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## Conduction cooled SRF photogun for UEM/UED applications

*Friday, 13 November 2020 10:00 (20 minutes)*

The Superconducting RF (SRF) photocathode gun is a promising candidate to produce highly stable electrons for applications where a high repetition rate beam is needed. It operates in an ultrahigh Q, CW mode, and dissipates a few watts of RF power, which make it possible to achieve a 10s ppm level of beam stability by using modern RF control techniques. Euclid, in collaboration with Fermilab, is currently developing a novel L-band conduction cooled Nb<sub>3</sub>Sn SRF photogun. This approach can greatly save on both construction and operational costs. The back wall of the gun is used as a photocathode. The quantum efficiency of bare Nb surface can exceed 10E-5 at 266 nm. This metal photocathode is very robust, and a mW-scale UV laser power is sufficient to generate the electron beam currents required for many applications, including the MeV ultrafast electron microscopy. The design, development, and timeline of the project, as well as the up to date progress are presented. The project is funded under DoE SBIR Grant DE-SC0018621.

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