



MaCh3 status update

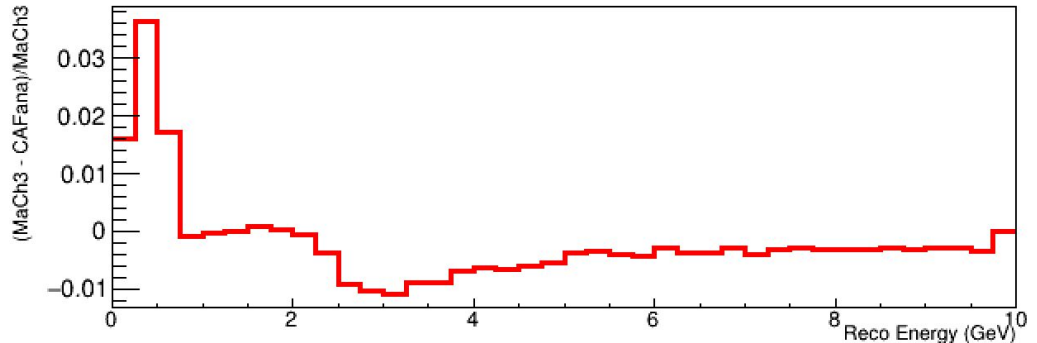
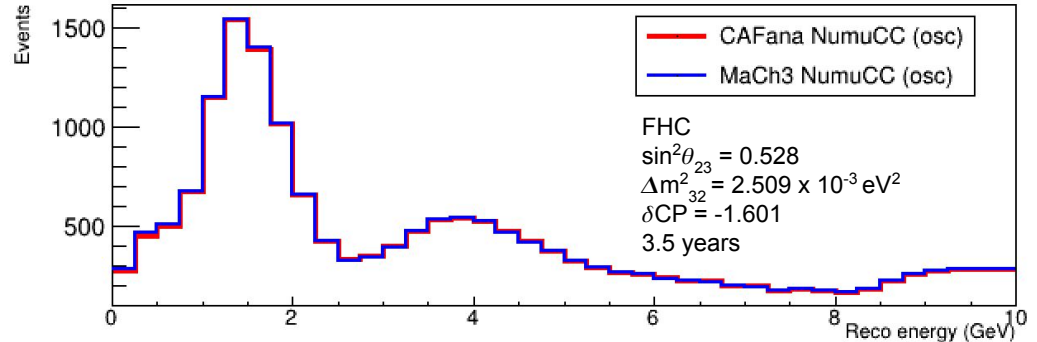
B. Radics on behalf of the MaCh3 group
- DUNE LBL Meeting June 14 2021 -

Status - Oscillation probability

- Validation of oscillation probability calculation:
 - MaCh3 uses Prob3++ that was validated before
 - Validation against CAFana: near perfect, 10^{-4} level agreement with CAFana
- Running the tute/demoX.C scripts to produce the plots by CAFana with default configuration
- Initial slight disagreement resolved: CAFana by default using a precalculated binned oscillation probability, while MaCh3 uses unbinned, event-by-event osc. probability
- Comparison:
 - FD prediction, NumuCC events (noswap)
 - Using binned osc. probability vs. unbinned osc. probability

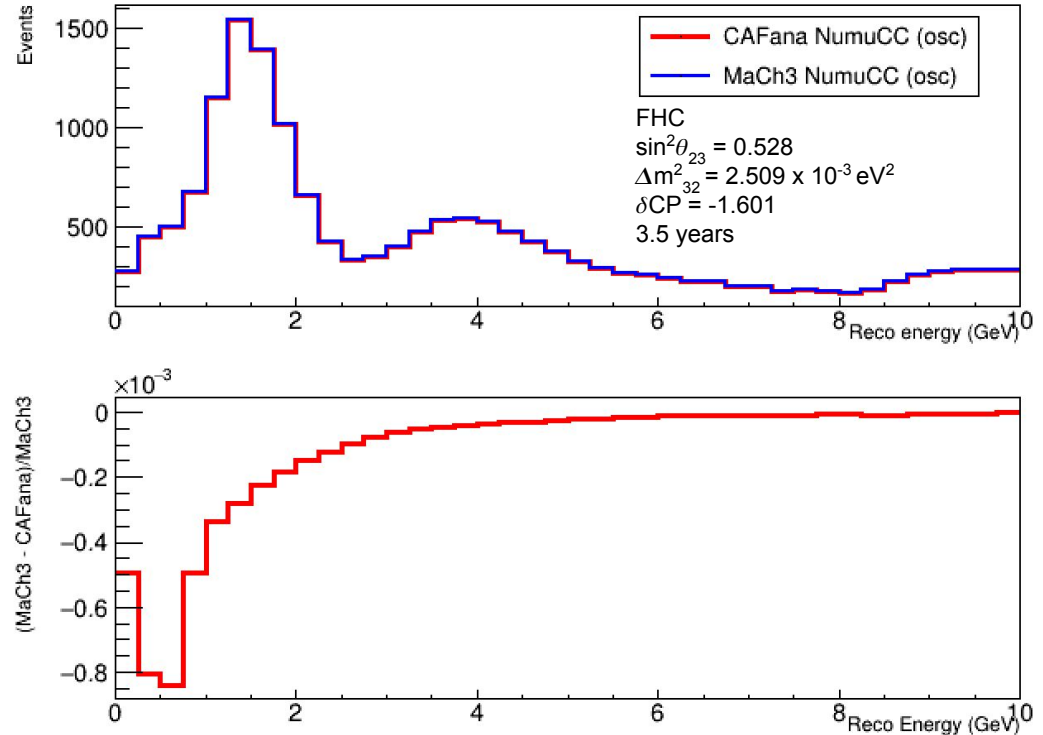
Status - Oscillation probability, CAFana vs. MaCh3

- Shown at the CM meeting
- MaCh3: event-by-event, unbinned oscillation probabilities
- CAFana: binned oscillation probabilities
 - 100 bins: 0.5 - 50 GeV



Status - Oscillation probability, CAFana vs. MaCh3

- MaCh3: binned oscillation probabilities
- CAFana: binned oscillation probabilities
 - 100 bins: 0.5 - 50 GeV



Status - DUNE flux systematics

- DUNE flux errors and covariance reading in by MaCh3 implemented:
 - Converting root file to MaCh3 xml format
- Directly throwing correlated multidim Gaussian from the 208x208 flux covariance matrix
- Internally mapping to the FD truth bins and calculate weights
- Validation against CAFana: starting

Status - DUNE xsec systematics

- Liban is working on learning the CAF production chain
- Aim is to make weight/spline generation for each systematic parameter a step independent of LArSoft and factorised from getting all reco variables
- Splines would be in a format that MaCh3 can already read
- Goal is to write an executable that talks to nusystematic similar to ND CAF Maker

Status - Summary

- Nominal FD spectrum matching well
- Oscillation probabilities: small deviation against CAFana resolved
 - MaCh3 uses event-by-event osc. prob.,
 - Binned probabilities: agreement at a level of 10^{-4}
- Flux systematics: technically implemented, validation starting
- Xsec systematics: implementation of weight/spline generation under way

→ Goal for September CM: first FD Asimov fits with flux+xsec systematics