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Project of the superposing beamline for parametric X-ray radiation and coherent transition radiation in THz region at LEBRA

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The new project of a THz-wave light source is in progress at the parametric X-ray (PXR) beamline of the Laboratory for Electron Beam Research and Application (LEBRA) in Nihon University. The THz-wave source is based on coherent transition radiation (CTR) emitted from a metal foil inserted downstream of a crystal target that is the radiator of PXR. A beryllium foil is the most prospect candidate of the THz-wave radiator. Since the electron linac of LEBRA was developed for free electron laser (FEL), the electron bunches of 1ps length can be provided by magnetic bunching at the bending magnet section. Thus, very intense CTR can be obtained in the frequency region around 1THz. According to preliminary experiments for CTR production, it is suggested that the most optimized electron beam from the LEBRA linac can provide sufficient photon yield to carry out THz-wave imaging. At present, however, the THz-wave beam emitted from the CTR target can not be transported to the measurement system located at the experiment hall where radiation safety is guaranteed. Thus, we have a plan to alter the PXR beamline for the transport of the THz-wave beam. The new system is expected to allow simultaneous non-destructive imaging in the wavelength regions of THz and X-ray.

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