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ProtoDUNE-ND: Containment Studies

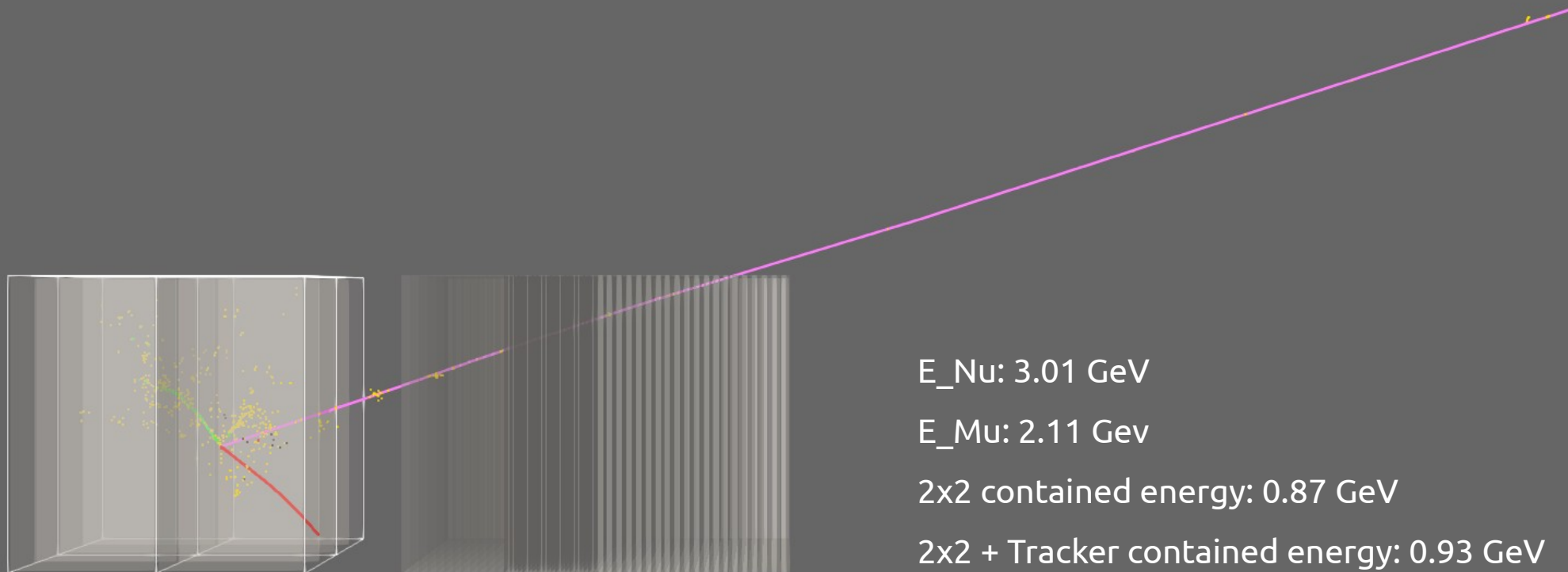
ArgonCube Fortnightly Call
Mai 8th, 2019

Patrick Koller (patrick.koller@lhep.unibe.ch)

