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Leptonic CP violation and mass hierarchy in the presence of sterile neutrino

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We investigate the impact of a light sterile neutrino ($\sim \text{eV}$) on the prospective data expected from currently running long-baseline experiments T2K and NOvA. If the future short baseline experiments confirm the existence of an eV scale sterile neutrino, then the 3+1 scheme will modify the mass hierarchy and CP-violation searches of the 3 active neutrino scenario in these two experiments (taken alone and in combination). We perform a detailed study of the sensitivity of these two experiments in the presence of new active sterile mixing angles and Dirac CP-violating phases. T2K and NOvA may give the first indications of new CP phases involved in such a 3+1 scenario and enable the extraction of more information on this enlarged active sterile mixing parameter sector.

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