Mini-projects

- 1. Leptonic CP violation

Analyse how CP violation can emerge in the leptonic mixing matrix and study how it can be tested in neutrino oscillations

i) Starting from the propagation of neutrinos in matter with constant density and in the 3-neutrino mixing scheme, derive an approximated formula for the oscillation probability of muon to electron neutrinos.

ii) Use this result to understand how T2K/NOvA and then T2HK and DUNE can gain information on the neutrino mass ordering and on leptonic CP violation.

iii) To this aim, plot the probability in various experimentally relevant situations.

Possible further directions: perform an analysis of T2K or DUNE with the globes code to obtain CPV sensitivity.