



Contribution ID: 83

Type: not specified

Influence of a Space Charge Effect in a Femtosecond Electron Beam on Coherent Transition Radiation Spectrum

Friday, 30 September 2016 10:15 (15 minutes)

The coherent radiation generated by a short electron bunches is well studied and finds a broad application for different scientific communities. However, the improvement projects towards the implementation of the compact accelerator system providing the high-charge and ultra short electron bunches are still attractive and open up a new possibility of the high-brightness coherent radiation generation. Recently it was shown that a photocathode RF gun can produce a femtosecond electron beam with low-charge [1] without magnetic compression techniques. For the case of high-charge beam a space charge effect dramatically increases the bunch sizes and the spectrum of coherent radiation is also changed. In this report we discuss the space charge effect suppression techniques. Using ASTRA software we performed optimization of the LUCX RF gun parameters to produce high-charge electron bunches keeping femtosecond bunch length. As a test of simulation results the experimental investigation of coherent transition radiation was carried out at KEK LUCX facility.

[1] A. Aryshev, M. Shevelev, Y. Honda, N. Terunuma, and J. Urakawa, 2015 arXiv:1507.03302v1 [physics.acc-ph]}

This work was supported by the Photon and Quantum Basic Research Coordinated Development Program from the Ministry of Education, Culture, Sport, Science and Technology, Japan and JSPS KEKENHI: 23226020 and 2465076.

Primary author: Mr SHEVELEV, Mikhail (KEK)

Co-authors: Dr ARYSHEV, Alexander (KEK); Prof. URAKAWA, Junji (kek); Prof. TERUNUMA, Nobuhiro (KEK); Dr HONDA, Yosuke (KEK)

Presenter: Mr SHEVELEV, Mikhail (KEK)

Session Classification: W2.1: The 8th AGTaX workshop "Advanced Generation of THz and X-ray beams"