INTERNATIONAL MASTERCLASSES

HANDS ON PARTICLE PHYSICS

Neutrino Masterclass Projects

Ken Cecire, for the emerging neutrino masterclass collaborations

QuarkNet

INTERNATIONAL MASTERCLASSES

hands on particle physics

Fermilab Short-Baseline Program

- MINERνA, MicroBooNE currently running
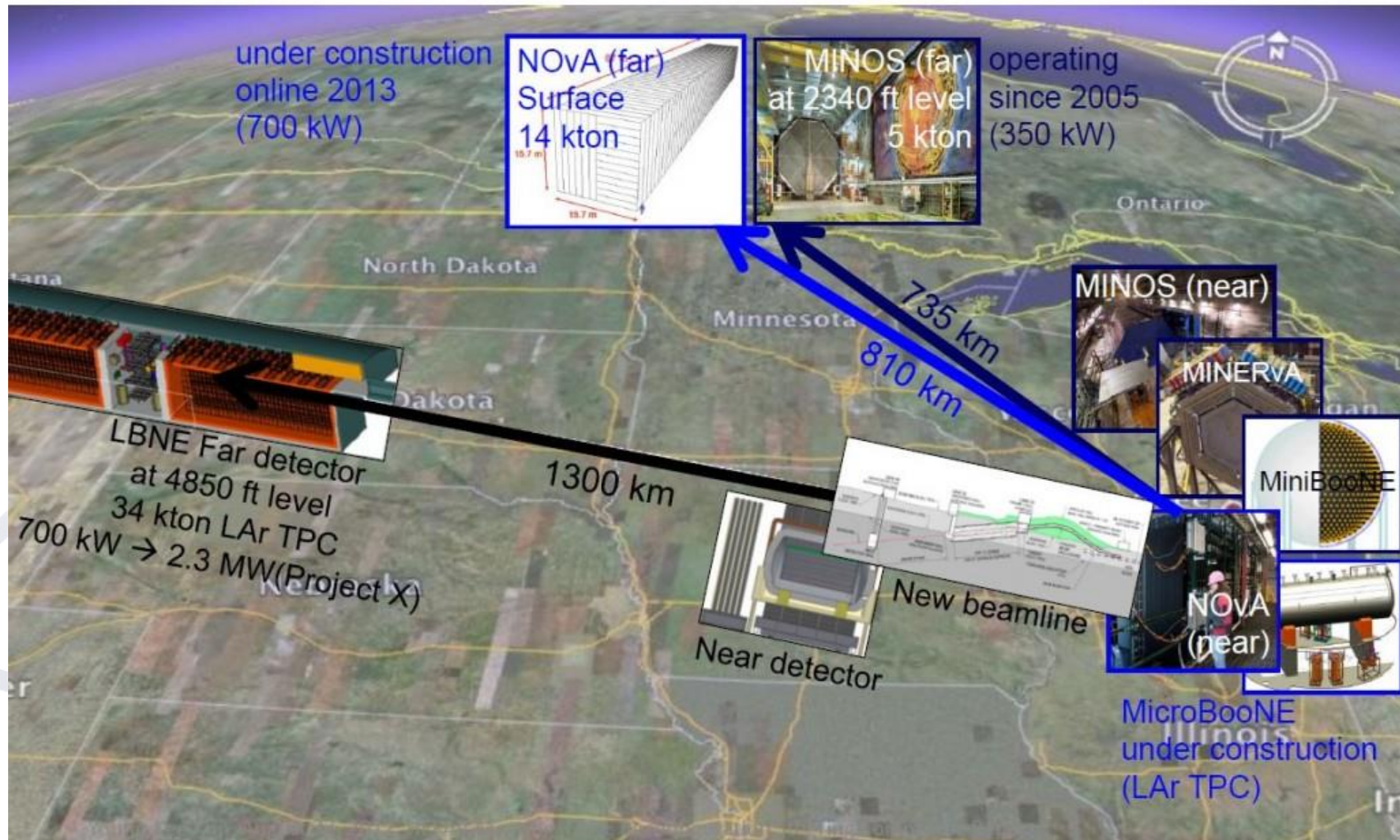- MINERνA is near the MINOS near detector.

Fermilab Long-Baseline Program

Evolution of U.S. Long Baseline Neutrino Experiments

MINOS(2005-~2015) → NOvA(2013-~2022) → LBNE(~2022-~2040?)

