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Application of multiple-orbit synchrotron radiation for electron time-of-flight spectroscopy

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At the metrology light source (MLS), the compact electron storage ring of the Physikalisch-Technische Bundesanstalt (PTB) with a circumference of 48 m, a specific multiple orbit for stored electrons was realized closing after three turns. In combination with single electron bunch operation, the new mode was applied for electron time-of-flight spectroscopy with an interval of the synchrotron radiation pulses which is three times the single bunch period of revolution at MLS. The achievement is of significant importance for PTB's future programs of angular-resolved electron spectroscopy with synchrotron radiation and similar projects at other compact electron storage rings. Moreover, the applied scheme for orbit and source spot separation via optical imaging at the insertion device beamline of MLS can be considered partially as a proof of principle for BESSY VSR project of the Helmholtz-Zentrum Berlin.

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