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TALK: Decoding the Flavor Evolution of Supernova Neutrinos: Shedding Light on Neutrino Electromagnetic Properties and Supernova Dynamics

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Two of the most important questions in neutrino astrophysics are: A) How can the extreme supernova environments, through which neutrinos propagate, be used to shed light on the new physics behind neutrino masses and mixing? B) What is the flavor evolution of supernova neutrinos in the latest stages of core collapse? In this talk, I will summarize our recent developments in these directions, emphasizing how the unique magnetic fields of supernova progenitors can modify neutrino evolution in the presence of both Dirac and Majorana neutrino magnetic moments during the first few tens of milliseconds of neutrino emission. For the rest of the neutrino emission (roughly 10 seconds), I will describe how standard matter effects can define the main features of the neutrino signal in terrestrial detectors despite the exotic neutrino-neutrino refraction that dominates in the supernova core.

Presenter: PORTO, Yago (ABC Federal University)