

# Simulation Tasks (as part of calibration)

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# Simulation Goals

1. Study impact of (detector) uncertainties on physics parameters
  - Use existing LBNE analysis framework consisting of
    - + beam simulation
    - + detector simulation (WCh, LAr, ND)
    - + reconstruction tools (WCh, LAr, ND)
    - + GloBES, Bret's oscillation propagation codeto study physics sensitivity of simulated experiment
  - Simulate uncertainties and biases in far and near detectors and study effect on physics parameters
  - Derive prioritized and quantitative list of calibration requirements.

# Simulation Goals

2. Study performance of different simulation and reconstruction tools and identify the specific calibration needs.
  - WC
    - SK simulation and reconstruction.
    - MiniBooNE like simulation and reconstruction.
  - LAr
    - LArSoft
    - ????

# Both Far and Near Detector Parameters

- Far and Near detectors:
  - a) energy
    - + energy scale uncertainty
    - + energy resolution
    - + position dependence
  - b) particle position and ID
    - + vertex position bias
    - + vertex position resolution
    - + angular resolution uncertainty

# WC Specific

PMT effects

- + timing resolution
- + pulse height uncertainty and resolution
- + obtaining time PDFs, charge PDFs

Water effects:

- + water transparency
- + position dependent effects (stratification)

# LAr Specific

- LAr specific:
  - a1) readout plane dependent effects (?)  
+ ...
  - a2) cryostat effects:  
+ ...
- Near Detector specific:
  - n1) ...