Contribution ID: **102** Type: **Poster (Session B)**

Nondestructive measurement of charged particles by laser diffraction readout

The detection principle of charged particles developed so far is based on the local inelastic processes such as ionizations and excitations with the energy consumption above 1eV order. However, if one could utilize more macroscopic processes such as polarizations in an electro-optical(EO) crystal for the electric field sensing, the necessary energy consumption is expected to be well below 1eV order. This opens up new applications for quasi-nondestructive measurements especially for slow charged particles in addition to the application for the beam diagnosis of relativistic charged particles in accelerators. For the detection of polarizations caused by remote electric fields of charged particles, laser lights transmitted by an EO crystal with the local refractive index changes are diffracted and interfered by a lens and the change of the diffraction pattern at the focal plane can be utilized to sense the extremely small refractive index changes. In this talk, a result to verify the detection principle will be presented. The first successful measurement has been performed with LiNbO3 crystal with respect to a weak DC electron beam of 1nA by using a Nd:YAG CW laser with the intensity of 1W. The electron beam profile was 50μm(FWHM) and the kinetic energy was 4keV which was located at the distance longer than 100μm from the crystal surface. The change of the diffraction pattern at the focal plane was observed associated with the existence of the remote electron beam and the feature of the diffraction pattern was qualitatively confirmed.

Primary author: HOMMA, Kensuke (Uni Hiroshima)

Presenter: HOMMA, Kensuke (Uni Hiroshima)