

# Appendix A

## Monte Carlo Samples

A number of MC samples are utilized in this analysis and referred to throughout the text. Below is a list of the MC samples used and an explanation of what the sample names mean.

### A.1 List of Samples

1. Drell-Yan + up to 2 hard jets:

/DYJetsToLL\_TuneZ2\_M-50\_7TeV-madgraph-tauola/  
Fall111-PU\_S6\_START42\_V14B-v1/AODSIM

2. QCD enriched with  $B$  and  $D$  meson decays to electrons:

/QCD\_Pt-20to30\_BCtoE\_TuneZ2\_7TeV-pythia6/  
Fall111-PU\_S6\_START42\_V14B-v1/AODSIM,  
/QCD\_Pt-30to80\_BCtoE\_TuneZ2\_7TeV-pythia6/  
Fall111-PU\_S6\_START42\_V14B-v1/AODSIM,  
/QCD\_Pt-80to170\_BCtoE\_TuneZ2\_7TeV-pythia6/  
Fall111-PU\_S6\_START42\_V14B-v1/AODSIM

3. Photon + jet doubly enriched with jets passing an EM filter:

/GJet\_Pt-20\_doubleEMEnriched\_TuneZ2\_7TeV-pythia6/  
 Fall111-PU\_S6\_START42\_V14B-v1/AODSIM

4.  $W$  leptonic decays + up to 2 hard jets:

/WJetsToLNu\_TuneZ2\_7TeV-madgraph-tauola/  
 Fall111-PU\_S6\_START42\_V14B-v1/AODSIM

5.  $t\bar{t}$  + up to 2 hard jets:

/TTJets\_TuneZ2\_7TeV-madgraph-tauola/  
 Fall111-PU\_S6\_START42\_V14B-v2/AODSIM

## A.2 Explanation of Naming Conventions

- L: charged lepton
- B:  $B$  hadron
- C:  $D$ , or charmed, hadron
- E: electron or positron
- G: photon
- W:  $W$  boson
- Nu: neutrino
- T: top quark
- TuneZ2: Pythia tune incorporating 2010 LHC data with CTEQ6L1 [?] PDFs [?]
- M-50: Generated  $l^+l^-$  invariant mass threshold of 50 GeV
- 7TeV: Generated center-of-mass energy 7 TeV

- **pythia6**: Parton showering and hadronization simulated with Pythia v6.424 [?]
- **madgraph**: Hard interaction generated with MadGraph 5 [?]
- **tauola**:  $\tau$  decays generated with Tauola [?]
- **PU\_S6**: Generated with S6 pileup scenario, which has a mean between 6 and 7 interactions per crossing, and includes pileup from the neighboring bunch crossings according to a Poisson distribution with mean equal to the number of interactions in the in-time crossing [?]
- **START42\_V14B**: Reconstructed with best alignment and calibration constants and magnetic field conditions as of August 3, 2011
- **Pt\_XtoY**:  $X \leq \text{generated } \hat{p}_T < Y$
- **BCToE**: Only keeps events if they contain at least one electron with  $E_T > 10$  GeV in  $|\eta| < 2.5$  that came from a  $b$  or  $c$  quark
- **doubleEMEnriched**: Enriched in photons, electrons, electrons from  $b/c$  decay, and electromagnetic jets [?]
- **AODSIM**: Run through full CMS reconstruction algorithm based on a GEANT 4 [?] detector simulation; AOD data tier, including generator-level information