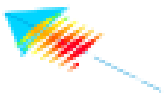

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Deep-learning reconstruction in ANTARES

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ANTARES is currently the largest undersea neutrino telescope, located in the Mediterranean Sea and taking data in its full configuration since 2008. It consists of a 3D array of photosensors, instrumenting about 10Mt of seawater to detect Cherenkov light induced by secondary particles from neutrino interactions. The event reconstruction and background discrimination is challenging and machine-learning techniques are explored to improve the performance. In this contribution, two case studies are presented. In the first one, a deep-learning approach is used to improve the direction reconstruction of low-energy single-line events, for which the reconstruction of the azimuth angle of the incoming neutrino is particularly difficult. We observe a promising improvement in resolution over classical reconstruction techniques and expect to at least double our sensitivity in the low-energy range, important for dark matter searches. The second study employs deep convolutional neural networks for neutrino vs background classification and for energy determination. For both studies, performance results will be presented and compared to other techniques used in ANTARES.

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Clasificación de la sesión : Methods and tools

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