

Techniques for Electro-Optic Bunch Length at the Femtosecond Level

Patrick Krejcik

SLAC, 2575 Sand Hill Rd, Menlo Park, CA 94025

Electro optic methods to modulate ultra-short laser pulses using the electric field of a relativistic electron bunch have been demonstrated by several groups to obtain information about the electron bunch length distribution. We discuss the merits of different approaches of transforming the temporal coordinate of the electron bunch into either the spatial or frequency domains. The requirements for achieving femtosecond resolution with this technique are discussed. These techniques are being applied to the Linac Coherent Light Source (LCLS) and the Short Pulse Photon Source (SPPS) currently under construction at SLAC.