

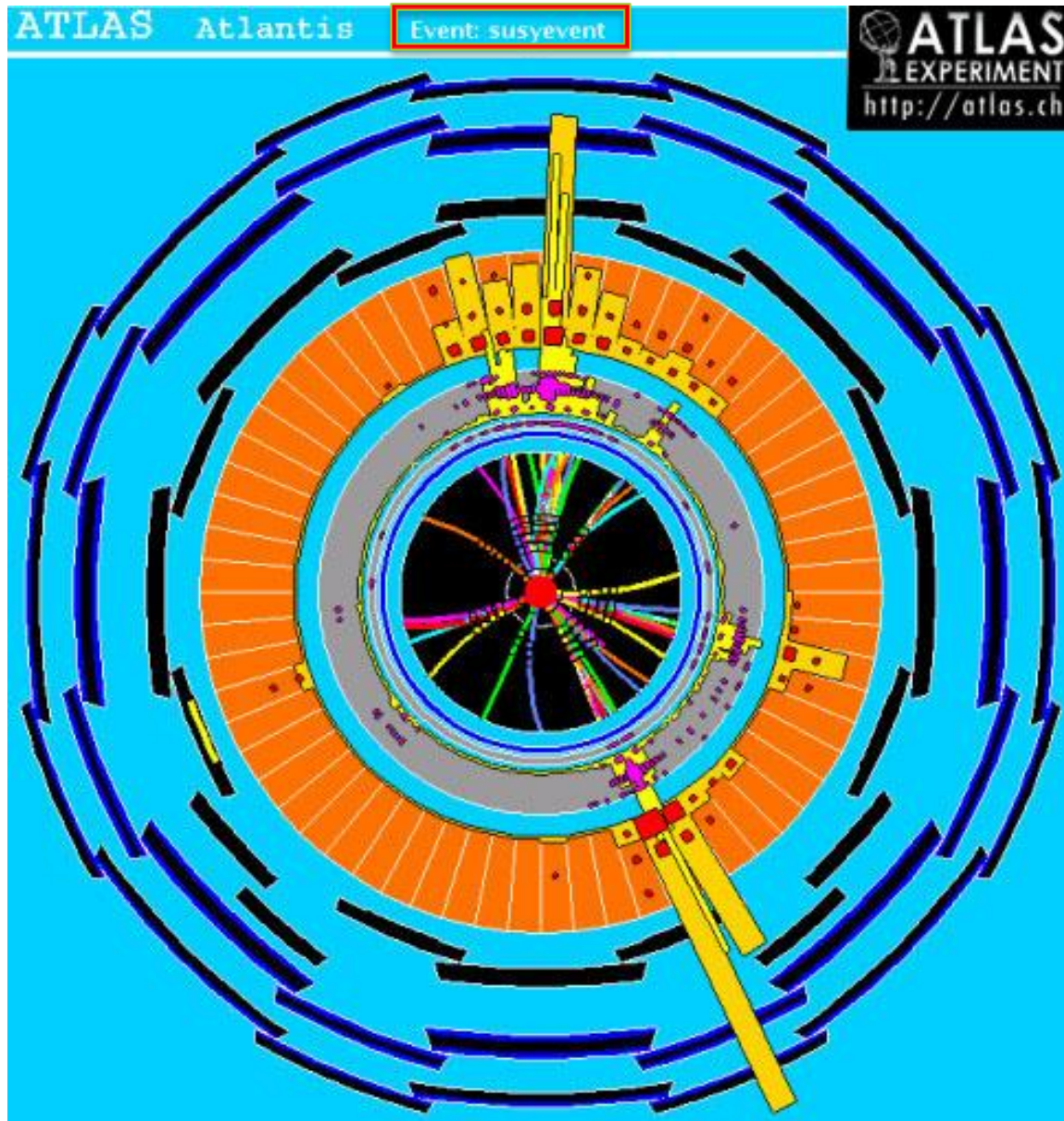
ATLAS: Missing Transverse Energy in the Search for Supersymmetry

