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Very-high-energy gamma-rays and neutrinos from astrophysical sources

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Since its discovery more than one hundred years ago, the origin of the cosmic-ray flux measured on Earth is still unknown: in order to explain the region under the knee, SNRs are usually addressed as cosmic accelerator candidates, even though no clear indication of PeV energies has been observed so far in such kind of sources. Recently, the Galactic Center region has been detected as a multi-TeV gamma-ray emitter, implying proton primaries in the PeV energy range in case of hadronic production mechanism: this detection triggers the search for a PeV cosmic accelerator at the center of our Galaxy. In order to identify the origin of this emission, a multi-messenger strategy can be adopted: in the case of a hadronic scenario for the production of gamma-rays, neutrinos might be considered as a counterpart for the electromagnetic emission. The potentials of neutrino telescopes are here investigated in the light of the Galactic Center H.E.S.S. detection.

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