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Connecting neutrino Astrophysics to Multi-TeV to PeV gamma-ray Astronomy with TAIGA

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Recent evidence for neutrinos in the PeV energy range from IceCube further motivates the search for the most energetic Galactic accelerators. Gamma-ray astronomy is a sound strategy to reach this goal, providing the energy range beyond 10 TeV can be covered at a sufficient sensitivity level. The energy spectra of most known gamma-ray emitters only reach up to few 10s of TeV. The HEGRA IACT installation reported evidence for gamma-ray energies from the Crab Nebula as high as 80 TeV. Uncovering their spectral shape up to few 100s of TeV could answer the question whether some of these objects are cosmic ray Pevatrons, i.e. Galactic PeV accelerators. Extending observations beyond this energy range requires very large effective detector areas of the order of 10s to 100 square-km. While imaging air Cherenkov telescopes have proven to be the instruments of choice in the GeV to TeV energy range, large detector areas are more easily accessed with the (non-imaging) shower-front timing technique which also naturally provides large viewing angles. The poor gamma-hadron separation power of shower front timing arrays can be compensated by a combination with small imaging air Cherenkov telescopes. Such a new hybrid detector concept is currently being implemented by the TAIGA collaboration in the Tunka-valley in Siberia. The potential of the hybrid technique to access the Pevatron energy range and the status of the TAIGA project will be presented.

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