

Experiment	Beam Source	Detector (threshold)	Interaction	Flavors	Physics	Status
DUNE	PIP-II / NuMI (0.5~10 GeV)	L-Ar Time Projection Chamber, (a few MeV)	NC, CC, ES	all	Oscillation Interaction	Construction

Physics Issues of DUNE

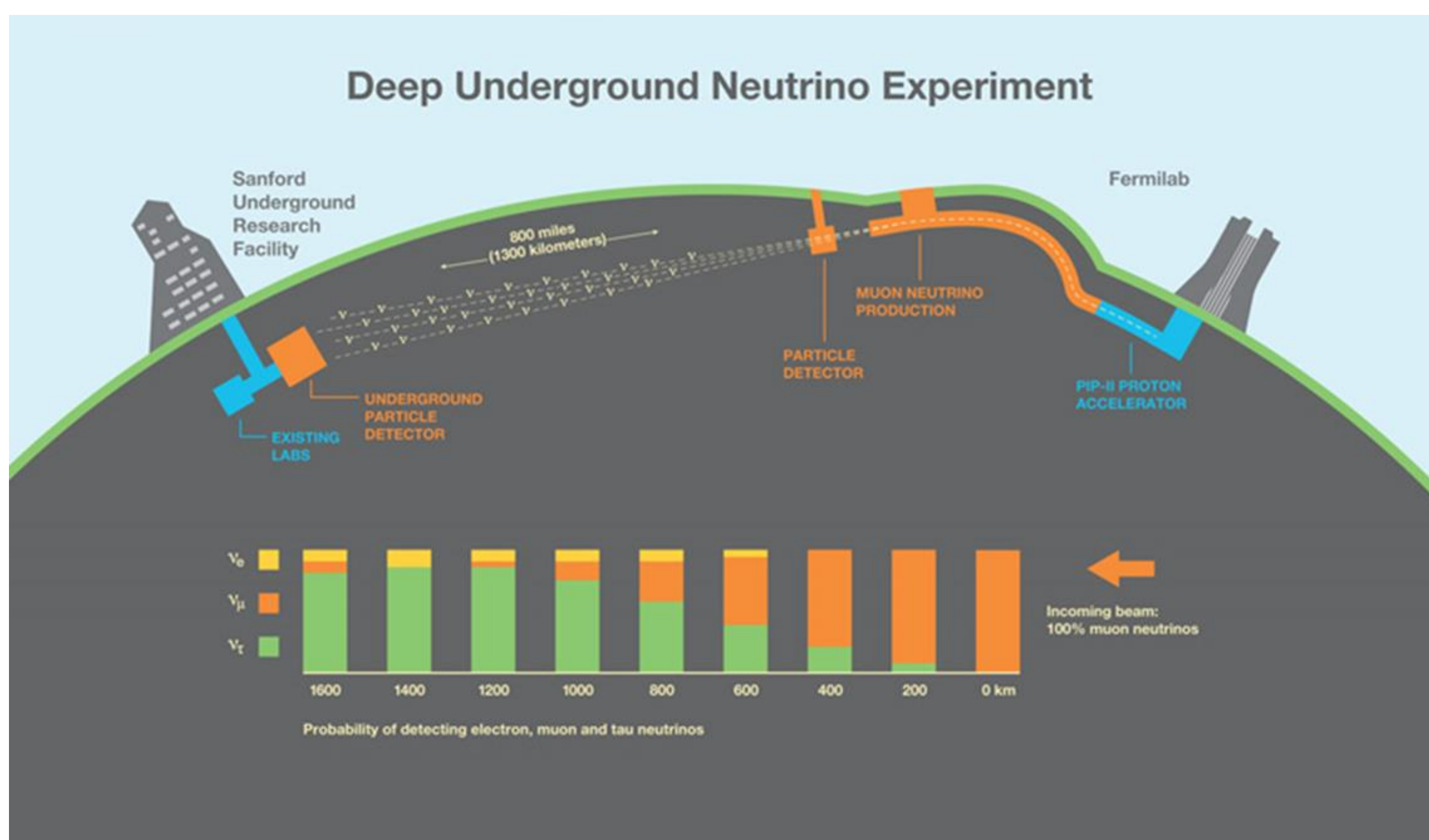
Accelerator-Neutrino Physics

- Long-baseline oscillation
- Neutrino interactions
- ProtoDUNE analysis
- BSM and more!

