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Update on CARIE high gradient photocathode test stand at LANL

Wednesday 10 July 2024 11:40 (20 minutes)

This talk will report on the status of commissioning of the Cathodes And Radio-frequency Interactions in Extremes (CARIE) high gradient C-band RF photoinjector test stand at Los Alamos National Laboratory. We are assembling and testing the high gradient photoinjector capable of producing electric fields at the cathodes up to 250 MV/m. The photoinjector will be powered by a 50 MW, 5.712 GHz Canon klystron. The klystron was delivered to LANL in July of 2023, installed, and commissioned. The waveguide line from the klystron goes through a high-power circulator into a concrete vault that is rated to provide radiation protection for electron beams with beam power up to 20 kW. The all-copper photoinjector was fabricated, tuned, and is awaiting high gradient testing. The second version of the photoinjector will be built with replaceable high quantum-efficiency cathodes to test behavior of advanced photocathode materials at high gradients. Adding capability to operate the photoinjector at cryogenic temperatures is considered. The status of the facility and its high-power operation and plans for photocathode testing will be presented.

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