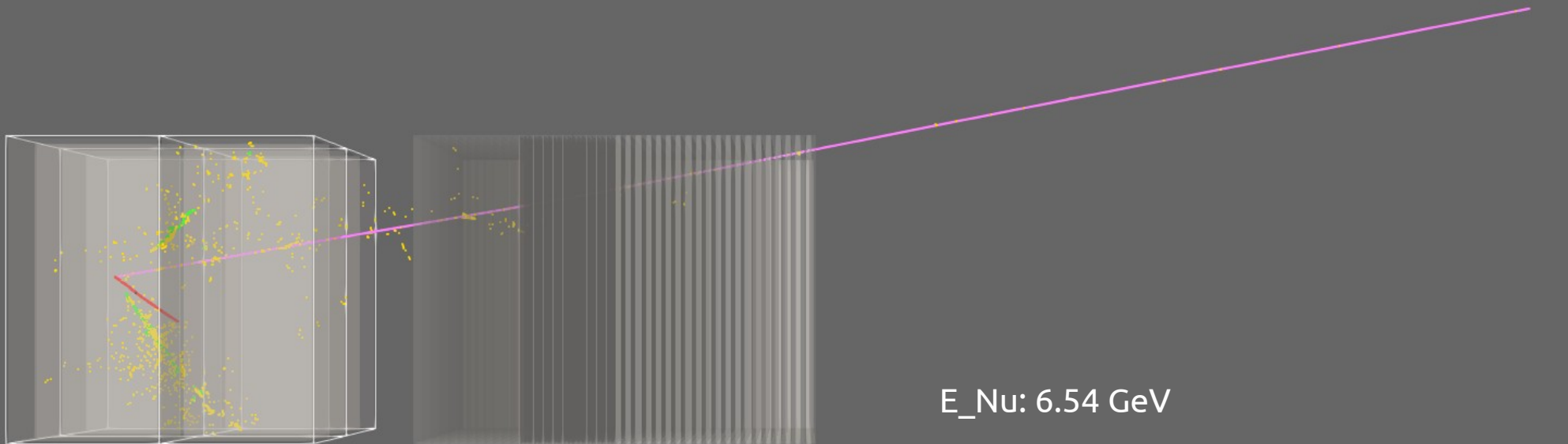
Updates

- Had a quick look into what fraction of energy is carried away by the primary muon.
(proposed by Dan during the last Call)
- How does it affect event containment in ProtoDUNE-ND?