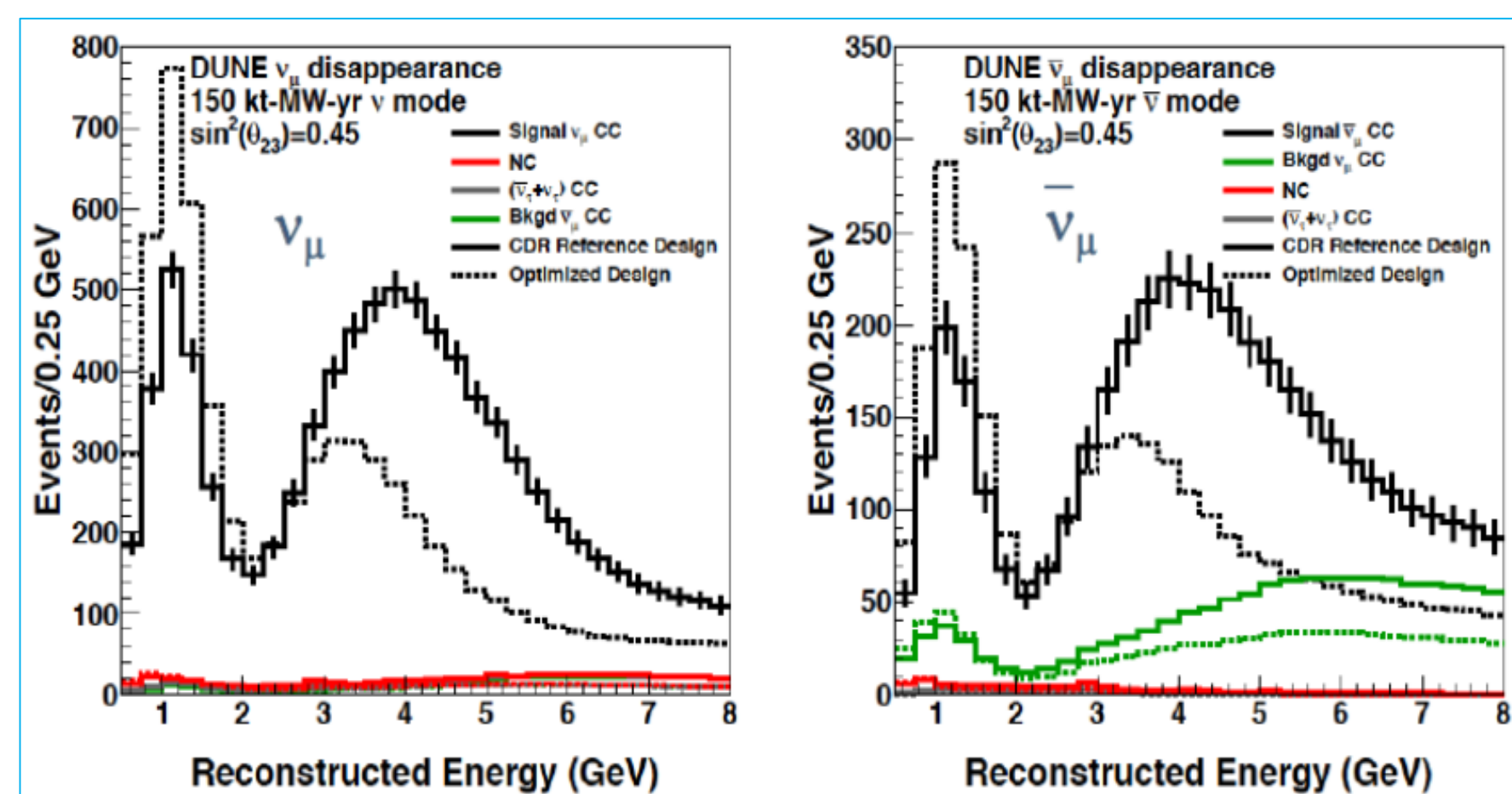
Non-Accelerator Physics

- High-Energy Neutrinos (GeV-scale):
 - atmospheric neutrinos,
 - nucleon decays
 - other signals with atm nu background
- Low-Energy Neutrinos (1-10 MeV-scale):
 - Super Nova burst
 - Solar nu
 - with natural radioactivity background

