Measurement of large angle muon flux in GRAPES-3 experiment using triggerless DAQ system

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PoS(ICRC2021)379

What is this contribution about?

This work is about detection of large angle muon tracks with the newly upgraded triggerless muon DAQ system which was not possible with the old DAQ system.

Why is it relevant / interesting?

The new triggerless DAQ system is equipped with FPGAs. It allows to record each PRC hits with a time resolution of 10 ns. An offline software trigger allows to identify the muon tracks from raw data itself. This extends the physics scope of the GRAPES-3 muon telescope beyond the conventional objectives.

What have we done?

We have deployed the new DAQ system for 25% of the telescope. The salient features of this system is demonstrated with the identification of large angle muon tracks.

What is the result?

In result the new triggerless DAQ system and the software trigger algorithm allows to reconstruct the muons as large as 85°. It records a good fraction of large angle muons ($\sim$5% at θ>60°) with a good angular resolution.