ν Physics with Project X 8-GeV Beam

- Construct a low duty-factor ν beam as part of Project X with an 8-GeV, 0.2 MW proton beam

- **Short Baseline Physics:**

Search for sterile neutrinos & large Δm^2 ν oscillations via ν_e appearance & ν_μ disappearance

Search for other weakly-interacting particles (e.g. axions, new scalar/vector bosons) by their decay or interaction

Measurement of $\nu e \rightarrow \nu e$ elastic scattering ($\sin^2\theta_W$, μ_ν)

Measurement of ν cross sections & axial-currents in nuclei

Understand the MiniBooNE Low-Energy Excess (axial anomaly radiative process? 3+2 Model with CP Violation?)

BooNE at FNAL

Two identical detectors (e.g. 2 or more Liquid Cherenkov detectors or 2 or more Liquid Ar detectors) at different distances

BooNE would involve a second “MiniBooNE-like” detector (~$8M) at FNAL at a different distance; with 2 detectors, many of the systematics would cancel

Search for sterile neutrinos via **NCPI0** scattering & **NCEL** scattering