

Accepted Manuscript

A novel transparent charged particle detector for the CPET upgrade at TITAN

D. Lascar, B. Kootte, B.R. Barquest, U. Chowdhury, A.T. Gallant, M. Good, R. Klawitter, E. Leistenschneider, C. Andreou, J. Dilling, J. Even, G. Gwinner, A.A. Kwiatkowski, K.G. Leach



PII: S0168-9002(17)30714-3
DOI: <http://dx.doi.org/10.1016/j.nima.2017.07.003>
Reference: NIMA 59952

To appear in: *Nuclear Inst. and Methods in Physics Research, A*

Received date: 22 September 2016
Revised date: 6 May 2017
Accepted date: 4 July 2017

Please cite this article as: D. Lascar, B. Kootte, B.R. Barquest, U. Chowdhury, A.T. Gallant, M. Good, R. Klawitter, E. Leistenschneider, C. Andreou, J. Dilling, J. Even, G. Gwinner, A.A. Kwiatkowski, K.G. Leach, A novel transparent charged particle detector for the CPET upgrade at TITAN, *Nuclear Inst. and Methods in Physics Research, A* (2017), <http://dx.doi.org/10.1016/j.nima.2017.07.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A Novel Transparent Charged Particle Detector for the CPET Upgrade at TITAN

D. Lascar^{a,*}, B. Kootte^{a,b}, B.R. Barquest^a, U. Chowdhury^{a,b}, A.T. Gallant^{a,c},
M. Good^a, R. Klawitter^{a,d}, E. Leistenschneider^{a,c}, C. Andreoiu^h, J. Dilling^{a,c},
J. Even^{a,e}, G. Gwinner^b, A.A. Kwiatkowski^{a,f}, K.G. Leach^{a,g}

^aTRIUMF, 4004 Wesbrook Mall, Vancouver, British Columbia V6T 2A3, Canada

^bDepartment of Physics & Astronomy, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada

^cDepartment of Physics & Astronomy, University of British Columbia, Vancouver, British Columbia V6T 1Z1, Canada

^dMax-Planck-Institut für Kernphysik, Heidelberg D-69117, Germany

^eKVI Center for Advanced Radiation Technology, University of Groningen, Groningen, 9747 AA, Netherlands

^fCyclotron Institute, Texas A&M University, College Station, Texas 77843, USA

^gDepartment of Physics, Colorado School of Mines, Golden, Colorado, 80401, USA

^hDepartment of Chemistry, Simon Fraser University, Burnaby, British Columbia V5A 1S6, Canada

Abstract

The detection of an electron bunch exiting a strong magnetic field can prove challenging due to the small mass of the electron. If placed too far from a solenoid's entrance, a detector outside the magnetic field will be too small to reliably intersect with the exiting electron beam because the light electrons will follow the diverging magnetic field outside the solenoid. The TITAN group at TRIUMF in Vancouver, Canada, has made use of advances in the practice and precision of photochemical machining (PCM) to create a new kind of charge collecting detector called the “mesh detector.” The TITAN mesh detector was used to solve the problem of trapped electron detection in the new Cooler Penning Trap (CPET) currently under development at TITAN. This thin array of wires etched out of a copper plate is a novel, low profile, charge agnostic detector that can be made effectively transparent or opaque at the user's discretion.

Keywords: Detectors, Photochemical Machining, Ion Trapping, Ion Cooling,

*Corresponding author. Tel: +1-604-222-1047 x6815; Fax: +1-604-222-1074
Email address: d1ascar@triumf.ca (D. Lascar)

Download English Version:

<https://daneshyari.com/en/article/5492760>

Download Persian Version:

<https://daneshyari.com/article/5492760>

[Daneshyari.com](https://daneshyari.com)