

Measurements of CSR radiation at KARA using novel thin-film lithium niobate electro-optical sensors

Electro-optical detection provides a powerful method for characterizing the electric fields of relativistic electron beams and their emitted radiation. We report on the use of novel thin-film lithium niobate electro-optical sensors for the detection of freely propagating terahertz (THz) pulses and, for the first time, measurements of coherent synchrotron radiation (CSR) at the Karlsruhe Research Accelerator (KARA). The thin-film lithium niobate sensors combine strong electro-optical response with engineered velocity matching and compact device geometry, enabling sensitive detection of transient THz fields. Using integrated Mach–Zehnder interferometer waveguide structures, we demonstrate successful coupling of CSR to the device and present first measurement results.

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