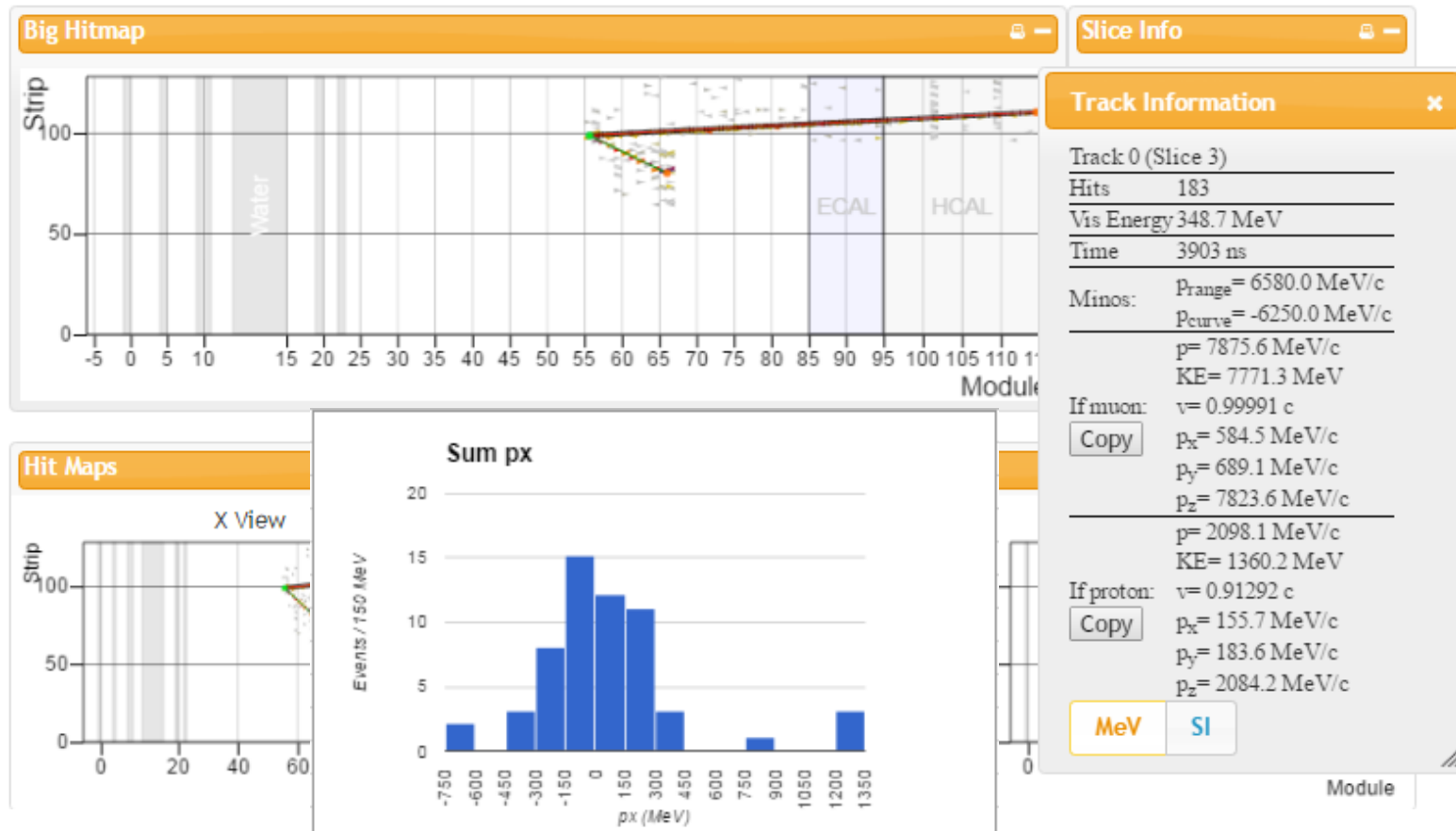Electron efficiencies 4% → 30% → > 80%

On Board for IMC Development

- MINERνA
  - Momentum and energy transfer measurement
  - Students attempt to find diameter of carbon nucleus.
  - Test in summer 2017; deploy in IMC 2018.
  - See http://neutrino-classroom.org/.
  - Main developer Kevin McFarland, University of Rochester

