

Prototype Detection System for High Energy Electrons and Positrons in the Space

Kyung Sook Kim¹, Man Woo Lee¹, Gui Nyun Kim¹, Dongchul Son¹,
Jongmann Yang², Volker Chommichau³, Hanspeter von Gunten³,
Ulf Röser³, and Gert Viertel³

¹*Department of Physics, Kyungpook National University, Daegu, Korea,*

²*Department of Physics, Ewha Womans University, Seoul, Korea,*

³*ETH-Zürich, Labor für Hochenergiephysik, Zürich, Switzerland*

We propose a prototype detection system for high energy electrons and positrons in space based on synchrotron radiation. The detection system consists of a synchrotron radiation detector (SRD) and a transition radiation detector (TRD) as a trigger device. The SRD will consist of individual 1600 x-ray detection cells and each cell comprises the 3-cm wide cube crystal and photomultiplier. As a trigger detector, a new type of TRD has been suggested because of a minimal weight, a low power consumption, no negative impact on the SRD and its additional proton background suppression capability. The proposed TRD will consist a single layer of radiator material coupled to a very thin crystal scintillator array readout by photomultipliers. In this report we discussed a design of the prototype detector and a plan for the beam test for the TRD as a trigger device.