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Advanced Acceleration by Dielectric Based Structures, and Dielectric Materials for Accelerator Applications.

Wednesday, September 18, 2019 7:00 PM (1 hour)

Relativistic, high intensity and small emittance electron bunches are the basis of linear collider and FEL projects. With this talk, our interest focused on wakefields generated by using dielectric based structures. We consider Dielectric Disk Accelerating (DDA) and other dielectric structure designs. The electrical properties of low loss ceramic, fused silica and diamond like materials will be discussed for the wakefield beam-driven high repetition rate and high gradient structures applications. With this talk, we present recent results in the development and experimental testing of advanced dielectric materials for accelerators. The ceramic material, commonly used for the dielectric based accelerating structures, have to withstand high gradient accelerating fields, and prevent potential charging. We report here first experimental testing of a ceramic material with a finite DC electrical conductivity and low loss tangent ta GHz frequency ranges. The finite electrical conductivity will drain away the field-emission and halo induced charge. The low loss tangent will allow the realization of high efficiency wakefield acceleration. With this talk, we also present our recent experimental results of the fast (<100 ns) BST ferroelectric based 400 MHz tuner developed and tested by the CERN/Euclid Techlabs collaboration.

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