$\nu_\mu CC1\pi^+$ interaction on Carbon (FGD1) with 4π acceptance

Neutrino group meeting

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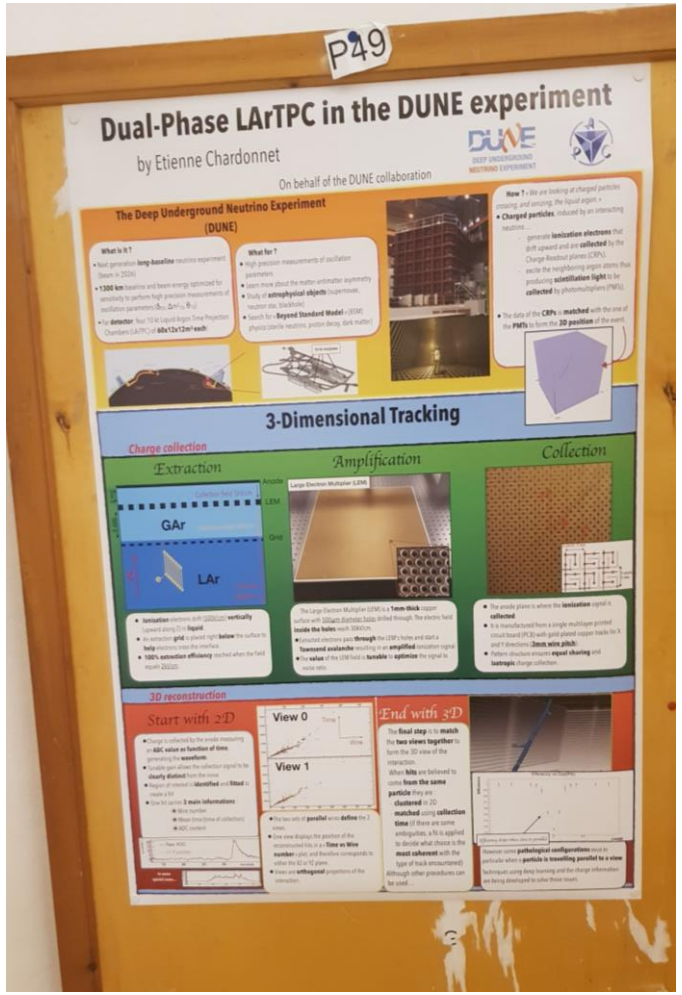
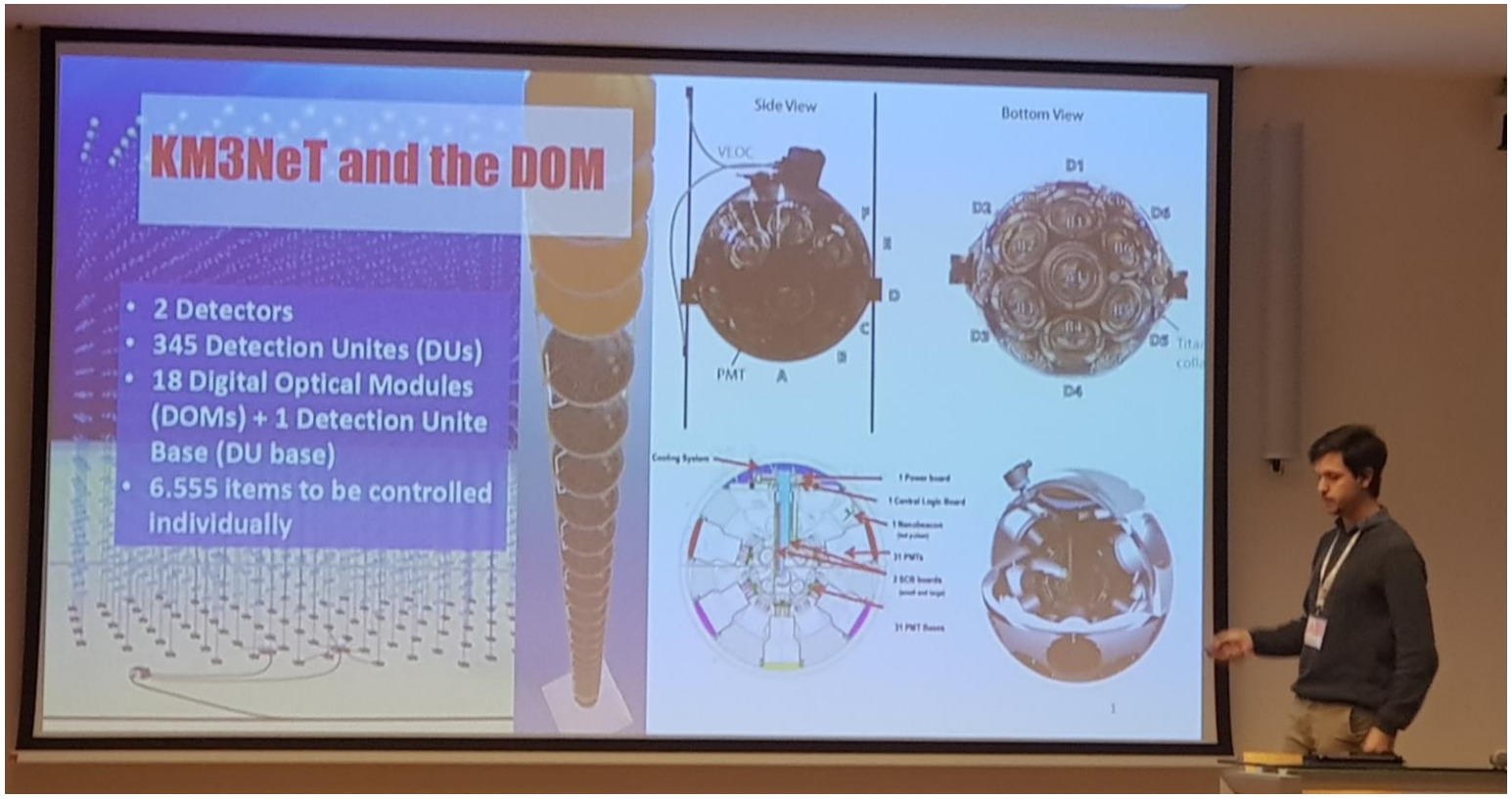
October 24th, 2019

