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Design of the photocathode plug for the CARIE RF photoinjector

Tuesday, 9 May 2023 16:30 (2 hours)

This poster will describe the design of the photocathode plug for CARIE. Photocathodes are used to produce beams for a variety of accelerator applications, including colliders, UED, and FELs. Thin film semiconductors offer ways to increase QE, reduce MTE, and increase beam brightness, but are very sensitive to chemical contamination and have never been tested under high gradients or successfully integrated into a high gradient injector. LANL is developing CARIE, which will serve as a high gradient photocathode test stand, and will consist of a cryo-cooled high gradient injector with beam diagnostics, capable of testing a variety of photocathodes. In order both to change photocathodes and transfer the photocathodes under UHV conditions, we are designing a metallic photocathode plug. The plug will interface with both the injector and the photocathode deposition system and has strenuous requirements from both. We describe the design of the photocathode plug for CARIE. We will discuss electrical and mechanical compatibility considerations, as well as surface and material properties that could enhance photocathode performance. We will also show preliminary experimental performance of photocathodes grown on these plugs.

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Footnotes

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Yes

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