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Neutrino signals by Upward Tau airshowering at Earth horizons and by Muon airshowering at Moon shadows

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Neutrinos are invisible, but their interactions with matter and their leptons signature leave an observable trace. Because the huge atmospheric neutrino noise, produced by cosmic ray rain, there is much hope for reveal highest energy neutrino as an astronomy, above TeVs energy. Neutrino and antineutrino are three. Electron traces radiate a lot therefore are short (meters) trace inside solid matter. Muons radiate much less, therefore are more penetrating (km at TeVs) but escape from matter and decay at far distances, larger than Earth size. Tau are hardly made by cosmic rays. They arise by astrophysical neutrinos democratically mixed in stellar and cosmic oscillating flights. Tau are also very penetrating but very unstable. They decay soon at PeV (49 meter) and their decay in air is amplified in widest area and richest secondaries airshowers. Therefore they are proposed since two decades and searched by recent experiments from mountains, valleys or space: tau airshowers from Earth horizons. Muons at TeVs or above may decay only from the Moon flight to Earth. Their secondary electron trace may airshower on Earth atmosphere as gamma ones. Because magnetic fields, bending vanishes above 6 TeV; the track is contained inside the moon shadows. Therefore rarest gamma-like airshower in LHAASO or in future widest kilometer size gamma array as GRAND may reveal these trough going muons escaping Moon and decaying as electron on terrestrial air. More energetic and fragmented decay may occur from PeVs tau, mostly hadronic pions, escaping and decaying from Moon toward Earth. Novel neutrino astronomy, free of atmospheric noise, may be revealed into widest gamma array recording the Moon shadows.

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Figure 1: A clear caption

1. Introduction

DO IT LATER, after the conclusion. Here:

1. A general panorama
2. The references to the papers and a little explanation about the importance of what we will use to compare/apply our results (other approaches experiments...)
3. The open questions to be answered (What we will find answered in the conclusion)
4. What we want to find (have found).

Citiamo anche i nostri per esempio [1–3].

2. Methods

What should be known before we start to say what we found...

3. Results and Discussions

4. Conclusions

Here the conclusions

References

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[2] D. Fargion, P. Oliva, P. D. S. Lucentini, Crossing muons in icecube at highest energy: a cornerstone to ν astronomy, Nuclear Physics B - Proceedings Supplements 256-257 (Supplement C) (2014) 213 – 217, cosmic Ray Origin – Beyond the Standard Models. doi:https://doi.org/10.1016/j.nuclphysbps.2014.10.024.
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