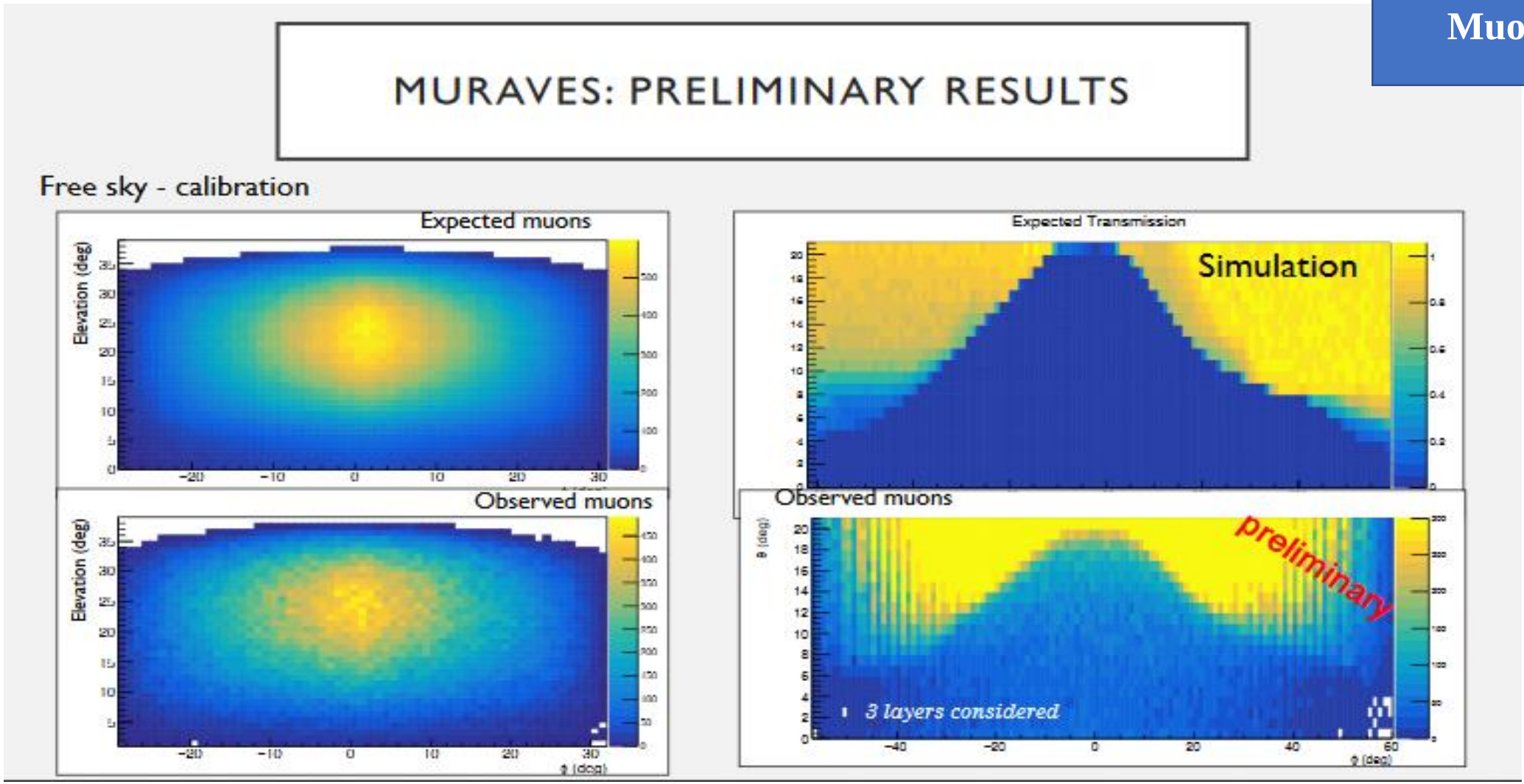
15th Topical Seminar on Innovative Particle and Radiation Detectors (IPRD19)





