



T

Abstract Submitted
for the DPP03 Meeting of
The American Physical Society

Sorting Category: 2.2.0

Coherent transition radiation from a self-modulated laser wakefield accelerator generated electron beam¹ CARL SCHROEDER, ERIC ESAREY, JEROEN VAN TILBORG, WIM LEE-MANS, Lawrence Berkeley National Laboratory Transition radiation from a relativistic electron beam generated by a self-modulated laser wakefield accelerator (SMLWFA) is studied analytically. The coherent and incoherent transition radiation spectrums are calculated for an electron beam with a Boltzmann longitudinal momentum distribution, characteristic of SMLWFA produced electron beams, including the effects of beam divergence. The implications for use of the coherent transition radiation from the plasma-vacuum transition as a beam diagnostic and as a source of intense THz radiation are considered. It is shown that diffraction radiation from the narrow transverse width of the laser-generated plasma strongly effects the coherent radiation spectrum and angular distribution. Analytic modeling indicates that the SMLWFA source has the capability of producing more than 0.1 mJ/pulse, some two orders of magnitude beyond current laser-based methods of THz generation. The results are compared to recent experimental observations at LBNL.

¹Research supported by the U.S. DOE under Contract No. DE-AC03-76SF0098

- Prefer Oral Session
 Prefer Poster Session

Carl Schroeder
CBSchroeder@lbl.gov
Lawrence Berkeley National Laboratory

Date submitted: 16 Jul 2003

Electronic form version 1.4