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## Detection of cosmic-ray-muon using plastic scintillators

M Ghahremani Gol and M Khakzad

School of particles and accelerators, Institute for Research in Fundamental Sciences(IPM), Tehran, Iran

E-mail: mohsen@ipm.ir

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### Abstract

In this study, the detection of cosmic ray from the earth's atmosphere is addressed. The speed and lifetime of the muons are measured with plastic scintillator coupled to photomultiplier detector. In this research, the digital system is used over the analog system due to its reliability, high speed performance, small volume and accurate response. We find that the mean speed of muons is around  $(2.831 \pm 0.0394) \times 10^8$  m/s, ( $\beta = 0.944 \pm 0.0131$ ), with the mean lifetime of  $2.033 \pm 0.177$  microsecond; this is consistent with the theoretical results. In this experiment, we use the facilities at the School of Particles and Accelerator in IPM.

**Keywords:** cosmic rays, scintillator detector, photomultiplier (PMT), speed and the lifetime of the muons

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