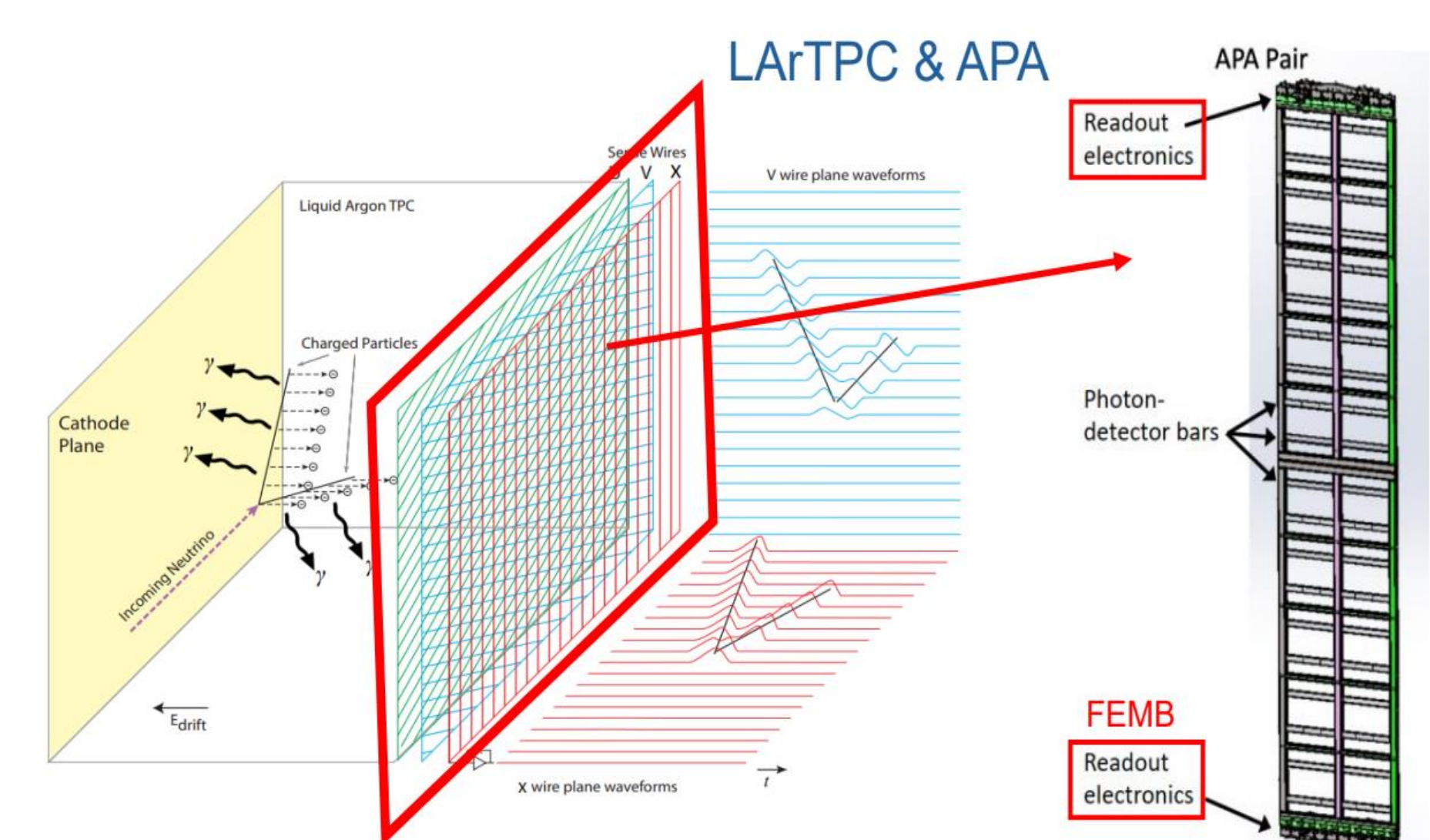
