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Graphene and Quantum Dot Photocathodes: Lifetime and Performance Benefits

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Since their inception, photocathode materials have been generally fallen into one of three categories: a bulk metal (such as copper or magnesium); a bulk semiconductor, perhaps with a surface treatment (such as cesiated gallium arsenide); or a thin-film semiconductor (for example cesium telluride deposited upon a molybdenum substrate).

In recent years, apart from process improvements, there has been a significant effort to both improve the performance of existing photocathodes, and to develop and study new photocathode materials. The ACERT effort at Los Alamos has pursued both of these paths. This talk will review our efforts both to develop graphene coatings for cathodes for lifetime improvement; and to develop quantum dot photocathodes, which appear to combine air stability with improved QE over copper. We present our findings to date, and intended path towards future studies.

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