Nationwide: Telematics Assessment Exercises

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July 17, 2020

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FCNC: What are we looking for? $t\bar{t} \rightarrow W(\rightarrow l\nu)b + q\gamma$

- Final state topology
  - One Neutrino, from W
  - One Lepton, from W
  - One B-jet, SM top
  - **One Photon, FCNC Top**
  - One Jet, FCNC Top

Background Processes

- Due to all of the processes at hadron colliders it is important to model similar event topologies well.
- Major backgrounds include $t\bar{t}$, W+Jets, Z+Jets, + processes with an associated photon

Monte Carlo Generation

- All of our MC data is put through a showering algorithm for propagation from final decay states
- Various showering algorithms are used at ATLAS - Pythia, Herwigg, etc.
- All of these will add radiative photons
- These events can be contained in other samples with explicit photons originating from the hard interaction
- Need to remove these events or risk double counting events

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Object Preselection

- We preselect events with objects that look like our expected topology
- Reminder that I require:
  - Exactly one lepton (e or μ) $\geq$ 28 GeV
  - Exactly one Good photon $\geq$ 25GeV
  - Missing Transverse Energy $\geq$ 30GeV
  - $\geq$ 2 Jets (at least one being b-tagged)
- All following plots will have signal scaled to 0.2% of nonallhadronic $\sigma_{t\bar{t}}$, MC scaled to 36.07fb^{-1}
- Only electron channel shown. Similar results for the muon channel are seen.

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Conclusion, Outlook

- Orthogonal validation/control regions are in development
- Data grid run complete, need to incorporate into CR/VR plots
- Next grid run will include a couple of looser regions for CR/VRs
  - 0 Photon Samples for Backgrounds with no Real Photons
  - 0 BJet Samples - possibly for WJets region
- Top Group - Pushing for MVA, want to start investigations using these techniques

Backup