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## Muon beams for Neutrino CP violation: A bridge between Energy and Neutrino Frontiers

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Here I present our recent proposal for connecting neutrino and energy frontiers by exploiting collimated muon beams for neutrino oscillation. As known, neutrino oscillation is one of the most important problems beyond standard model physics. Its observations enable us to infer that neutrinos have masses, although tiny. Another crucial problem within neutrino physics is the violation of Charge and Parity conservation, or namely CP violation. Here in our proposal we examine possible sensitivity on CP violating phase through oscillation modes of  $\nu_\mu$ ,  $\nu_e$  and their antineutrinos into  $\nu_\tau$  ( $\bar{\nu}_\tau$ ), produced from  $\mu^+ \rightarrow e^+ \bar{\nu}_\mu \nu_e$  and  $\mu^- \rightarrow e^- \nu_\mu \bar{\nu}_e$  decay channel. Interfacing with long baseline neutrino detectors such as DUNE and T2K, this proposal can be used to measure CP violating phase,  $\delta_{CP}$  and also serve as bright  $\nu_\tau$  factory. The symmetric  $\mu^+$  and  $\mu^-$  beams produce symmetric neutrino and anti-neutrino sources and importantly, signals for neutrino and antineutrino oscillation can be collected simultaneously. With rich flux of muon sources,  $5\sigma$  deviations of sensitivity can be easily reached for CP phase as  $|\pi/2|$ , within only 1-2 years of data taking.

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