

# ND Physics Simulation and Reconstruction \*ACTION ITEMS\*

AKA ND Sim/Reco  
AKA ND Reco/Sim

Linda Cremonesi and Mathew Muether  
DUNE Analysis workshop August 2022



WICHITA STATE  
UNIVERSITY



Queen Mary  
University of London



# Action items (re: samples)

ND samples to be produced for LBL next analyses:

- ND-LAr + TMS numu CC inclusive
- ND-LAr + TMS nu-on-e (stretch goal)
- ND-GAr (interactions in GAr)
- SAND hydrogen (mainly STT no need of GRAIN for this)

Written and working

Written and partially working

Work in progress

Not started

**MORE BOXES NEED TO BECOME GREEN!**

INTEGRATION WITH PRODUCTION	Stage 1 Geo + GENIE	Stage 2 GEANT	Stage 3 Detector Response	Stage 4 Detector Reco	Stage 5 Analysis files
ND-LAr	done	done	full	ML-Reco	CAFs
ND-LAr + TMS	done	done	partial	ML-Reco + Hough/A*	CAFs
TMS Only	done	done	cheated	Hough/A*	CAFs
ND-GAr	done	done	full	GArSoft	CAFs + GArAna
SAND+STT+GRAIN	done	done	full/fast		CAFs

# Action items (Sim/Reco development)

- Move to GENIE-3
- Production tools integration
  - ND LAr reco GPU – Andrew M
  - ND GAr integration – Alex B/Francisco?
  - SAND integration
- What's missing from CAFs to enable systematics studies?
- Detector systematics:
  - Develop within subdetector working groups
  - File based or parametrisation as a function of CAF variables
- Include digitisation:
  - ND-LAr ready but output needs to be make as input for LAr ML reco (1-2 months)
  - TMS not worth it
- Spill structure (stretch goal)

# Action items (Physics studies)

- LAr:
  - inclusive sample
  - pion/proton multiplicity matrix
  - resolution of proton variables
- ND-GAr:
  - inclusive sample
  - pion and proton multiplicity studies
  - pion/proton resolution studies
- SAND:
  - inclusive sample
  - kinematics studies for hydrogen sample

# Action items (re: meetings)

- Re-doodle meeting time
- ND Reco/Sim meeting about FILE STRUCTURE
- ND Reco/Sim meeting about DETECTOR SYSTEMATICS

