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Exploring Octant and CP violation at DUNE in presence of Reactor Experiments

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Deep Underground Neutrino Experiment (DUNE) is an upcoming long baseline experiment at Fermilab, which aims to answer many fundamental questions both in particle physics and astrophysics. Neutrino physics is in the precision era. DUNE can answer questions regarding neutrino mass ordering, the octant of atmospheric mixing angle θ_{23} and most importantly it can probe CP violation in the neutrino sector. Here in this work, we have explored the octant and CP violation sensitivity at DUNE by combining data from reactor experiments. With a 35 kt Liquid Argon time-projection chamber deployed as a far detector, at Sanford Underground Research Facility, DUNE is capable of resolving the octant ambiguity as well as discovering CP violation in the neutrino sector. Our work shows that combining reactor data with DUNE improves both octant and CP violation sensitivity significantly.

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