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ANDIAMO, an innovative acoustic neutrino telescope proposal

When extremely energetic neutrinos ($E > 10^{19}$ eV) interact in a medium produce a thermo-acoustic process where the energy of generated particle cascades can be conveyed in a pressure pulse propagating into the same medium. The kilometeric attenuation length as well as the well-defined shape of the expected pulse suggest a large-area-undersea-array of acoustic sensors as an ideal observatory. For this scope, we propose to exploit the existing and no more operative offshore (oil rigs) powered platforms in the Adriatic sea as the main infrastructure to build an acoustic submarine array of dedicated hydrophones covering a surface area up to 10000 km^2 and a volume up to 500 km^3 . In this work we describe the advantages of this detector concept using a ray tracing technique as well as the scientific goals linked to the challenging purpose of observing for the first time ultra-high-energy cosmic neutrinos. Great progresses in signal processing techniques and the augmented computational power of modern computers makes nowadays this project feasible respect to the previous attempts of more than two decades ago.

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