Contribution ID: **115** Type: **Posters**

High rate diamond detectors for fast neutron beams

Tuesday, 29 November 2011 15:11 (1 minute)

Abstract. Fast neutron monitors are being developed for accelerator applications such as the study of neutron-induced single event effects (SEE) in microelectronics components, which are been recognized as a key threat to the reliability of advanced electronic systems. A new beam line (CHIPIR) dedicated to neutron SEE testing is being built at the ISIS spallation source (UK) to provide fluxes of 105-107 neutrons s-1 cm-2 in the 1-800 MeV energy range. Commercial high purity single crystal diamonds (SDD) with contacts made in aluminium or gold and coupled to a fast digital data acquisition system have been tested at the ROTAX and VESUVIO beam lines. They feature a pulsed neutron beam generated by proton induced spallation on a tungsten target at 50 Hz repetition rate. The SDD event signal is digitalized at 1 Gsample to reconstruct its deposited energy (pulse-height) and arrival time; the event time of flight (tToF) is obtained from the recorded proton beam signal t0. The SDD stability during the measurements has been investigated since the polarization of the diamond induced by the radiation field can degrade its resolution. The analysis has been carried out in terms of count rate and of its effects on pulse-height and tToF spectra. Results from the first measurements at ROTAX indicate that the SDD performance became stable after few hours of irradiation. The SDD's used at VESUVIO instead proved stable for all the experimental campaign.
Keywords: Fast diamond neutron detector, digitized pulse-height and ToF measurements, high-energy neutron beam monitor, neutron-gamma energy discrimination.
PACS: 28.50.Dr; 29.27.Fh; 29.30.Hs; 29.40.Wk; 81.05.ug.

Presenter: Dr GIACOMELLI, Luca (Milano-Bicocca University)

Session Classification: Poster Session: presentation of posters