Tevatron V+jets Working Group

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Instigation

- At this point in Tevatron program, further progress on low-mass Higgs, some BSM searches and top cross sections is limited by, and fully relies on, a convincing understanding of V+Jets QCD production.

- V+Jets WG proposed by Michelangelo Mangano to perform joint CDF/D0 V+jets data and theory comparisons and pursue areas of discrepancies.

- Informal planning meeting Jan. 26, 2010

  - lots of interest

- Issues

  - normalization of W+jets backgrounds

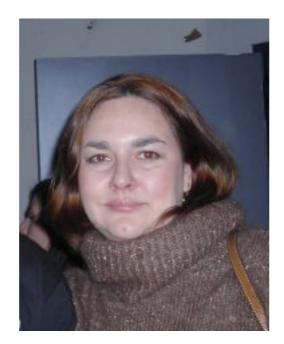 - normalization of heavy flavor backgrounds

Charge

- Facilitate communication between CDF and D0 to coordinate our V+jets measurements in such a way that a coherent physics message is brought to the HEP community

- Facilitate communication between experimentalists and theorists to ensure that

    - good choices of MC parameters are made when comparing data and theory

    - experimentalists are running the MC programs correctly

    - theorists understand the meaning of data measurements

- Provide a forum where algorithmic techniques relevant to V+jets measurements can be discussed, and bring insights back to experiments

- Impress upon the HEP community the importance of understanding these processes as backgrounds to Higgs and BSM searches

- Participate in data storage algorithms: HEPDATA, Rivet, etc.

Group Structure

- Representatives from CDF, D0 (appointed), plus representatives from FNAL theory group

- Sasha Pronko (CDF), Lidija Zivkovic (D0), Sabine Lammers (D0)

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Plans

- Have informal meetings with each of the CDF and DO V+jets analysis teams

- Address questions such as:

  - can we align the phase spaces the measurements are made in?

  - can we align the choice of observables and binning of the final results?

  - how do individual results compare against benchmark calculations?

  - are there additional observables that are interesting?

- We plan to provide lists of observables, binnings, cuts, etc. to theorists who are preparing simulation predictions.

Priority Measurements

- W+jets

  - long-standing CDF measurement, new CDF and D0 measurements coming very soon

  - benchmark observables: jet p_T and rapidity (y), W/lepton p_T and rapidity (y), dijet $\Delta\phi$, dijet Δy

  - additional observables: lepton asymmetry, ΔR(jet,jet), H_T

- Z+jets

  - extensive set of measurements from D0 and CDF

  - benchmark observables: jet pT and rapidity/pseudorapidity, Z pT and y/η, $\Delta\phi$(Z,jet), $\Delta\eta$(Z,jet)

- W+b

  - CDF has interesting 2.7σ excess above NLO prediction

  - D0 has measurement in the planning stages

- Z+b

  - CDF has recent, thorough analysis, but statistics limited

  - D0 measurement of Z+b/Z+jets is imminent (DIS)

Timescales

- We are in the process of organizing meetings with CDF and D0 analyzers on an analysis-by-analysis basis

- We are working on measurements planned for summer conferences

- Are quite open to and interested in including CMS and ATLAS interests