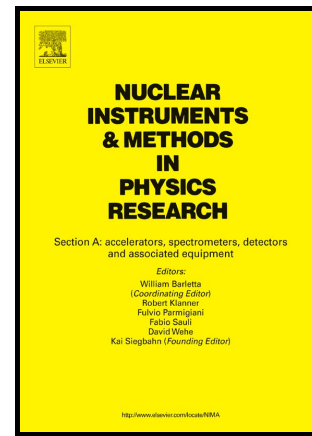


# Author's Accepted Manuscript

Test of Ultra Fast Silicon Detectors for Picosecond Time Measurements with a New Multipurpose Read-Out Board

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[www.elsevier.com/locate/nima](http://www.elsevier.com/locate/nima)

PII: S0168-9002(17)30482-5  
DOI: <http://dx.doi.org/10.1016/j.nima.2017.04.032>  
Reference: NIMA59820

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

Received date: 11 March 2017  
Revised date: 17 April 2017  
Accepted date: 19 April 2017

Cite this article as: N. Minafra, H. Al Ghouli, R. Arcidiacono, N. Cartiglia, L. Forthomme, R. Mulargia, M. Obertino and C. Royon, Test of Ultra Fast Silicon Detectors for Picosecond Time Measurements with a New Multipurpose Read Out Board, *Nuclear Inst. and Methods in Physics Research, A* <http://dx.doi.org/10.1016/j.nima.2017.04.032>

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1           Test of Ultra Fast Silicon Detectors for Picosecond  
 2           Time Measurements with a New Multipurpose  
 3           Read-Out Board

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10 **Abstract**

Ultra Fast Silicon Detectors (UFSD) are sensors optimized for timing measurements employing a thin multiplication layer to increase the output signal. A multipurpose read-out board hosting a low-cost, low-power fast amplifier was designed at the University of Kansas and tested at the European Organization for Nuclear Research (CERN) using a 180 GeV pion beam. The amplifier has been designed to read out a wide range of detectors and it was optimized in this test for the UFSD output signal. In this paper we report the results of the experimental tests using 50  $\mu\text{m}$  thick UFSD with a sensitive area of 1.4  $\text{mm}^2$ . A timing precision below 30 ps was achieved.

11 *Keywords:* Time-of-flight, Time precision, Ultra Fast Silicon Detectors,  
 12 Charge Sensitive Amplifier, Picosecond Time Measurement

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13 **1. Introduction**

14       The increasing demand for better timing and spatial resolution has been the  
 15 key purpose for developing new type of sensors. Low Gain Avalanche Detector  
 16 (LGAD) technology is one of the most promising advancements in silicon detector  
 17 technology as it allows a sensible increase of the detector output signal,  
 18 while keeping all of the known advantages of a silicon substrate, such as low  
 19 cost and large scale production capabilities. A sensor with an enhanced output

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