Contribution ID: **99** Type: **Contributed Oral**

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

Thursday, November 10, 2022 8:30 AM (30 minutes)

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.

Acknowledgments

Funded by Los Alamos National Laboratory LDRD Program

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Session Classification: WG3: Laser and High-Gradient Structure-Based Acceleration

Track Classification: Working Group Parallel Sessions: WG3 Oral: Laser and High-Gradient Structure-Based Acceleration