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Tunable High-peak-current electron bunch train and its application in THz production

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High peak current electron bunch trains can find applications in high transformer ratio wakefield acceleration and high power tunable narrow band THz production. Based on the TTX (Tsinghua Thomson-scattering X-ray) facility, we performed experiments on high peak current bunch train production by nonlinear longitudinal space charge oscillation and obtained narrow band THz radiation via coherent transition radiation(CTR) with such bunch trains. The THz radiation spectrum was able to be conveniently tuned both by chicane strength and the gun phase. The radiation power was maximized by optimizing the longitudinal modulation on the drive laser.

Primary author: Dr YAN, Lixin (Department of Engineering Physics, Tsinghua University)

Presenter: Dr YAN, Lixin (Department of Engineering Physics, Tsinghua University)

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