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* **Systematic studies of the microbunching and weak instability at short bunch lengths**

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At KARA, the Karlsruhe Research Accelerator of the Karlsruhe Institute of Technology synchrotron, the so-called short-bunch operation mode allows the reduction of the bunch length down to a few picoseconds. The microbunching instability resulting from the high degree of longitudinal compression leads to fluctuations in the emitted terahertz radiation. For highly compressed bunches at KARA, the instability occurs not only in one but in two different bunch-current ranges that are separated by a stable region. The additional region of instability is referred to as short-bunch-length bursting or weak instability. We will present measurements of the threshold currents and fluctuation frequencies in both regimes. Good agreement is found between the measurement and numerical solutions of the Vlasov-Fokker-Planck equation. This contribution is based on the paper Phys. Rev. Accel. Beams 22, 020701.

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