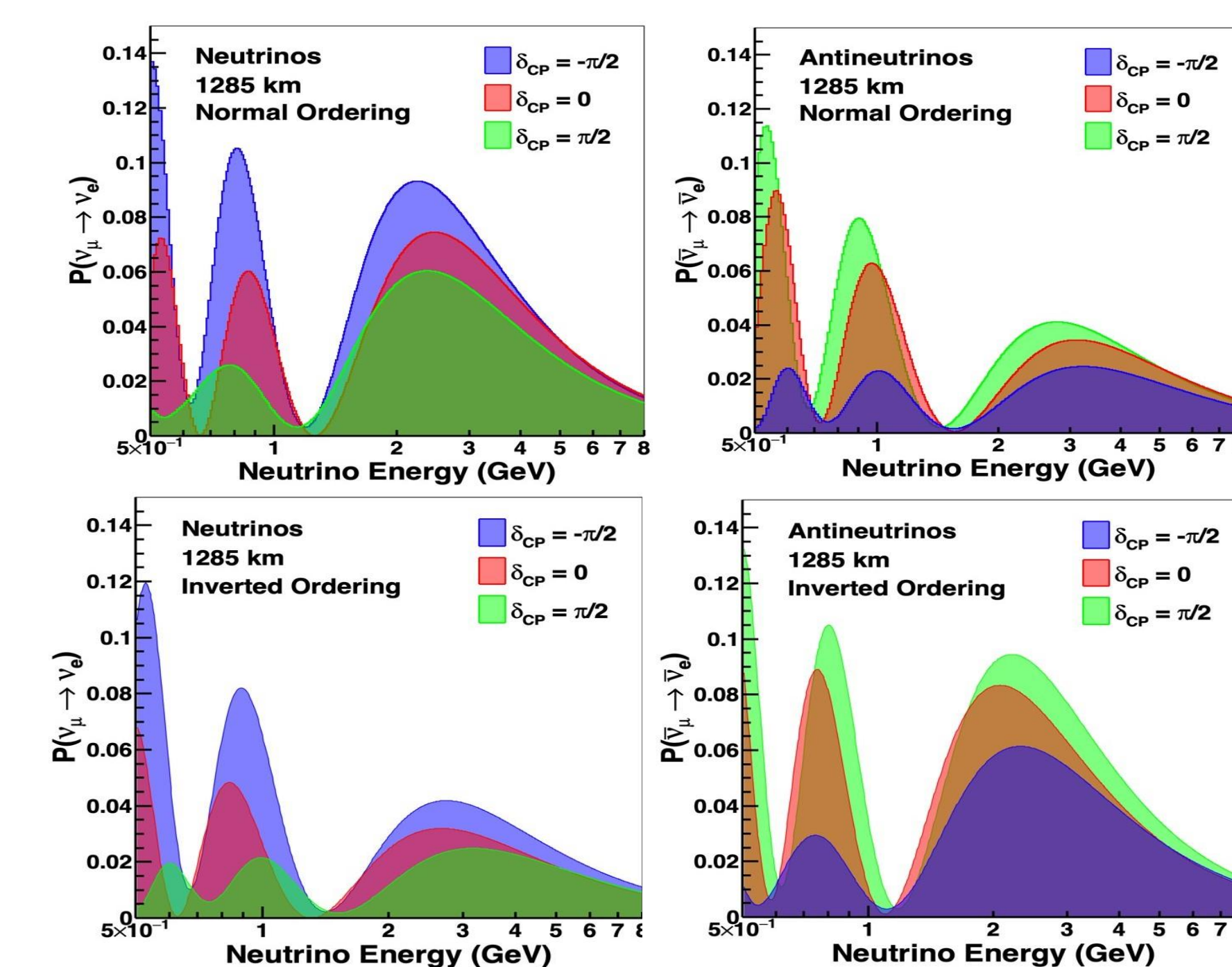
Long-Baseline Neutrino Oscillation



