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标题: Spatio-temporal dynamics of relativistic electron bunches during the micro-bunching instability in storage rings
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摘要: The intense Coherent Synchrotron Radiation emitted in the Terahertz range by relativistic electron bunches circulating in a storage ring is an attractive source for spectroscopy. Its stability is related to the electron bunch dynamics, and can exhibit a bursting behavior resulting from the irregular presence of micro-structures in the bunch. We evidence here the existence of two thresholds in the electron bunch spatio-temporal dynamics, associated with different levels of Terahertz signal fluctuations, with increasing number of electrons. The first threshold indicates the presence of micro-structures drifting in the bunch profile, and the second one appears when those micro-structures are strong enough to persist after about half a revolution period of the electron-bunch in the phase-space. Their prediction thanks to numerical simulations are confirmed by experiments at the synchrotron SOLEIL. Copyright (C) EPLA, 2012
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