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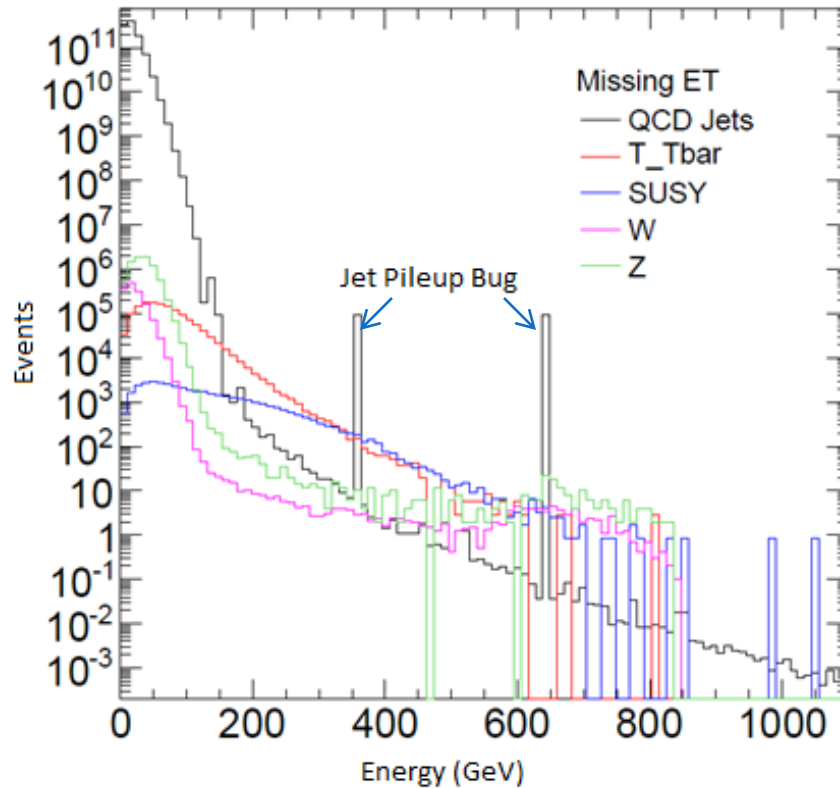
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ATLAS



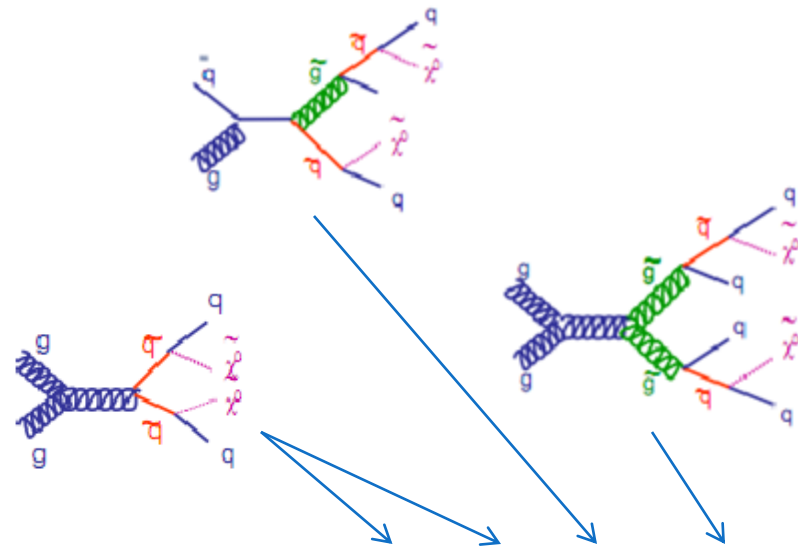
Results from Last Time

- Plotted with Monte Carlo simulation data



Cuts for Signal Region A

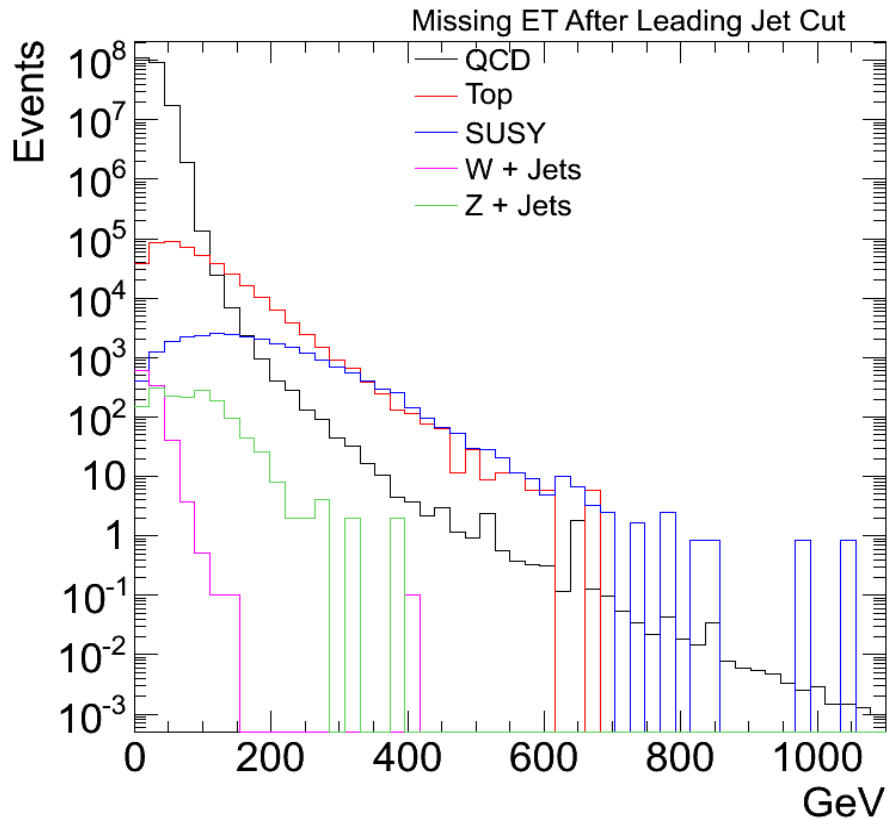
- Different cuts on the data for different SUSY production processes
- Focused on signal region A: light- $\tilde{q}\tilde{q}$ production



