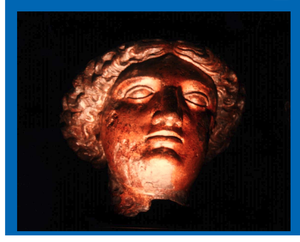
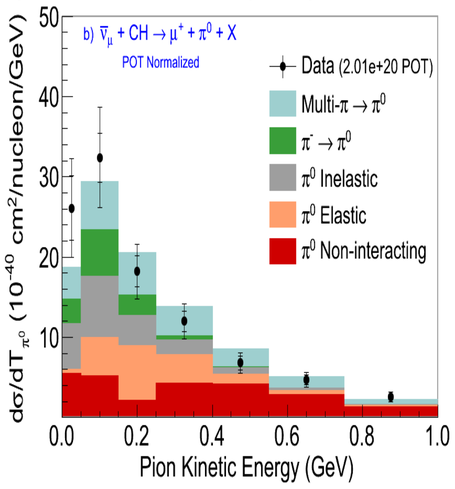
CC1pi0X in plastic scintillator (CH) at ME



Roger Galindo - Universidad Tecnica Federico Santa Maria
On behalf of MINERvA Collaboration

Motivation

LE Semi-Exclusive
Phys. Lett. B 749, 130 (2015)



The differential cross section measurement is in progress and close to be finished. It is made with the intention to:

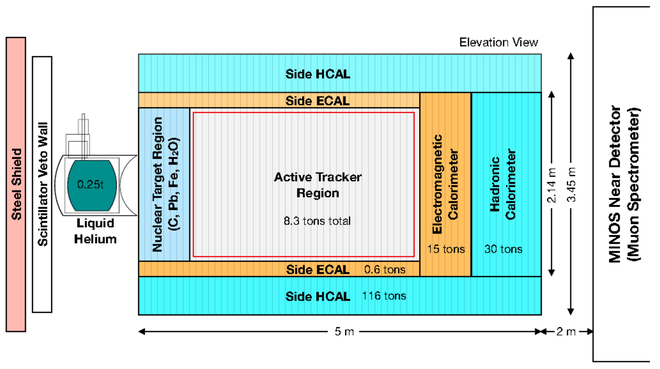
1. Be the 1st MINERvA measurement of single neutral pion in a semi-inclusive channel.

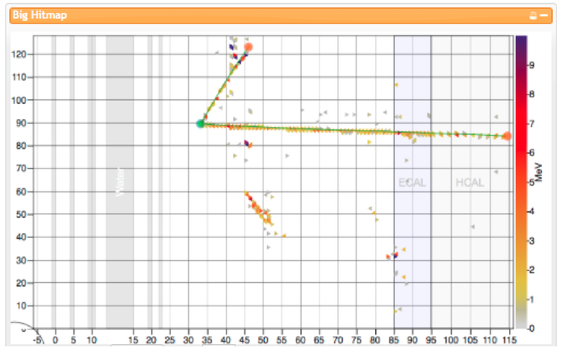
2. Compare the pion kinematics with semi-exclusive measurements in the LE MINERvA data set.

3. Compare the cross section results for the same channel made by NOvA.

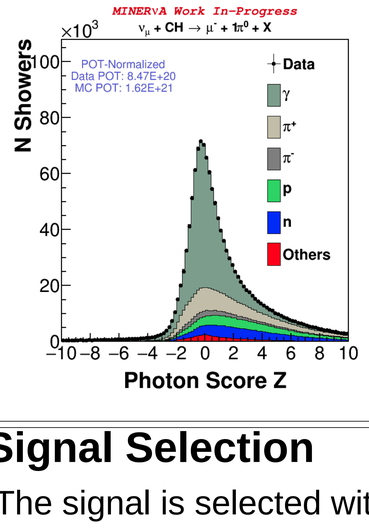
4. Explore the cross section measurement for higher energetic pions, as is expected to be seen in DUNE

Minerva Experiment





Photon Identification



$$dEdX = \frac{E_{vis}}{L} \qquad Z = \frac{dEdX_{ob} - \overline{dEdX}(E)}{\sigma(E)}$$

A shower is accepted to be a photon candidate if:

1. Has a conversion length Xo > 15 cm.

2. Has a photon score < 2.0

Signal Selection

The signal is selected with events that have:

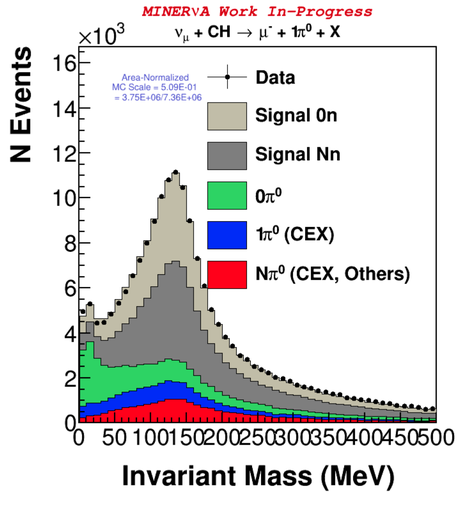
1. Interaction vertex found in the fiducial region.

