

Towards Cosmic Neutrino Background detection

Symposium on the PTOLEMY project

23 Ottobre 2019 ore 14:00 - Dipartimento di Fisica - Aula Caianiello



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Speakers:

A.G. Cocco (INFN - Sezione di Napoli)
G. Mangano (Università di Napoli Federico II)
M. Messina (INFN - Lab. Naz. del Gran Sasso)
G.P. Pepe (Università di Napoli Federico II)
C. Tully (Princeton University)

The PTOLEMY project aims at the construction of a low energy Cosmic Neutrino Telescope, a unique device that may, for the first time, look at our Universe one second after the Big Bang by detecting neutrinos that decoupled from ordinary matter when the temperature of the Universe dropped below about 1 MeV. These neutrinos, known as the Cosmic Neutrino Background (CNB), date back to well before the photons of the Cosmic Microwave Background (CMB) that underwent a similar decoupling when neutral atoms became stable. Many indirect astrophysical and cosmological observations, the Planck measurements of CMB anisotropies among the latest, tell us that indeed the CNB pervades the Universe. Yet its direct experimental detection has been considered so far extremely difficult, if not just impossible.

The aim of the meeting is to illustrate the original idea of the detection principle and to focus on the many technological aspects and challenges faced by the PTOLEMY Collaboration in order to meet its ambitious goal. A broad audience is expected and welcome due to the many fields of expertise involved. Among others, graphene properties, material science, RF antenna design and low energy electron detection.

References:

A.G. Cocco, G. Mangano and M. Messina “Probing low energy neutrino backgrounds with neutrino capture on beta decaying nuclei”, *JCAP* 06(2007)015
A.G. Cocco, G. Mangano and M. Messina “Low Energy Antineutrino Detection Using Capture on EC Decaying Nuclei”, *Phys. Rev. D* 79 (2009) 053009
M.G. Betti et al. “A design for an electromagnetic filter for precision energy measurements at the tritium endpoint”, *Prog. Part. Nucl. Phys.* 106 (2019) 120-131
M.G. Betti et al. “Neutrino Physics with the PTOLEMY project”, *JCAP* 07(2019)047

