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# Ultra-high-energy neutrino detection with radio antennas in the ground-based observatory

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The detection of Ultra-High-Energy (UHE) neutrinos offers a unique opportunity to unravel the mysteries surrounding the astrophysical origins of the universe's most energetic cosmic rays. Radio detection promises significant advantages for detecting highly inclined air showers induced by UHE neutrinos, including a larger exposure range compared to particle detectors, which is due to minimal atmospheric attenuation of radio signals combined with good reconstruction precision. Furthermore, this technique improves the air shower longitudinal reconstruction, which can be used to identify neutrinos with their first interaction far below the top of the atmosphere.

In this work, we investigate the potential for detecting UHE neutrinos using ground-based observatories like the Pierre Auger Observatory. We find that incorporating radio detectors enhances trigger efficiency for inclined air showers induced by neutrinos. Precise reconstruction of the shower maximum position and shower axis is essential for neutrino identification via radio signals. Therefore, we highlight the algorithm specifically developed for reconstructing neutrino-induced showers. Additionally, we model the relationship between radio radiation energy and the total shower energy for neutrino events. Finally, we present the expected neutrino detection sensitivity achievable using radio antennas alone.

## Collaboration(s)

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