Contribution ID: **78** Type: **Poster**

Study of Sterile Neutrinos in Extensions of the Standard Model of Elementary Particle Physics

The observation of neutrino oscillations provides compelling evidence that neutrinos are massive, a property not accounted for in the Standard Model (SM) formulation. This motivates the inclusion of sterile neutrinos: fermions that are singlets under $SU(3)_C \times SU(2)_L \times U(1)_Y$ and interact only through mixing with active neutrinos or gravitational couplings. Sterile neutrinos provide a promising framework to explain neutrino masses via Dirac or Majorana terms and address key open questions such as anomalies in short-baseline experiments, the nature of dark matter, and leptogenesis.

This study conducts a phenomenological analysis of models extending the leptonic sector with sterile neutrinos. Experimental oscillation data will constrain the parameters of the effective mass matrix and assess active-sterile mixing. The impact of these mixings on oscillation probabilities, mixing angles, and unitarity violations in the extended PMNS matrix will be evaluated. Possible signals of light and heavy sterile neutrinos will also be explored in current experiments like DUNE and JUNO, and future colliders.

Finally, the decay widths of heavy sterile neutrinos will be calculated to characterize their decay channels and assess their detectability. This framework aims to guide both data interpretation and experimental strategies in the search for new physics beyond the SM.

Author: ALMANZA, Nataly

Presenter: ALMANZA, Nataly