15th Topical Seminar on Innovative Particle and Radiation Detectors (IPRD19)

Muography



T2K Cross-Section Workshop

Software:

✓ nd280Highland v2r35

Signal:

selecting events with a CC1π^+ topology in FGD1:

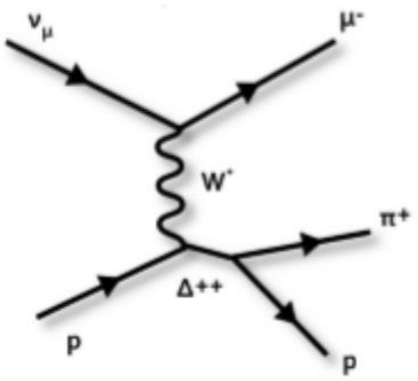
✓ 1 muon (in 4π acceptance)

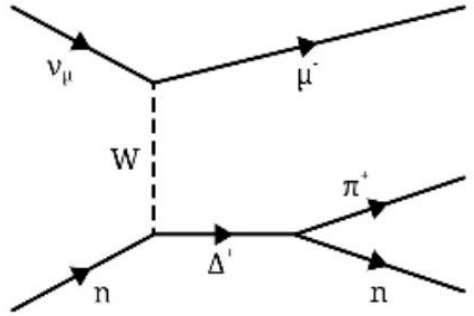
✓ 1 positive pion in TPC

