

Table 1: Background MC Summary

| Sample Name | xSec(pb) | NEvt | Lumi(pb^{-1}) | k Factor | Weight |
|------------------------------|------------------|--------------------|-------------------|-------------|----------------|
| SingleTs | 3.354 | 6.18506e+06 | 41529.2 | 1 | 0.0225202 |
| SingleTtWantitop | 35.6 | 7.68603e+06 | 41529.2 | 1 | 0.192354 |
| SingleTtWtop | 35.6 | 7.88439e+06 | 41529.2 | 1 | 0.187515 |
| SingleTtantitop | 26.3087 | 3.67591e+06 | 41529.2 | 1 | 0.297227 |
| SingleTttop | 44.2065 | 5.98206e+06 | 41529.2 | 1 | 0.306894 |
| TTTo2L2Nu | 88.29 | 6.85956e+07 | 41529.2 | 1 | 0.0534525 |
| TTToHadronic | 377.96 | 1.29211e+08 | 41529.2 | 1 | 0.121478 |
| TTToSemiLeptonic | 365.34 | 4.33791e+07 | 41529.2 | 1 | 0.349759 |
| WJets | 50690 | 7.76312e+07 | 41529.2 | 1.21 | 32.8114 |
| W1Jets | 9493 | 5.41069e+07 | 41529.2 | 1.21 | 8.81635 |
| W2Jets | 3120 | 6.57044e+06 | 41529.2 | 1.21 | 23.8615 |
| W3Jets | 942.3 | 1.96697e+07 | 41529.2 | 1.21 | 2.4073 |
| W4Jets | 524.2 | 1.1074e+07 | 41529.2 | 1.21 | 2.37865 |
| DYJetsToLL10to50 | 18610 | 3.98212e+07 | 41529.2 | 1.21 | 23.4839 |
| DYJetsToLLM50 | 4895 | 9.77148e+07 | 41529.2 | 1.18 | 2.45486 |
| DY1JetsToLLM50 | 1016 | 7.59429e+07 | 41529.2 | 1.18 | 0.655604 |
| DY2JetsToLLM50 | 331.4 | 1.01161e+07 | 41529.2 | 1.18 | 1.60537 |
| DY3JetsToLLM50 | 96.36 | 6.88789e+06 | 41529.2 | 1.18 | 0.68556 |
| DY4JetsToLLM50 | 51.4 | 4.31776e+06 | 41529.2 | 1.18 | 0.583365 |
| TGJets | 2.967 | 372122 | 41529.2 | 1 | 0.33112 |
| TTGJets | 3.697 | 1.17852e+07 | 41529.2 | 1 | 0.0130277 |
| TTWJetslnu | 0.2043 | 2.71601e+06 | 41529.2 | 1 | 0.00312385 |
| TTZJets2l2nu | 0.2529 | 3.7453e+06 | 41529.2 | 1 | 0.00280424 |
| WminusH | 0.03369 | 2.25677e+06 | 41529.2 | 1 | 0.000619965 |
| WplusH | 0.053 | 2.34337e+06 | 41529.2 | 1 | 0.000939266 |
| ZH | 0.04865 | 3.91269e+06 | 41529.2 | 1 | 0.00051637 |
| WW | 118.7 | 7.76583e+06 | 41529.2 | 1 | 0.634769 |
| WZ | 47.13 | 3.92863e+06 | 41529.2 | 1 | 0.498206 |
| ZZ | 16.523 | 1.92593e+06 | 41529.2 | 1 | 0.356288 |
| WWW | 0.2086 | 203246 | 41529.2 | 1 | 0.0426231 |
| WWZ | 0.1651 | 219964 | 41529.2 | 1 | 0.0311708 |
| WZZ | 0.05565 | 219660 | 41529.2 | 1 | 0.0105212 |
| ZZZ | 0.01398 | 214318 | 41529.2 | 1 | 0.00270895 |
| QCDPt80To120EMEnr | 350000 | 9.10485e+06 | 41529.2 | 1 | 1596.42 |
| QCDPt120To170EMEnr | 62964 | 8.51511e+06 | 41529.2 | 1 | 307.083 |
| QCDPt300ToInfEMEnr | 1350 | 2.8743e+06 | 41529.2 | 1 | 19.5054 |
| QCDPt80to120MuEnrPt5 | 106034 | 2.3249e+07 | 41529.2 | 1 | 189.406 |
| QCDPt120to170MuEnrPt5 | 25190.5 | 2.07748e+07 | 41529.2 | 1 | 50.3561 |
| QCDPt170to300MuEnrPt5 | 8654.49 | 4.61707e+07 | 41529.2 | 1 | 7.78446 |
| QCDPt300to470MuEnrPt5 | 797.353 | 1.77448e+07 | 41529.2 | 1 | 1.86609 |
| QCDPt470to600MuEnrPt5 | 79.0255 | 2.42436e+07 | 41529.2 | 1 | 0.13537 |
| QCDPt80to170bcToE | 3.221e+06 | 1.59995e+07 | 41529.2 | 1 | 8360.62 |
| QCDPt170to250bcToE | 105771 | 9.84766e+06 | 41529.2 | 1 | 446.053 |
| QCDPt250toInfbcToE | 21094.1 | 9.99689e+06 | 41529.2 | 1 | 87.6293 |