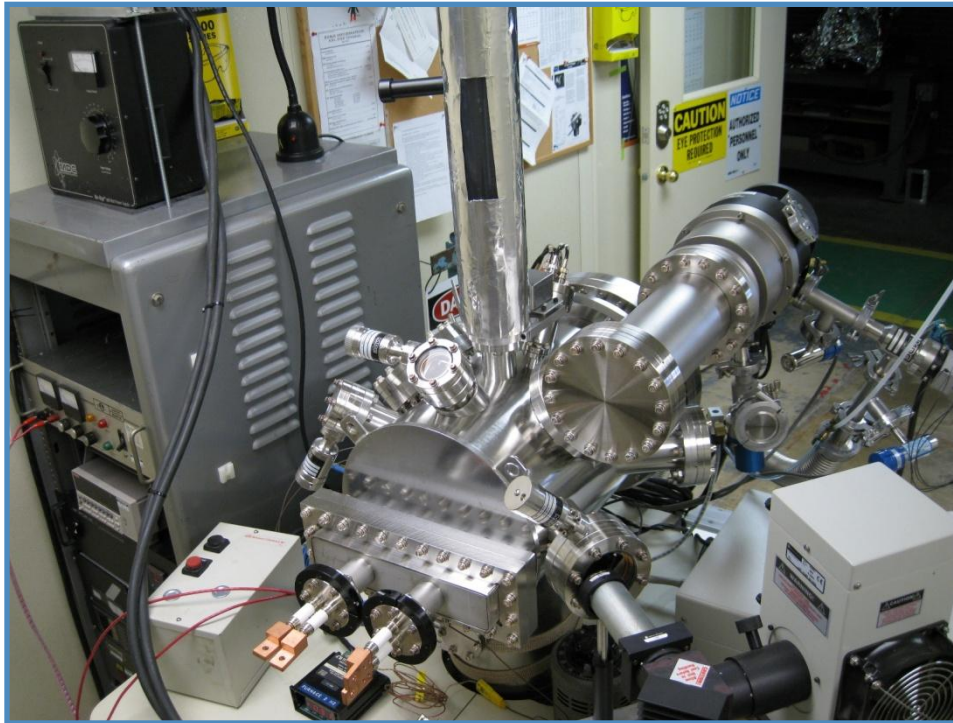
Work function reduced by
 ~ 1 eV relative to $\text{Ag}(001)$

Normalized emittance
0.05 mm-mr/mm

Preliminary idea from
surface catalysis systems
[L. Giordano et al., J. Chem.
Phys. 127, 144713 (2007)].



ANL: High QE Photocathode - Fabrication and Vacuum Transfer

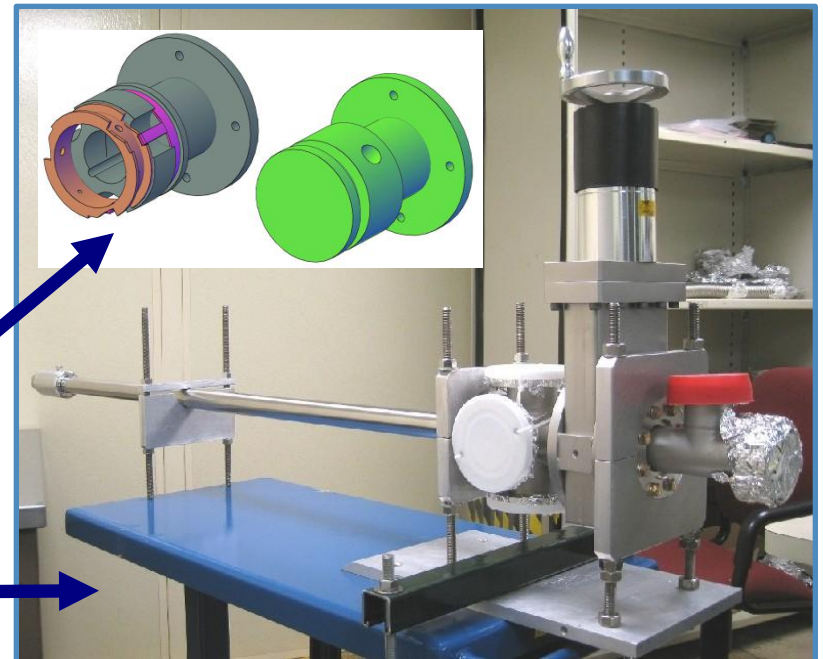
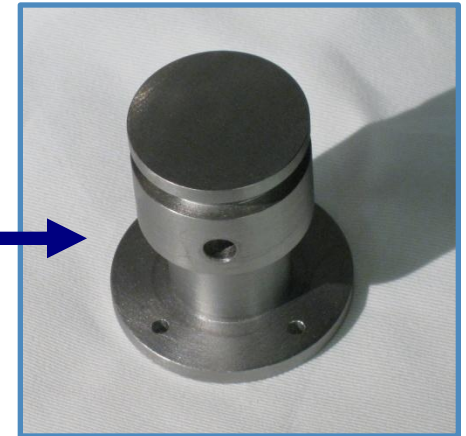


Cs₂Te photocathode deposition system

Universal design for HEP-MSD-APS transfer

Cs₂Te UHV vacuum transfer system to rf gun

Photocathode plug/substrate (Mo)



ANL: Large-scale cathodes optimized for fast photodetectors