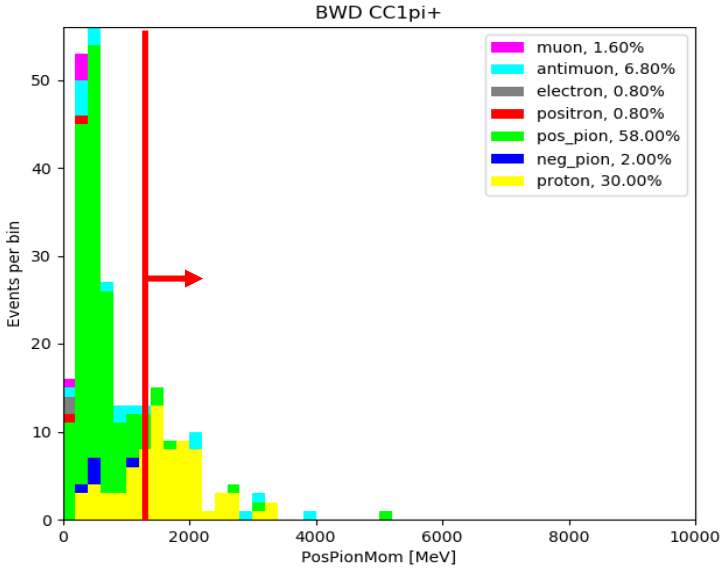
✓ with or without cut on the P_π in TPC

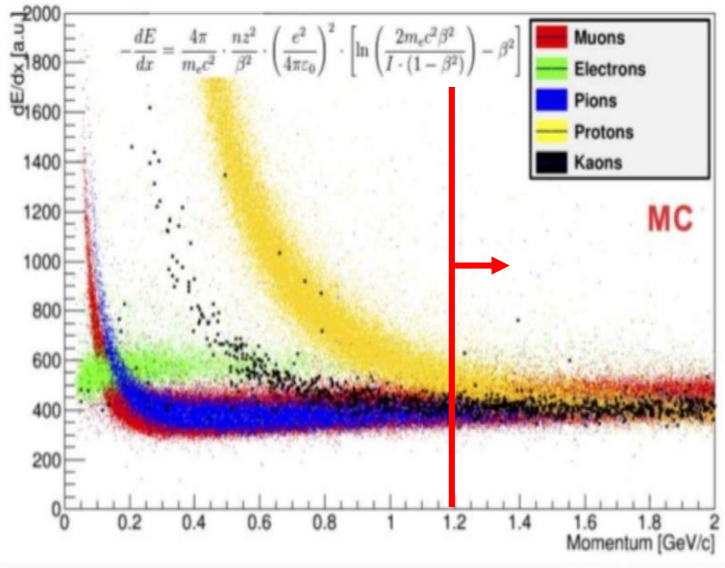
✓ with or without FGD π and ME tagging

✓ with or without the π^0 ECal veto









T2K Cross-Section Workshop

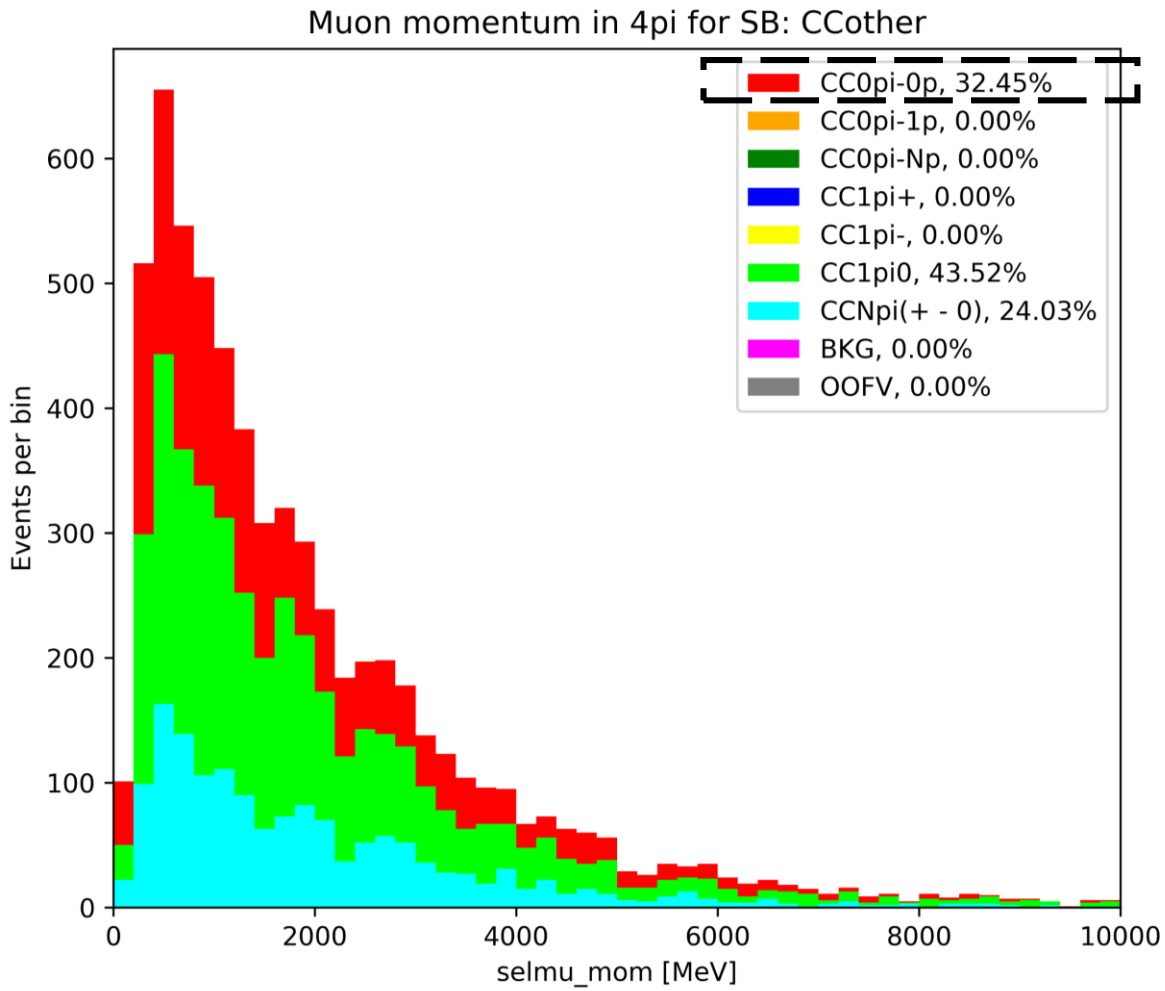
Momentum distribution for BWD based on true topology and true particle ID.

