Contribution ID: **87** Type: **Poster Presentation**

Radiation hardness of plastic scintillators for the Tile Calorimeter of the ATLAS detector

Tuesday, 8 July 2014 17:10 (1h 50m)

Abstract content
   (Max 300 words)
Formatting &
Special chars

The Tile Calorimeter of the ATLAS detector is a hadronic calorimeter responsible for detecting hadrons that result from the p-p collisions within the LHC. Plastic scintillators form an integral component of this calorimeter and are specifically chosen for their properties of high optical transmission and fast rise and decay time. This enables efficient data capture since fast signal pulses can be generated. The main problem encountered by plastic scintillators however, is radiation damage incurred due to their interaction with the highly ionizing particles to be detected. This damage causes a significant decrease in the light yield of the scintillator and introduces an error into the time-of flight data acquired. In lieu of the recent planned upgrade of the Tile Calorimeter, a comparative study was conducted into the radiation hardness of several grades of plastic scintillators available on the market.

In this talk, we present an analysis on the damage undergone by three PVT based plastic scintillators, EJ200, EJ208 and EJ260 obtained from ELJEN Technologies which have been subjected to 6 MeV proton irradiation using the tandem accelerator of iThemba LABS, Gauteng. The degradation in light transmission is assessed for doses over a range of kilo Grays to Mega Grays, and a Raman characterization of the change to bonding structure are presented.

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

Hons

Main supervisor (name and email)
and his / her institution

Bruce Mellado
Bruce.Mellado@wits.ac.za
University of the Witwatersrand

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Ms JIVAN, Harshna (University of the Witwatersrand)

Co-authors: Prof. MELLADO, Bruce (University of the Witwatersrand); Prof. SIDERAS-HADDAD, Elias (University of the Witwatersrand); Mr ERASMUS, Rudolph (University of the Witwatersrand)

Presenter: Ms JIVAN, Harshna (University of the Witwatersrand)

Session Classification: Poster1

Track Classification: Track B - Nuclear, Particle and Radiation Physics