PHOTON COUNTING MEASUREMENT IN SINGLE BUNCH OPERATION IN UVSOR-II ELECTRON STORAGE RING

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Abstract

In single-bunch operation in electron/positron storage ring for SR light source, it is very important to always keep good single-bunch purity because undesirable spurious bunches can disturb experiments with pulsed SR light. Even though only one main bunch is injected and stored initially, however, spurious bunches can be generated in RF-buckets following the main bunch and gradually grow. Such phenomenon has been understood as a result of Touschek effect in the main bunch; namely, electrons which gain larger momenta than RF-bucket height by scattering process between electrons in the main bunch and go out of the original RF-bucket can be captured again in the following bucket*. We have observed impurity bunches in single-bunch operation in UVSOR-II electron storage ring by using photon counting method which has enough dynamic range to observe both the main bunch and the impurity bunches simultaneously. With the method, we have measured growth of the single-bunch impurity with time and tried to discuss Touschek effect in UVSOR-II.

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