

A Hilbert Transform Spectrometer using a High Tc Josephson Junction for Bunch Length Measurements at the TTF Linac, M.GEITZ, K.HANKE<sup>\*\*</sup>, P.SCHMUESER<sup>\*\*\*</sup>, DESY; Y.DIVIN<sup>\*\*\*\*</sup>, U.POPPE, IFF, KFA-JUELICH; V.PAVLOVSKII, V.SHIROTOV, O.VOLKOV, IRE MOSCOW; M.TONUTTI, 3. PHYS. INST. RWTH AACHEN - The longitudinal charge distribution of an electron/positron bunch can be determined from the coherent transition radiation emitted as the bunch crosses a thin metal foil. A Josephson junction made from  $\text{Yba}_2\text{Cu}_3\text{O}_{7-x}$  is used for a detector for transition radiation in the millimeter and submillimeter range. The radiation-induced modification of the current-voltage characteristic of the Josephson junction is derived from a scan with and without incident radiation. Multiplying this quantity with the dc bias current and the dc voltage across the junction and applying a Hilbert transformation one obtains the spectral intensity of the radiation and the longitudinal form factor of the bunch. The physical principles of a Josephson junction as a detector for submillimeter wave radiation are outlined and a first bunch length measurement is presented.

<sup>\*\*</sup> present adress: CERN, CH-1211 Geneva 23

<sup>\*\*\*</sup> also 2. Institut für Experimentalphysik, University of Hamburg

<sup>\*\*\*\*</sup> home adress: IRE Moscow