Example 1



Example 2



E_{Nu} : 6.54 GeV

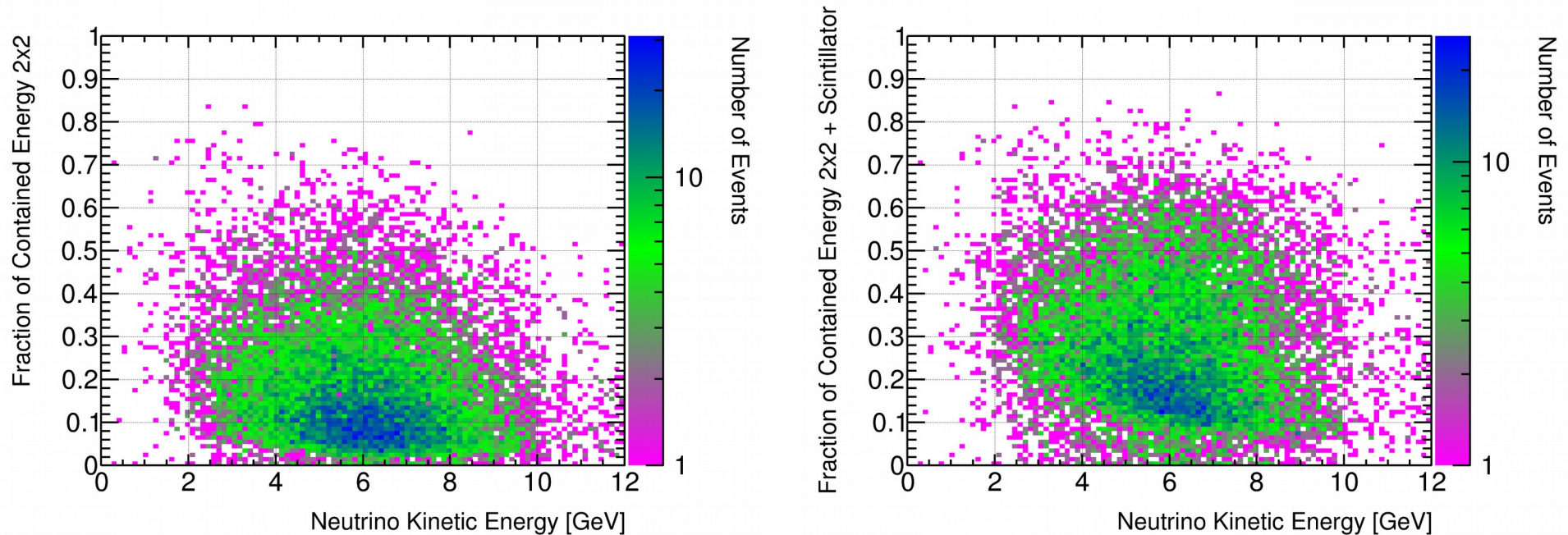
E_{Mu} : 5.38 GeV

2x2 contained energy: 1.10 GeV

2x2 + Tracker contained energy: 1.20 GeV

Energy Containment: **Total Event**

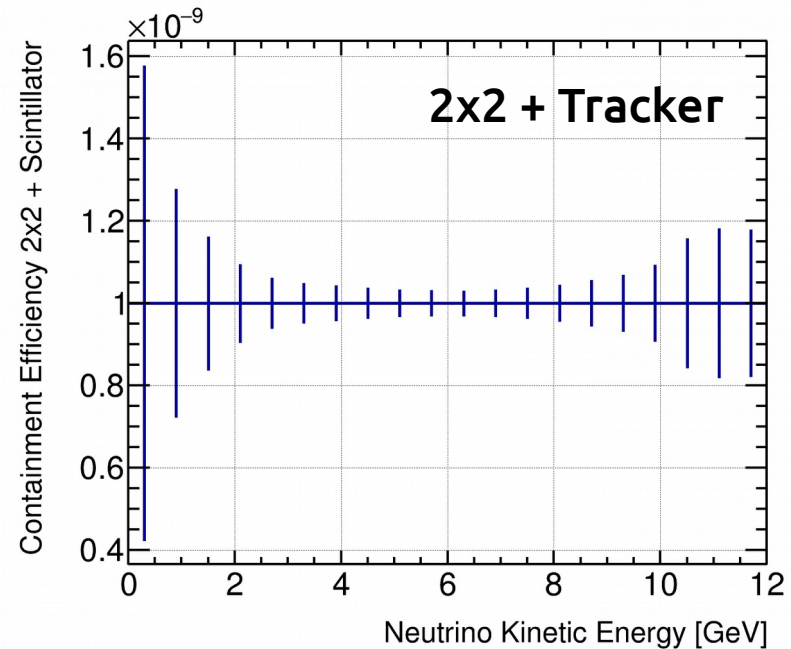
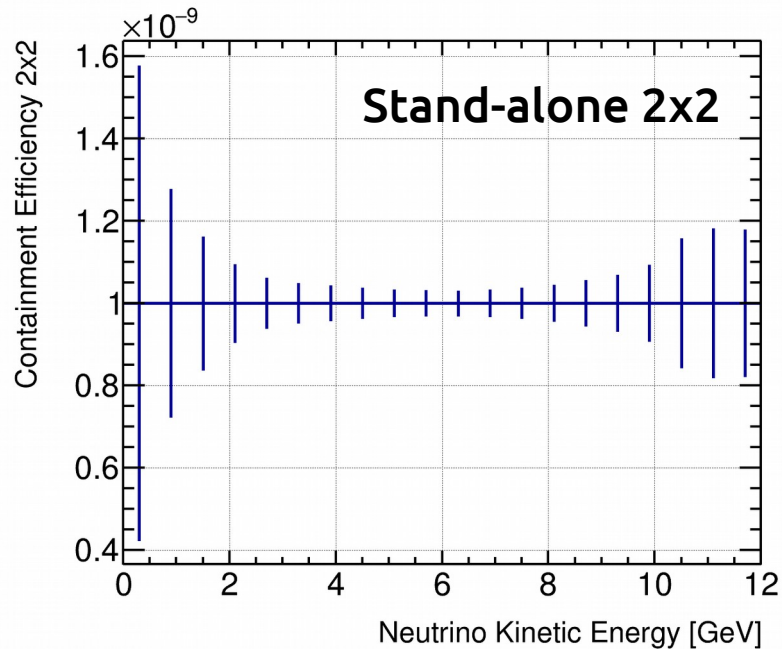
Including primary muon energy:



If more than 90% of **total energy** is deposited within the 2x2 active volume, it is classed as contained.

Containment Efficiency: Total Event

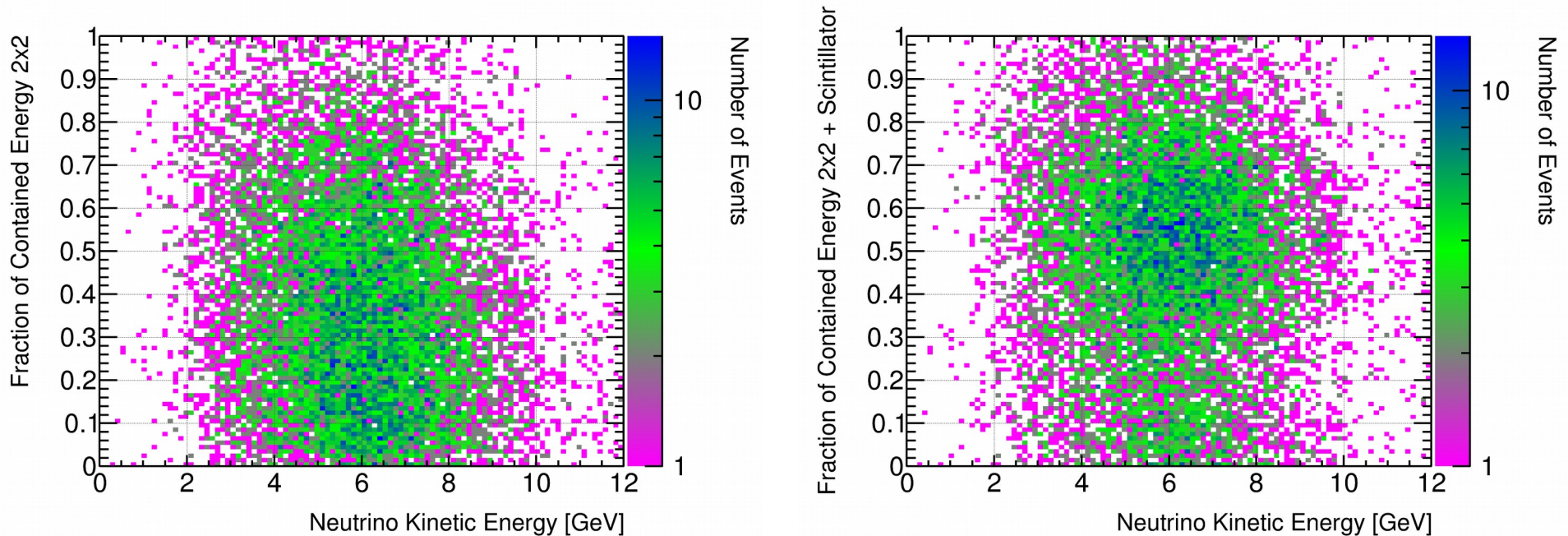
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Energy Containment: **Total Event**

