



Contribution ID: 142

Type: **Short plenary talk (PhD students only)**

Prospects of TDEs investigation as potential candidates of high energy neutrinos

Friday, 21 February 2025 17:00 (5 minutes)

High energy neutrinos are unique particles with tiny masses, interacting via weak and gravitational forces. Their astrophysical origins, detection techniques, and determining their production mechanisms are challenging. Tidally disrupted events (TDE) are potential candidates for very-high- and ultra-high-energy neutrinos. The p-p and p-gamma are two interactions, which can produce such high-energy neutrinos, and metal-rich star accretion in TDEs provides ideal conditions for such processes to take place.

The KM3NeT (Cubic Kilometre Neutrino Telescope), located in the Mediterranean, hosts the next-generation neutrino telescopes, ARCA near Sicily and ORCA near Toulon, with an excellent angular resolution at the level of 0.10° and state-of-the-art hydrophones. The KM3NeT addresses the fundamental questions in astroparticle physics, including the neutrino mass hierarchy, and the origin of ultra-high energy cosmic rays. The presented study aims to reconstruct ultra-high-energy neutrinos via their acoustic signals, generated during their interactions with nuclei in salt water and producing particle cascades that deposit energy in the medium. Additionally, TDEs will be studied as potential sources of high-energy neutrinos.

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Session Classification: PhD short talks

Track Classification: Neutrino Astrophysics