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Update on the status of the C-band high gradient program at LANL

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

This talk will report on the status C-band high gradient research program at Los Alamos National Laboratory (LANL). The program is being built around two test facilities: C-band Engineering Research Facility in New Mexico (CERF-NM), and Cathodes And Radio-frequency Interactions in Extremes (CARIE). Modern applications require accelerators with optimized cost of construction and operation, naturally calling for high-gradient acceleration. At LANL we commissioned a high gradient test stand powered by a 50 MW, 5.712 GHz Canon klystron. The test stand is capable of conditioning accelerating cavities for operation at surface electric fields higher than 300 MV/m. CERF-NM is the first high gradient C-band test facility in the US. CERF-NM was fully commissioned in 2021. In the last several years, multiple C-band high gradient cavities and components were tested at CERF-NM. Currently we work to implement several updates to the test stand including the ability to autonomously operate at high gradient for the round-the-clock high gradient conditioning. Adding capability to operate at cryogenic temperatures is considered. The construction of CARIE began in October of 2022. CARIE will house a cryo-cooled copper RF photoinjector with a high quantum-efficiency cathode and produce an ultra-bright 250 pC electron beam accelerated to the energy of 10 MeV. The status of the facility, the designs of the photoinjector and the beamline, and plans for photocathode testing will be presented.

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Footnotes

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Yes

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