

**Fundamental Research of Subpicosecond Time Resolved X-Ray Diffractometry Using Electron Linac, H. HARANO, K. KINOSHITA, T. UEDA, M. UESAKA, T. WATANABE, K. YOSHII, Univ. Tokyo** - We have proposed a new pump and probe technique, subpicosecond time resolved X-ray diffractometry, which enables the direct observation of the lattice movement, namely the temporal change of the three-dimensional atomic arrangement in the transient phenomena of the subpicosecond order. This technique uses a subpicosecond electron pulse from a linac which produces the coherent FIR transition radiation on an aluminum foil as a pump pulse and the characteristic X-ray in a copper foil as a probe pulse. The time delay between these two pulses is controlled only through adjustment of the path length of the pump pulse, so this technique has an intrinsic advantage that there is no time jitter which may cause serious problems in adding up accumulated results. Preliminary experiments for this technique have been performed using the subpicosecond S-band electron linac at Nuclear Engineering Research Laboratory of Univ. of Tokyo and several results has been obtained such as the characteristic evaluation of the transition radiation, the Bragg spot of single crystals on the imaging plate and so on. The generation of the subpicosecond X-ray pulse was also confirmed numerically using the EGS4 code.