**"How to unravel the youngest Universe: introduction to the PTOLEMY project”**

Prof. Christopher G. Tully (Princeton University)

**Abstract:**

What would we give to see the youngest Universe?  And how can one even imagine how to do that?  One of the most subtle and important discoveries in elementary particle physics was to find that the tiny neutral particles that Enrico Fermi called the neutrinos have mass.  This mass was discovered indirectly through an effect predicted by Bruno Pontecorvo.  In the predictions of the youngest Universe, the tiny neutrino is immensely important, carrying nearly half of the total energy density of a rapidly expanding hot Big Bang, second only to the photons of light.  Unlike the photon, neutrinos are weakly interacting and can tell us about what happens inside burning stars, exploding stars, and even the early moments of the hot Big Bang.  PTOLEMY is a project that will one day detect the neutrinos from the Big Bang, but today, the focus is on first measuring the neutrino mass directly.  The talk describes how the original idea for direct measurement of the neutrino mass by Enrico Fermi has moved into the quantum sub-eV regime and how fantastic new technologies are opening our eyes to never before achieved sensitivity, bringing us closer to getting a glimpse of the very beginning.

**When:** 4 th December 2024, h.4.30 p.m.

**Where:** Room 500, Physics Dept. Via Dodecaneso 33, 16146 Genova