

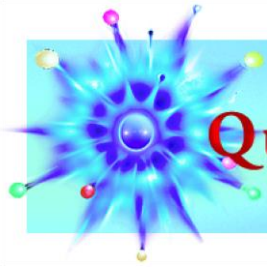
**QuarkNet**

# **LHC, Neutrinos, and Beyond**

## **Masterclass Update**

### **Neutrino Masterclasses:**

- **MINERvA (current)**
  - worked well in 2019 and in 2020 until COVID intervention; adapt to online for 2021.
  - Experiment no longer taking data; sunset in future?
- **Over-the-horizon development**
  - MicroBooNE – with Sowjanya Gollapinni (LANL)
  - DUNE – with group headed by David Martinez (SDSMT) and David DeMuth (VCSU)



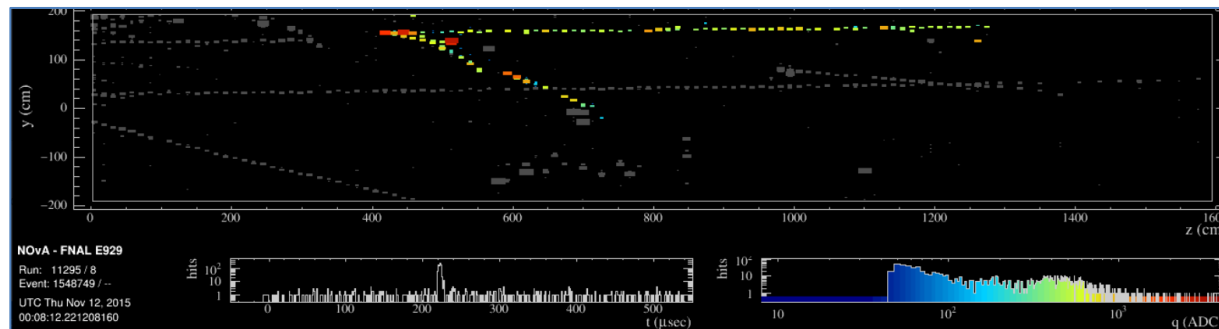
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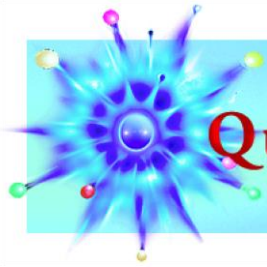
# LHC, Neutrinos, and Beyond

## Masterclass Update

### NOvA – Neutrino Oscillations:

- Working with UMN mentor Greg Pawloski
- Successful activity prototype at UMN center
- Working to expand collaboration with Fermilab





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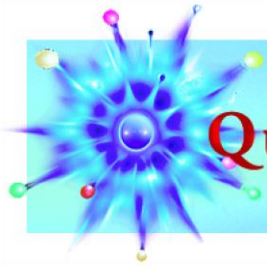
# LHC, Neutrinos, and Beyond

## Masterclass Update

### CMS Masterclass:

- **Improvements and new developments**
  - **New data: ~270 events with 4-lepton, including ZZ, H, background**
  - **CIMA, iSpy enable 2- & 4-lepton events with mass plots**
  - **CIMA, iSpy new data allocation scheme**
  - **CIMA fixes to speed database connections**
  - **CIMA plan to improve flexibility & maintainability**





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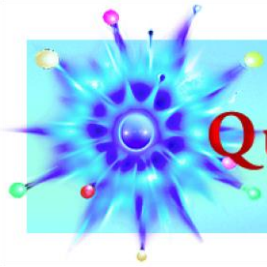
## Additional Work

### BAMC and BAMA Further Details:

- CMS April (QuarkNet) and May (International)
- ATLAS July (LBNL)
- Enthusiastic responses, nearly **800** students

### LHC and Neutrino Fellows:

- Monthly → weekly meetings (Mar.–Aug.); now biweekly
- Assisted, gave feedback, participated.



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# LHC, Neutrinos, and Beyond

## Additional Work

### World Wide Data Day (W2D2)

- Completed November 12
  - New measurement –  $\Phi$  and  $\Delta\Phi$  (previously  $\Phi$  and  $\theta$ )
  - Adapted for remote learning