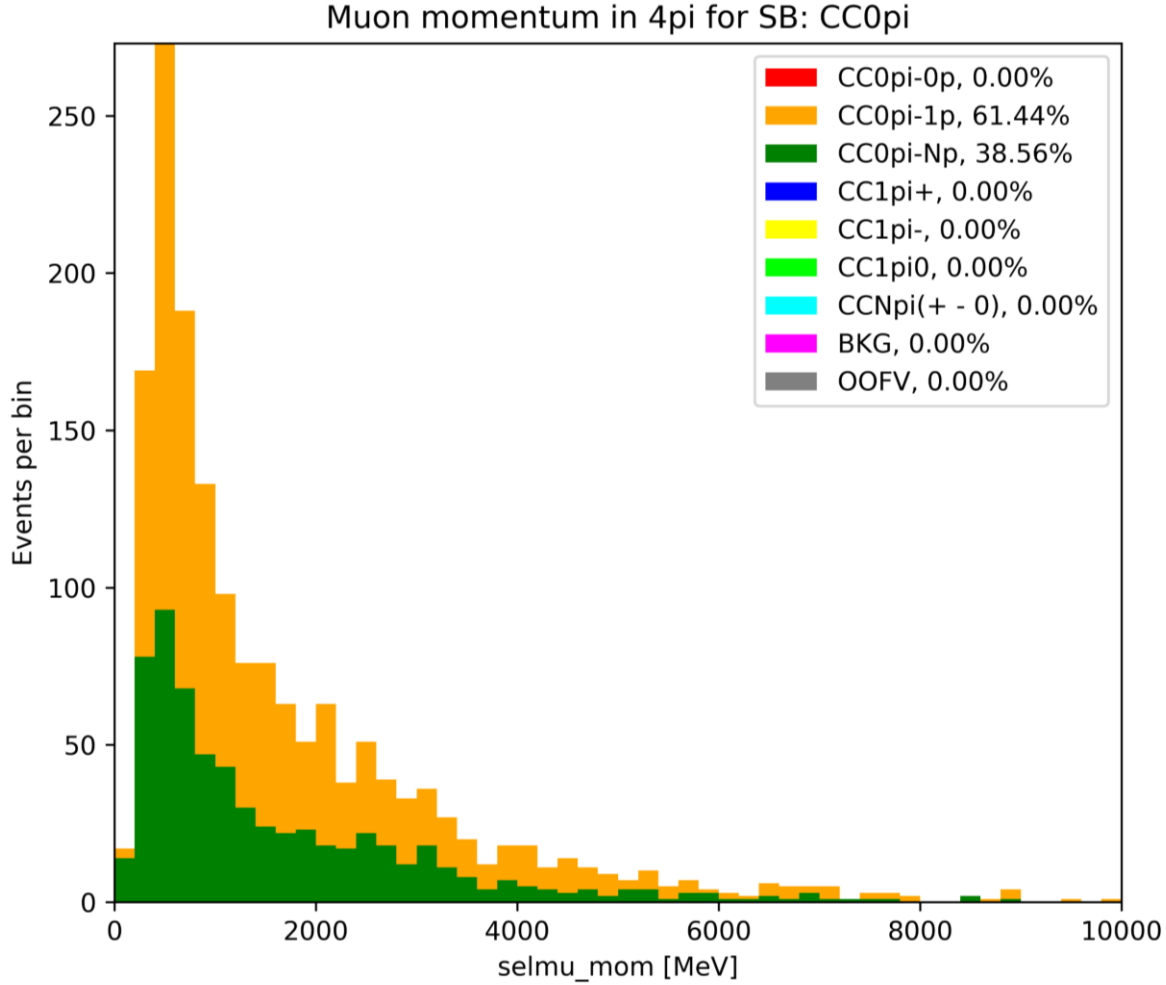
Note: In other to reduce the contribution of the CC0π (that one of the contribution is coming from protons identify as pions in the TPC) I applied the cut in the momentum of the particle when doing the TPC pion ID.

No momentum information of the ME or FGD pions!!!

