

ELECTRON BUNCH LENGTH DIAGNOSTICS FOR THE LUCX FACILITY BASED ON THE COHERENT OFF-AXIS UNDULATOR RADIATION

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In the nearest future the 30 cm compact edge-focusing wiggler [1] will be installed on the LUCX accelerator facility in KEK (Japan). The parameters of this wiggler ($K \sim 0.5 \dots 2.4$, period length is 6 cm) are such that fundamental radiation frequency ω_{10} is equal to 4.16 THz (0.45 mm) for K maximum value with electron energy about 8 MeV. The rms bunch length expected on the LUCX is around 30 μm , and due to this reason the undulator radiation (UR) will be coherent. In paper [2] there was suggested to use coherent off-axis UR to measure electron bunch lengths. We developed the proposed technique to analyze the possibility of using it for diagnostics applications on LUCX facility. This approach is based on the UR energy registration for the fixed observation angles. The simulated spectra are presented for different observation angles allowing to calculate UR energy for the chosen bandwidth. Both polarization components of UR were also simulated and a possibility of polarization measurements for diagnostics aims is discussed.

References

- [1] S.Kashiwagi et al. Rigorous evaluation of the edge-focusing wiggler based on the magnetic field measurement // PRST AB **12** 120703 (2009)
- [2] C.P.Neuman et al. Coherent off-axis undulator radiation from short electron bunches // PRST AB **3** 030701 (2000)

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