On Board for IMC Development

- MINERνA

On Board for IMC Development

- MicroBooNE
  - Task 1: Measure purity of liquid argon in the detector using cosmic ray data.
  - Task 2: Measure the charged particle multiplicity; compare with Monte Carlo.
  - Event displays
    - VENu for introduction (See what it can do.)
    - Derivative of Argo for measurement (also used for MINERνA)
  - Main developer Sowjanya Gollapinni, University of Tennessee
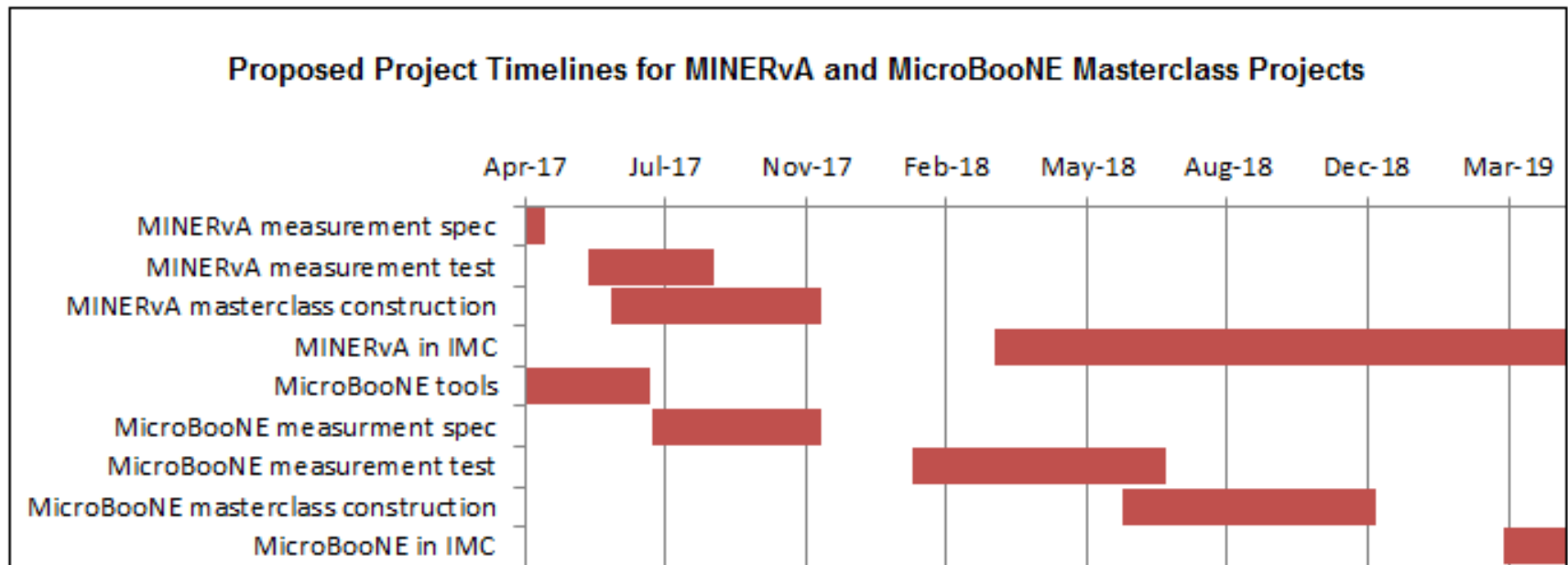
Targeted for IMC Development

- SBND
  - May be developed parallel with MicroBooNE
  - Hector Mendez, University of Puerto Rico
- NOνA
  - Existing long-baseline facility
  - Kanika Sachdev, Fermilab
  - [See it live](#).
- DUNE
  - Ultimate goal

Current Project Plan

- Start with MINERνA and MicroBooNE.
- Add SBND, NOνA, DUNE.
- Planning meeting at Fermilab, 15th May

Proposed Project Timelines for MINERvA and MicroBooNE Masterclass Projects

	Apr-17	Jul-17	Nov-17	Feb-18	May-18	Aug-18	Dec-18	Mar-19
MINERvA measurement spec								
MINERvA measurement test								
MINERvA masterclass construction								
MINERvA in IMC								
MicroBooNE tools								
MicroBooNE measurment spec								
MicroBooNE measurement test								
MicroBooNE masterclass construction								
MicroBooNE in IMC								

Discussion

- Neutrino program and existing IMC
  - Fit together?
  - Parallel?
  - Separate?
- How to connect with IceCube?
- IMC message for 15th May meeting?
- Recommendations to IPPOG?