FGD π & ME	P_{π} (TPC) cut	π^0 ECal veto	Results (topogy)	Results (particle)	
X	---	---	CC0π~25% CC1π^+~ 30% CCother~ 25% BKG~ 5% OOFV~ 16%	μ^-~ 84% π^-~ 11% π^+~ 4%	π^+~ 58% p~ 30% μ^+~ 7%
X	---	X	CC0π~ 29% CC1π^+~ 35% CCother~ 16% BKG~ 5% OOFV~ 15%	μ^-~ 84% π^-~ 10% π^+~ 4%	π^+~ 55% p~ 33% μ^+~ 8%
X	X	X	CC0π~ 13% CC1π^+~ 50% CCother~ 18% BKG~ 3% OOFV~ 16%	μ^-~ 86% π^-~ 7% π^+~ 5%	π^+~ 76% p~ 12% μ^+~ 6%

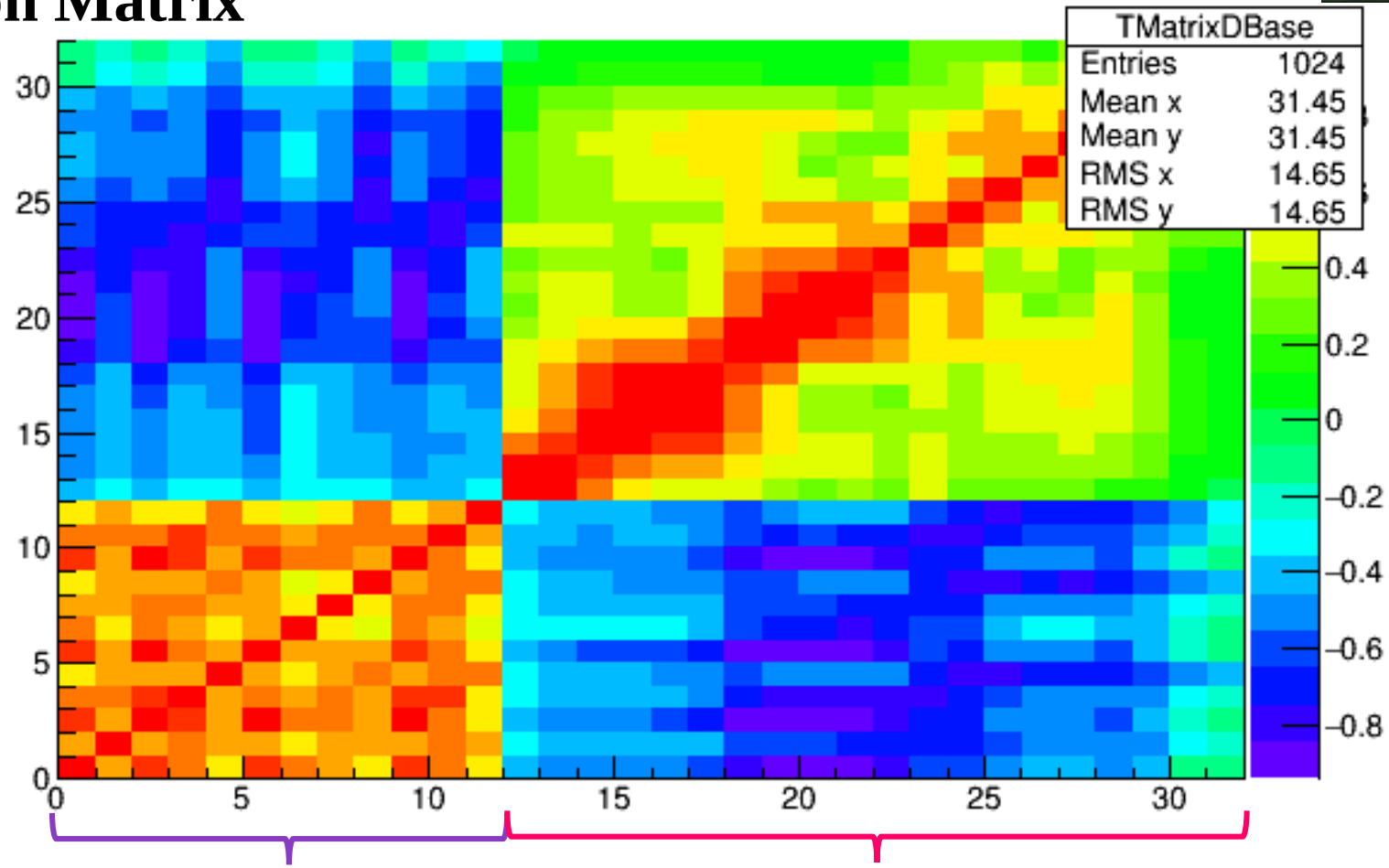
T2K Cross-Section Workshop





T2K Cross-Section Workshop

Correlation Matrix

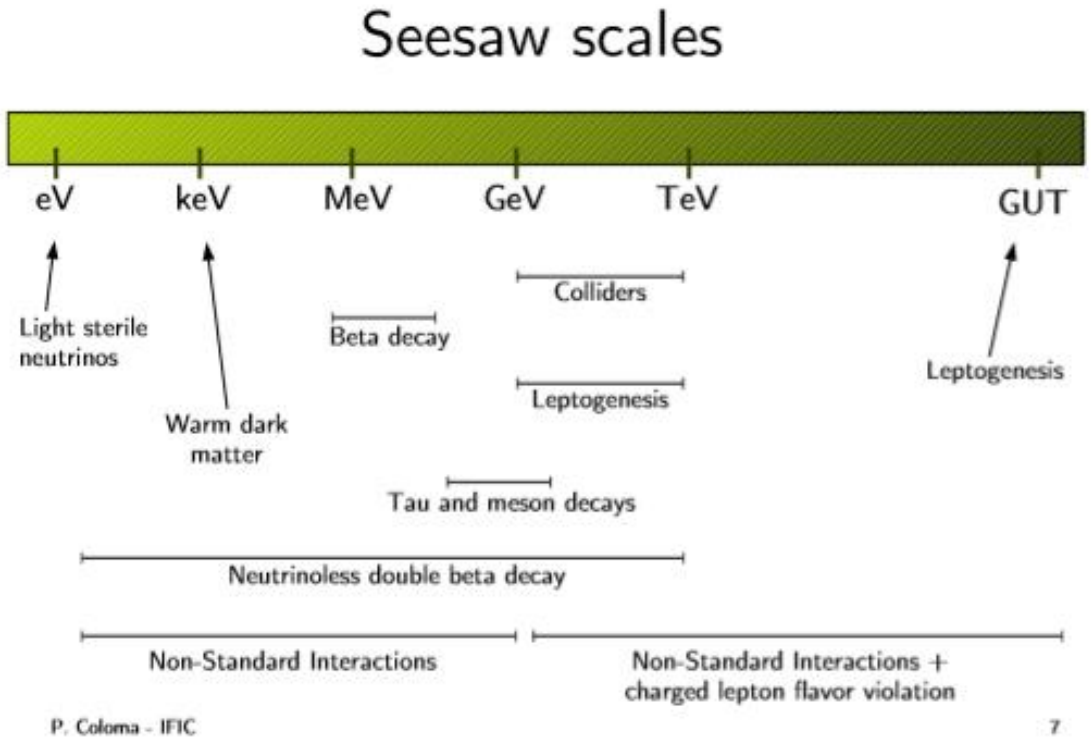


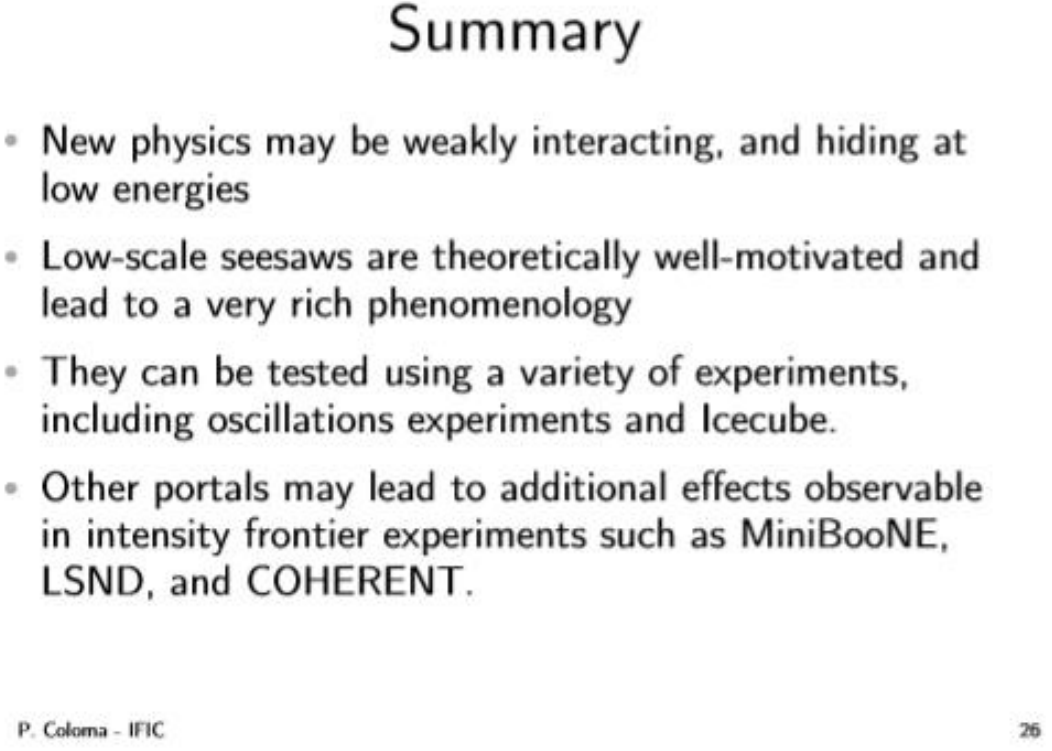
XI CPAN DAYS

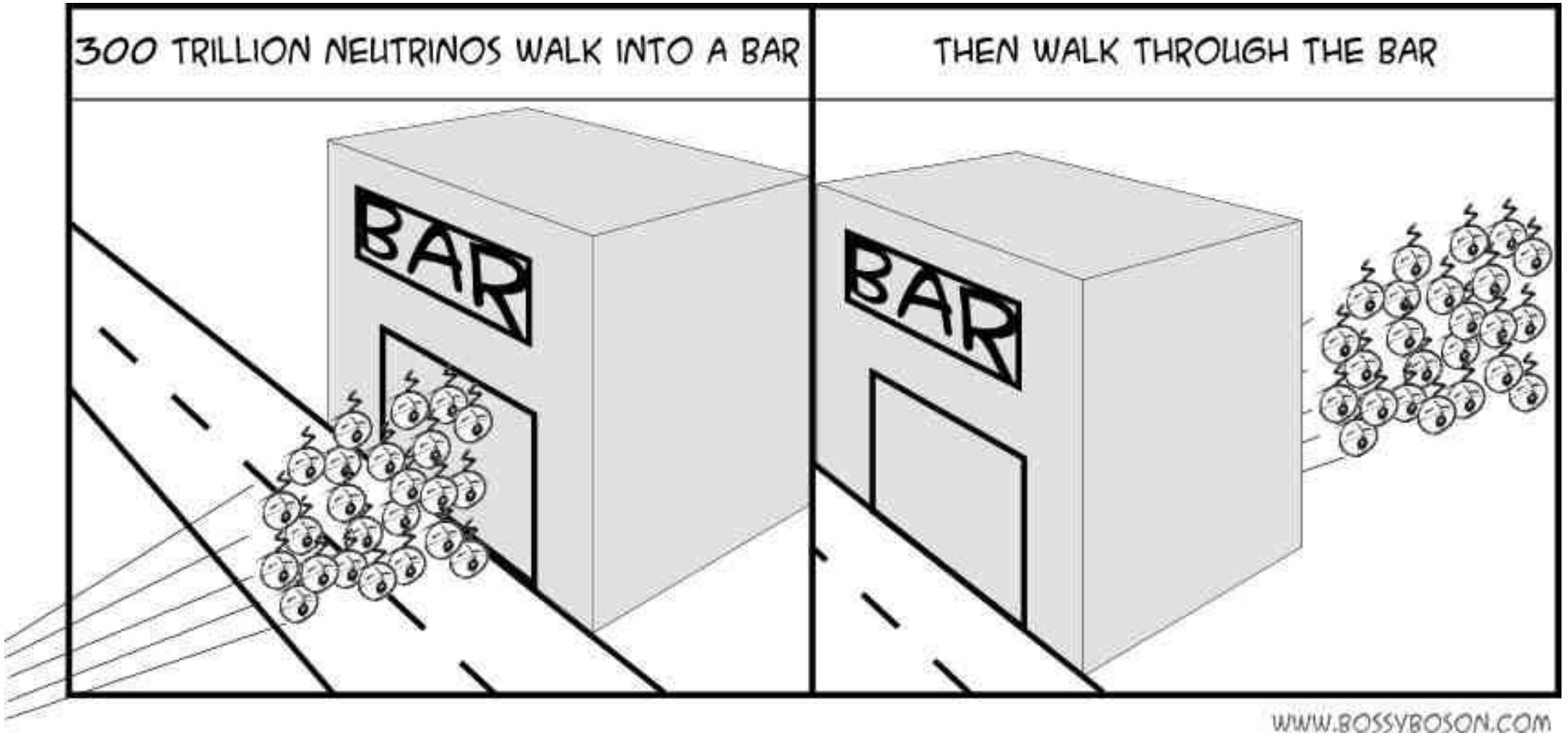
- **Theorical Physics:**
  - A Strong Scalar Weak Gravity Conjecture and Some Implications
  - Charged Lepton Flavor Violation in low scale seesaw models
- **Astrophysics:**
  - Light detection results in protoDUNE Dual-Phase at the CERN Neutrino Platform
- **Plenary talks:**
  - The global 3-neutrino picture [before DUNE and Hyper-K]
  - New physics searches with neutrino experiments

XI CPAN DAYS

New physics searches with neutrino experiments






300 TRILLION NEUTRINOS WALK INTO A BAR
THEN WALK THROUGH THE BAR
BAR
BAR
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Thank you!!!