2.Track that reach MINOS and identified as a muon.

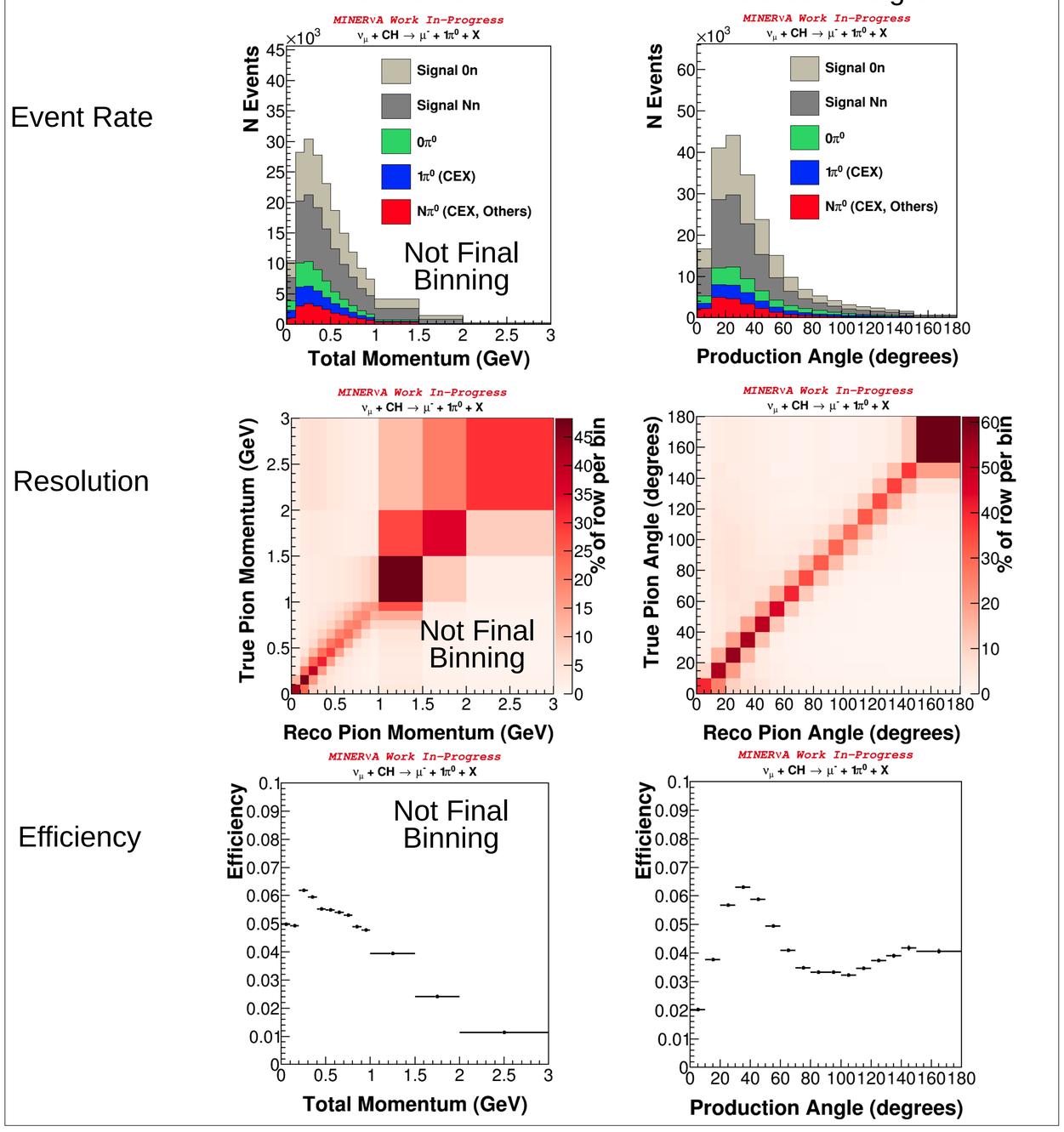
3. Two showers identified as photons that points to the interaction vertex.

4. Invariant mass M = [70, 200] MeV.

The final selection has an efficiency of ~5% with a purity of ~72%.



Pion Kinematics (Simulation)



Final Comments

1. A photon identification technique has been developed, it helps to have a well defined invariant mass of a pair of photons.

2. The current selection start to show more energetic pions compared with other analyzes made in the low energy era.

3. The selection is more efficient for low energy pions, and it is also related with the efficiency of the pion angle.

4. Results are coming...