



LNGS SEMINARS

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Can we probe Octant of θ_{23} in presence of New Physics?

Abstract

Present global fits of world neutrino data hint towards non-maximal θ_{23} with two nearly degenerate solutions, one in the lower octant ($\theta_{23} < \pi/4$), and the other in the higher octant ($\theta_{23} > \pi/4$). This octant ambiguity of θ_{23} is one of the fundamental issues in the neutrino sector, and long-baseline (LBL) experiments can resolve this issue with the help of $\nu_{\mu} \rightarrow \nu_e$ appearance channel. First, I will discuss how this measurement would be affected in the upcoming LBL experiments if there exist a light eV-scale sterile neutrino. I will show that in the so called 3+1 scheme involving three active and one sterile neutrinos, a *new interference term* in $\nu_{\mu} \rightarrow \nu_e$ transition probability can spoil the chances of measuring θ_{23} octant completely. Next, I will describe in detail the degeneracy between the octant of θ_{23} and flavor-changing neutral-current non-standard interactions (NSI's) in neutrino propagation. I will show that for values of the NSI coupling as small as *few%*, the discovery potential of the octant of θ_{23} gets completely lost.

September 8, 2017 - 11:00 am
LNGS - "B. Pontecorvo" room