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Search for New physics with High multiplicity from High energy cosmic rays

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We explore the detectability of generic new physics process with high-multiplicity from Ultra-High energy (UHE) neutrinos (above 100 PeV) with the nucleon in the Earth atmosphere. The current sensitivity from the large area air-shower ground detector arrays (Pierre-Auger and TA) are still above various astrophysical models of Cosmic Rays and GZK neutrino flux with large uncertainties. We consider the criterions for the trigger about neutrino-induced new physics air-showers and heavy-nuclei-like features for proton-induced new physics air-showers. We discuss the current bounds on O(10) TeV scale new physics and also the future prospects. Possible new physics interpretations of recent muon excess in highly-inclined air-showers at Pierre Auger and TA is also discussed.

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