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X-ray Sampling Calorimeter for Bunch Length Measurement

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The challenge of reliable measurement and diagnostics of extremely short electron bunches is of crucial importance for commissioning and operation of the accelerators like a FELs and colliders. A method widely applied for bunch length diagnostics is Coherent Radiation Diagnostics (CRD). Radiation is emitted coherently if the wavelength is in the order of the bunch length, i.e. information about bunch length and shape is encoded in the emission spectrum which is exploited in CRD. For bunch lengths in the order of hundreds of femtoseconds, the Far-Infrared wavelength region is of interest. It is propose to extend the range of CRD up to attoseconds by using radiation in X-ray region, but for this our will need to register of high intensity X-ray pulses. The goal of this work is developed of technic and setup for bunch length measuring based on registration of high intensity X-ray pulses by sampling calorimeter.

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