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

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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 such as X-ray sources 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 in excess of 300 MV/m. CERF-NM is the first high gradient C-band test facility in the United States. CERF-NM was fully commissioned in 2021. In the last year, 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 and initial beam physics simulations of the beamline will be presented.

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