# MWDays Discussion Points

Josh Bendavid (MIT)

# Discussion of Experimental/Theoretical Issues

- Tevatron-LHC mW Combination Working group has a specific mandate for combinations of mW measurements
  - Semi-closed group since information internal to experiments is sometimes used here
  - Experimental/theoretical issues relevant for consistent combinations are by necessity discussed here as well
- LPCC Electroweak Working Group is an ongoing, open forum for discussion of both experimental and theoretical issues across experiments/theory
  - Would benefit from more open discussion in this forum and active participation of Tevatron experiments
    - Situation should improve once the current WIP combination paper is published and corresponding information is fully public

# “Data-Driven” vs a priori theory uncertainties

- Even if neutral current data is not used, profiling and in-situ constraints are inevitable
- Ideal world:  work towards improving the validity/applicability of theory uncertainties in this context
  - Make the resulting constraints interpretable by theorists as well!
  - Super ideal world: Well defined correlations -> simultaneous in-situ constraints between neutral and charged current

# Experimental use of state-of-the-art predictions: Technical/Physics

- LHC Experiments have excellent detector simulations and significant computing power -> significant benefit to using showered events with detector simulation
- Historically (and currently) significant gap/lag in accuracy available in standalone calculations (pointwise/binned cross sections, event generators) vs those matched to shower
- Experiments typically employ reweighting with some suitable binning in boson pT, y, m (+ angular coefficients)
- Prospects for improved matched shower MC predictions?
- Improvements possible in interfacing of less accurate shower MCs with more accurate calculations?  (event-wise/point-wise reweighting?)
- Improve speed of predictions?  (especially for large number of scale/pdf variations, angular coefficients)

# Experimental use of state-of-the-art predictions: Sociological

- A few possible models:
  - Theorists run predictions on request for the experimentalist
    - Mismatches in timescales, person-power, computing power
  - Experimentalists run private versions of code provided by theorists
    - Potentially serious problems with reproducibility (c.f. different private versions of Resbos + grids provided to CDF and D0 at different points in time)
  - Code is publicly available for experimentalists to run
    - Imposes documentation and support burdens on theorists
    - +10: Code available in public github or gitlab repository, with issues, pull requests, open development model
      - Experimentalists can and will help with technical aspects of the code! (compiler support, parallelization, etc)
      - Open development and public code likely to improve robustness and maintainability
      - Major reproducibility and open-science benefits
    - When can/should this happen with respect to theory publications?
    - Can/should funding agencies and large experiments pressure/coerce/incentivize theorists to do this?