

Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Plastic Scintillation Detectors for Time-of-Flight Mass Measurements¹ KAILONG WANG, S. SAMARANAYAKE, A. ESTRADE, S. NEUPANE, M. BARBER, Central Michigan University, M. FAMIANO, Western Michigan University, T. GINTER, National Superconducting Cyclotron Laboratory, Michigan State University, D. MCCLAIN, N. NEPAL, Central Michigan University, J. PEREIRA, H. SCHATZ, National Superconducting Cyclotron Laboratory, Michigan State University, G. ZIMBA, Central Michigan University — Fast timing detectors play a key role in the experimental setup for time-of-flight (ToF) mass measurements of unstable nuclei. Two scintillation detectors with each consisting of one thin plastic scintillator and four photomultiplier tubes (PMTs) have been developed for the ToF mass measurement experiments at the National Superconducting Cyclotron Laboratory (NSCL). In this presentation, we will present results of a test experiment for the detectors using ^{48}Ca beam at the NSCL. Different factors affecting the timing performance were systematically investigated during the test, and the best achieved time resolution (σ) of the detectors was 7.5 ps. We also evaluated the ability of positioning the hitting points on the scintillator using the timing information and obtained a resolution (σ) below 1 mm for well-defined beam spots. In addition, a switched capacitor digitizer (CAEN 742) was tested to process the signals from our scintillation detectors using a table-top laser setup. The optimization and evaluation of different algorithms for deriving the signal amplitude and time information will be discussed.

¹We acknowledge supports from DOE grant (DE-SC0020406) and NSF grants (PHY-1712832, PHY-1714153 and PHY-1430152).

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Date submitted: 28 Jun 2020

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