

Space applications of Silicon photomultipliers: ground characterizations and measurements on board the International Space Station with the Lazio experiment

M. Casolino, on behalf of the Si-PM collaboration

INFN Roma Tor Vergata, University of Roma Tor Vergata, Rome [casolino@roma2.infn.it]

Silicon Photomultipliers Si-PM consist of an array of semiconductor photodiodes joint on the common substrate and operating in limited Geiger mode. For their linearity, low voltage and small dimensions, they are particularly suited for space applications. The first application of Si-PM in space has been on board of the International Space Station by some of our group as part of the Lazio-Sirad measurement campaign in May 2005. The good performance of the system, an array of 16 detectors, each consisting of a 1 mm^2 detector coupled to a $3 \times 3 \text{ cm}^2$ scintillator via an optical fiber will be discussed. A new generation of Si-PM is currently under test in INFN Rome "Tor Vergata" facilities: they consist of a 5625 element, $3 \times 3 \text{ mm}^2$ array with an improved light response. These elements have been characterized (gain, light response, quantum efficiency) in static and dynamic stimuli configuration. Also results using cosmic ray and beam test data will be presented. In addition a functional model of the Si-PM has been developed; this will be used in a VLSI development of front-end electronics.