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Neutrino Physics with PTOLEMY: from the mass measurement to the CNB detection

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The cosmic neutrino background is a form of radiation emitted one second after the Big Bang. It is the most abundant source of neutrinos in the Universe; however, due to its extremely low energy, it has never been directly detected. PTOLEMY aims at exploring new experimental techniques to detect the cosmic neutrino background by exploiting neutrino capture on a tritium target. This goal imposes several technological challenges, both in materials science —for the development of a solid tritium target —and in the detection of radio frequencies combined with an innovative electromagnetic spectrometer. Another critical challenge is the measurement of electron energy with extremely high resolution (50 meV), a fundamental requirement that could be achieved by employing micro calorimeters e.g. TES or electrostatic analyzers. Both tecnologies will be tested in the framework of the electron detection system.
PTOLEMY is now entering the construction phase of its demonstrator, which will allow the detector proof of principle, laying the groundwork for the first experimental's physics goal: the measurement of the neutrino mass. The current status and future developments of the project will be presented.

Neutrino Properties

Direct neutrino mass measurement, Cosmic Neutrino Background detection

Neutrino Telescopes & Multi-messenger

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Neutrino Theory & Cosmology

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Data Science and Detector R&D

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