462
Accession number:WOS:000306328300001
Title:Electro-optical measurement of sub-ps structures in low charge electron bunches
Authors:Mueller, F. (1); Peier, P. (1); Schlott, V. (1); Steffen, B. (2); Feurer, T. (3); Kuske, P. (4)
Author affiliation: (1) PSI, Villigen, Switzerland; (2) DESY, D-2000 Hamburg, Germany; (3) Univ Bern, Inst Appl Phys, CH-3012 Bern, Switzerland; (4) HZB, Berlin, Germany
Source title:PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS
Abbreviated source title:PHYS REV SPEC TOP-AC
Volume:15
Issue:7
Issue date:JUL 12 2012
Pages:070701
Language:English
ISSN:1098-4402
Document type:Article
Publisher:AMER PHYSICAL SOC, ONE PHYSICS ELLIPSE, COLLEGE PK, MD 20740-3844 USA
Abstract:Electro-optical detection of THz coherent synchrotron radiation is a nondestructive method for measuring subpicosecond electron bunches or subpicosecond substructures on otherwise longer electron bunches. With a new diagnostic setup at the Swiss Light Source, which combines an amplified Yb fiber laser and a suitable GaP crystal, we demonstrate sampling as well as spectrally resolved single-shot measurements of sliced electron bunches containing as little as a few pC of charge. The single-shot measurements not only allow for a precise electric field characterization but also for a detailed analysis of the timing jitter between the electron bunch and the synchronized Yb fiber laser. The measurements of subsequent turns in the storage ring show distinct deviations from the simulations and we find strong indications that this discrepancy is caused by radiation loss through coherent synchrotron radiation itself, which is not included in many of today's simulation codes.
Number of references:25
Main heading:Physics
DOI:10.1103/PhysRevSTAB.15.070701