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Development and high power testing of C-band accelerator components

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This talk will report on the design, fabrication, and high power conditioning of multiple C-band high gradient components, such as C-band TM01 mode launchers and several test accelerator cavities. At LANL we commissioned a test stand powered by a 50 MW, 5.712 GHz Canon klystron. The test is capable of conditioning single cell accelerating cavities for operation at surface electric fields up to 300 MV/m. The rf field is coupled into the cavity from a WR187 waveguide through a mode launcher that converts the fundamental mode of the rectangular waveguide into the TM01 mode of the circular waveguide for coupling into the cavity. Several designs for mode launchers were considered and the final design was chosen based on a compromise between the field enhancements on the surface, operational bandwidth, and the simplicity and cost of fabrication. Four mode launchers were fabricated and cold-tested. Two mode launchers with the best transmission characteristics were installed on the waveguide line and conditioned to high power. The test stand is being used to test high gradient operation of multiple accelerator cavities including a beta=0.5 proton accelerating cavities, and electron accelerator cavities. The current test status will be reported.

Presenter: Dr SIMAKOV, Evgenya (LANL)

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