Beam Optimization

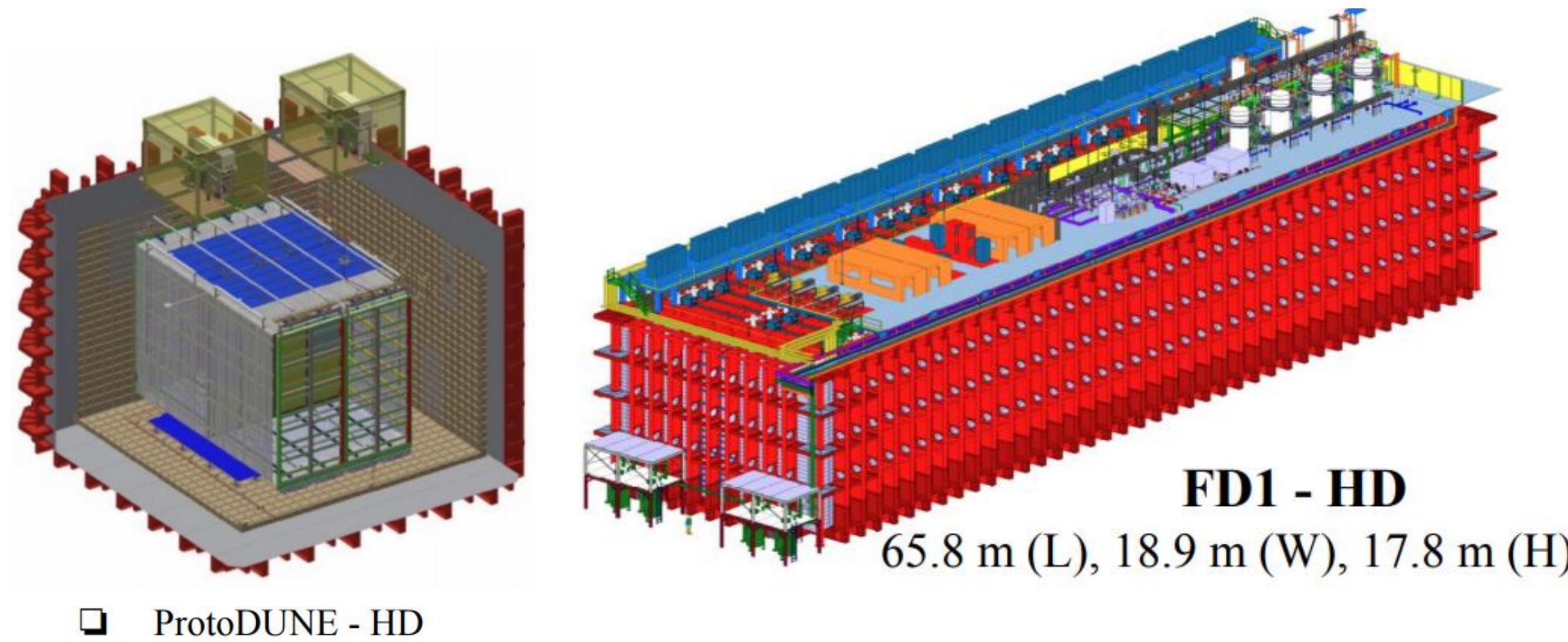


CP Violation

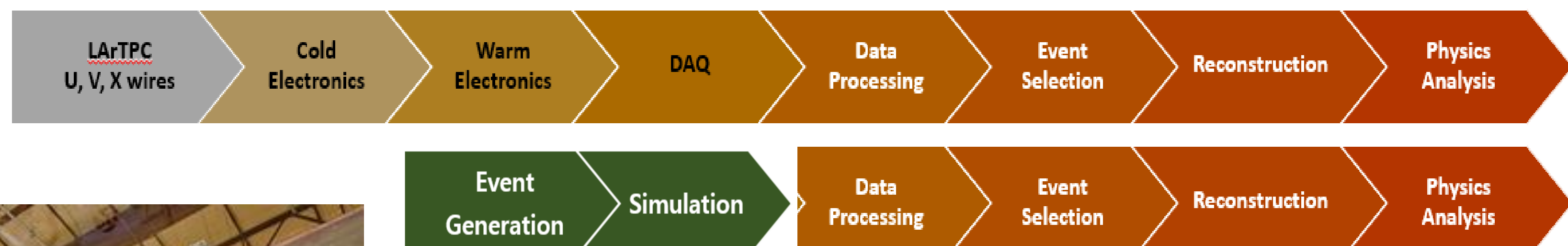


Liquid Argon Time Projection Chamber

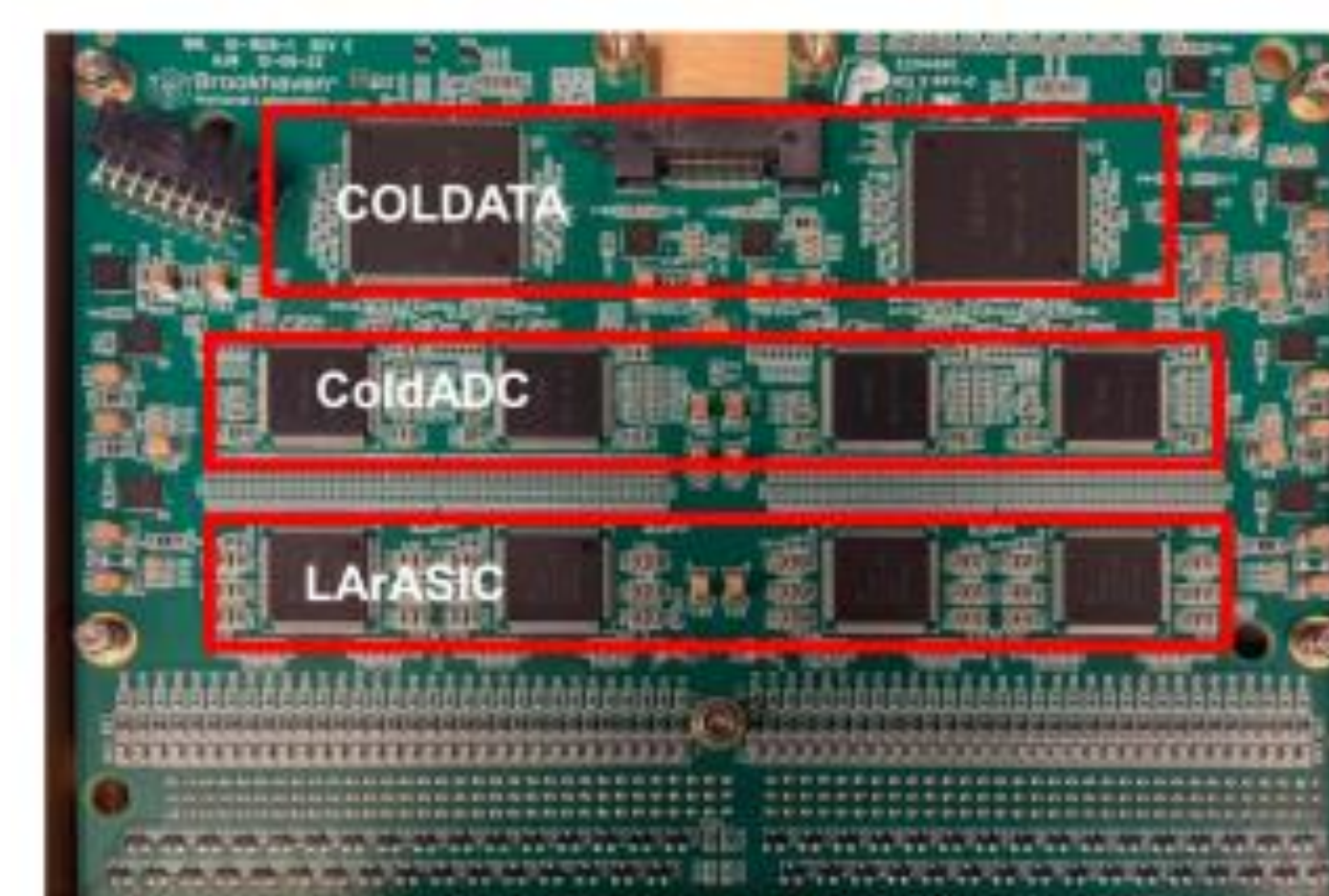
2025 ProtoDUNE Run-II (2단계) 가동, 실제 검출된 데이터 분석 실행
 2026-2027 DUNE FD(원거리 검출기) 설치
 2027-2028 DUNE FD 데이터 분석 실행



From Detection to Analysis



FEMB(Front-End Mother Board) with 3-ASICs



DUNE Korea since 2016

- Chung-Ang University (2016) IR: Kim Siyeon
- Jeon-Buk National University (2020) IR: Seondong Shin
- Seoul Nat'l Univ. of Sci & Tech. (2025) IR: Myeonghun Park
- Sejong University (2025) IR: Yong-Sun Kim
- Jeju National University (2025) IR: Young Ju Ko



CAU Nulans for DUNE

Members

Group leader: Kim Siyeon

Researchers: Mehedi Masud, Sunwoo Gwon, Nishat Fiza

Students: Suhyeon Kim, Juseong Park, Hokyeong Nam, Sun-Hong Kim, Yujin Park

Alumni: Young-Ju Ko, Yeon-Woo Jeong

Research Areas

Physics Topic: Neutrino Oscillation (Reactor Nu., Acc. Nu.), Neutrino Interaction (QE, Neutron kinematics), BSM Search (Sterile Nu., Large Extra Dimension., Non-Standard Interaction)

Detector: Liquid Argon Time Projection Chamber, 3-Dim Scintillation Tracker, Water-based Liquid Scintillator

Computing Expertise: MC, CNN, GNN, Transformer, QML

Tool Package: Genie, GEANT4, RAT-PAC, GLoBES, LArSOFT-WireCell