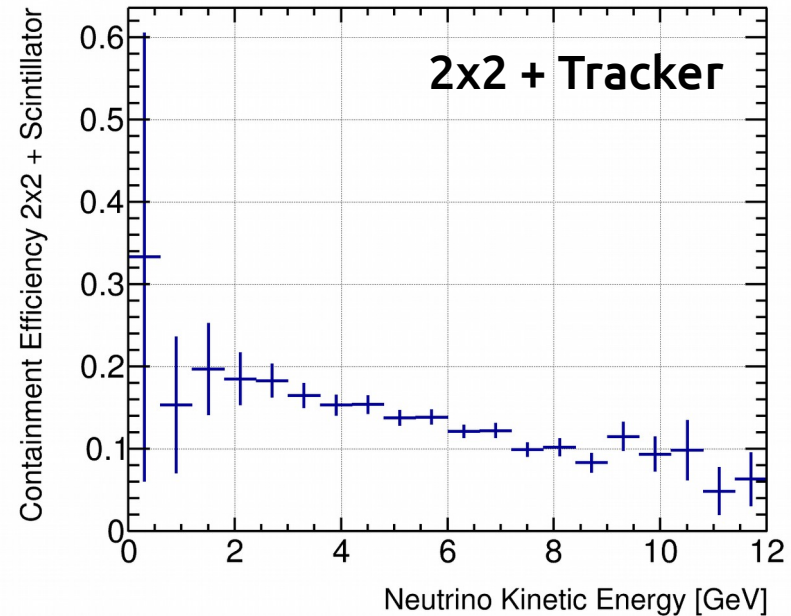
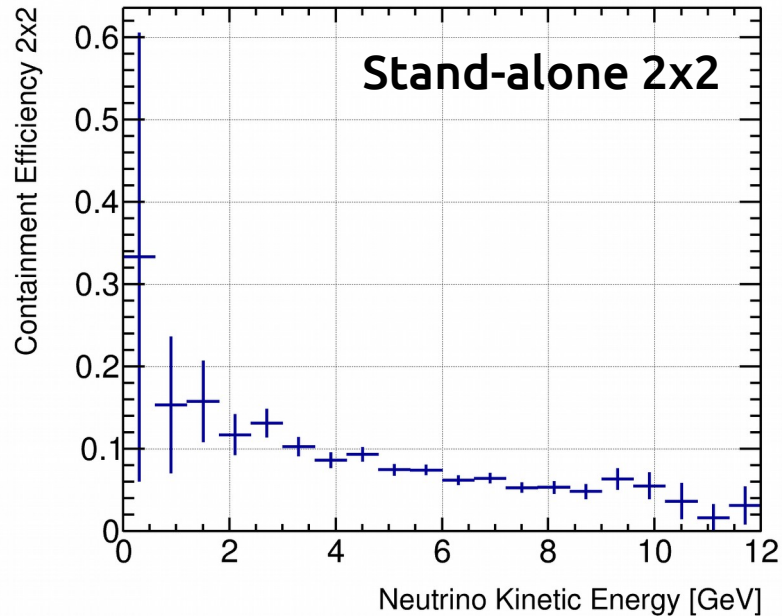
Ignoring primary muon energy:



If more than 90% of **total energy** is deposited within the 2x2 active volume, it is classed as contained.

Containment Efficiency: Total Event

Ignoring primary muon energy:



If more than 90% of **total energy** is deposited within the 2x2 active volume, it is classed as contained.

BACKUP

Updates presented last Fortnightly Call

- Total energy containment of the event
- Implemented gap between 2x2 and downstream tracker
- Implemented fiducial volume for nu vertices:
 - 30 cm from each side (~2 radiation lengths of LAr)
 - **not applied** to proton-induced tracks/showers

<https://indico.fnal.gov/event/20429/material/slides/0.pdf>