

A scintillator based timing detector read-out by silicon photomultipliers for the SHiP experiment

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ABSTRACT: SHiP is a proposed general purpose fixed target experiment to be located at the CERN SPS accelerator. A fixed target station will be followed by magnetic shielding to reduce beam induced background, a dedicated tau neutrino detector and a detector to search for hidden particles beyond the Standard Model. Background taggers and a dedicated timing detector will ensure sufficient background rejection. The timing detector is required to have a timing resolution of 100 ps or less in order to reduce combinatorial di-muon background to an acceptable level. A proposed option for such a timing detector consists of plastic scintillating bars read-out on each end by silicon photomultipliers, which is the focus of this study. Test beam results comparing different bar geometry and material type, different number of silicon photomultipliers on either end of the bar, as well as a new ASIC used for read-out are presented and discussed.

KEYWORDS: Si-PMTs, Scintillators, Timing detectors

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1 Introduction

The SHiP (Search for Hidden Particles) experiment is a new proposed fixed target experiment located at the CERN SPS accelerator [1]. SHiP is a high intensity experiment whose primary purpose is to search for physics beyond the Standard Model (SM) [2]. A dedicated 400 GeV proton beam will be aimed at a fixed target station, followed by a magnetic shield to reduce beam induced background [3]. Downstream of the target there is a dedicated tau neutrino detector followed by hidden sector detector

2 Experimental set-up and devices

3 Results

4 Summary

A Some title

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Acknowledgments

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