

Abstract Submitted
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Device Engineering of Large Area, High Performance Bi-Alkali Photocathodes for Fast-Timing Applications¹ JUNQI XIE, MARCEL DEMARTEAU, Argonne National Laboratory, HENRY FRISCH, University of Chicago, EDWARD MAY, ALEXANDER PARAMONOV, ROBERT WAGNER, DEAN WALTERS, Argonne National Laboratory, LAPPD COLLABORATION — The photo-cathodes are devices that convert a photon into free electrons, used in vacuum tubes for detecting photons. With its extremely low dark current and ultra-fast time response, alkali photo-cathodes have been widely used in high energy physics and astrophysics. However, until recently, fundamental understanding of the physics behind the variation of the photo-cathode performance was still limited, which prevents reliable and reproducible production of high performance photo-cathodes. This talk will discuss the development of large area bi-alkali photo-cathode for pico-second detector project. With thorough and careful investigation of several mature growth recipes, critical parameters which may affect the cathode performance were identified and subsequently studied. Optical and electrical measurements clearly reveal the affection of Sb thickness to the overall photo-cathode performance. Based on these studies, large area photo-cathode with high uniformity was achieved. The study also makes it possible for high performance photo-detector development.

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