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Electron attachment of C₅F₁₂ to be used as gas radiator in the
BARREL RICH detector of DELPHI

D. Fraissard, S. Haider, H. Hofmann, W. Klempt, E. Rosso,
D. Soria, CERN, Geneva, Switzerland
and
H. Jansen, NIKHEF, Amsterdam, Netherlands

The BARREL RICH detector, to be installed into DELPHI, measures the angle of the Cerenkov light produced by a traversing particle and thus directly the velocity of this particle. The envisaged gas radiator is C₅F₁₂ for its superior UV transparency and high index of refraction. The photons from the Cerenkov light are focussed into TPC like drift tubes, where they are converted into electrons via photoionisation. The electrons are drifted over a distance of up to 1.5 m to a multi wire proportional chamber to measure the 3 dimensions of the conversion point.

The aim of this study was to analyse the effect of a small contamination of radiator gas in the drift gas (0.7 CH₄ + 0.3 C₂H₆). For this purpose a 60 cm long drift tube has been realized, where the electrons have been produced in the ionisation along the track of light from a N₂ laser. To study the behaviour of single electrons drifting in the tube, the laser intensity has been attenuated to a level, where single electrons have been produced with an efficiency of 20% per wire and laser pulse. A small amount of C₅F₁₂ in the range of 1 to 5 ppm has been added to the drift gas and a corresponding reduction in the number of electrons detected in the wire chamber has been observed. The results have been interpreted in terms of a high electron attachment cross section for C₅F₁₂. This investigation has been carried out for different drift fields in the range from 0.3 KV/cm to 1 KV/cm. The impact of these measurements to the construction of the BARREL RICH detector will be discussed.

A2

A Fastbus Time Digitizer for LEP Detectors

J.P. Vanuxem
CERN/EP

This paper describes the specifications of a high performance time digitizer for application with detectors requiring a fine time resolution across a wide dynamic range, as well as multiple event buffering at the front-end level. The flexibility of the device, combined with a relatively low-cost, should also make it attractive for more conventional applications. Modern technology is planned to be used during the development of this unit, like high-speed memories, pals and LSI semi-custom ICS (gate arrays).