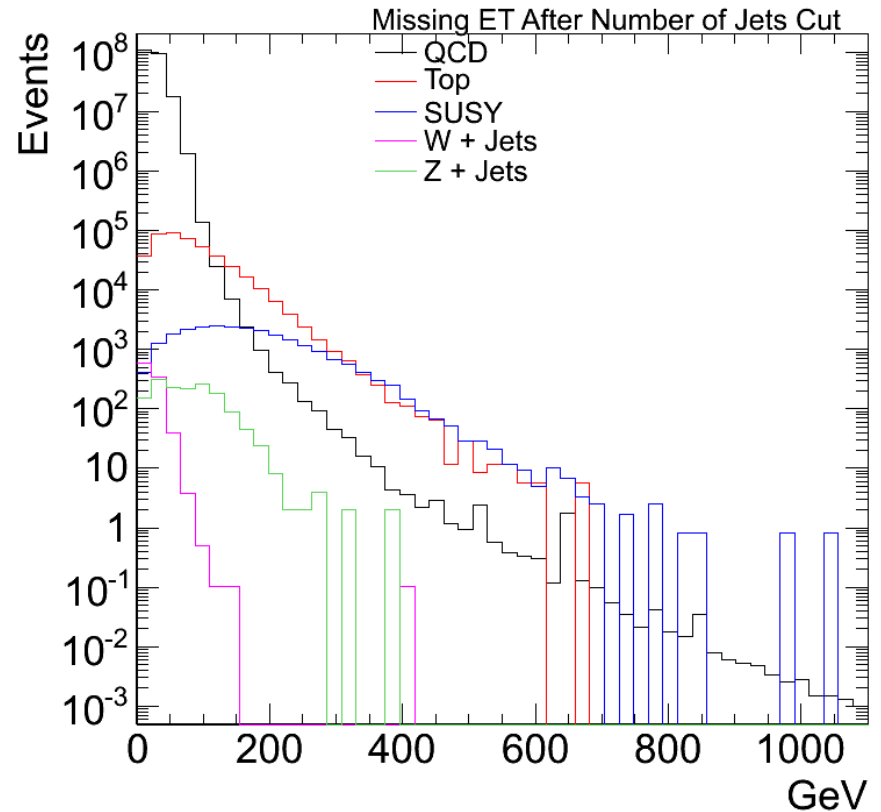
| | | A | B | C | D |
|-----------------|--|----------|----------|----------|----------|
| Pre-selection | Number of required jets | ≥ 2 | ≥ 2 | ≥ 3 | ≥ 3 |
| | Leading jet p_T [GeV] | > 120 | > 120 | > 120 | > 120 |
| | Other jet(s) p_T [GeV] | > 40 | > 40 | > 40 | > 40 |
| | E_T^{miss} [GeV] | > 100 | > 100 | > 100 | > 100 |
| Final selection | $\Delta\phi(\text{jet}, \vec{P}_T^{\text{miss}})_{\text{min}}$ | > 0.4 | > 0.4 | > 0.4 | > 0.4 |
| | $E_T^{\text{miss}}/m_{\text{eff}}$ | > 0.3 | - | > 0.25 | > 0.25 |
| | m_{eff} [GeV] | > 500 | - | > 500 | > 1000 |
| | m_{T2} [GeV] | - | > 300 | - | - |

Missing Transverse Energy - Jet Pt Cuts

- Leading jet $p_t > 120$ GeV

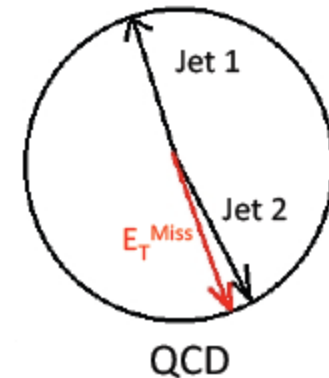
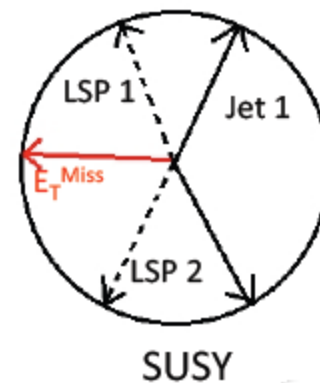
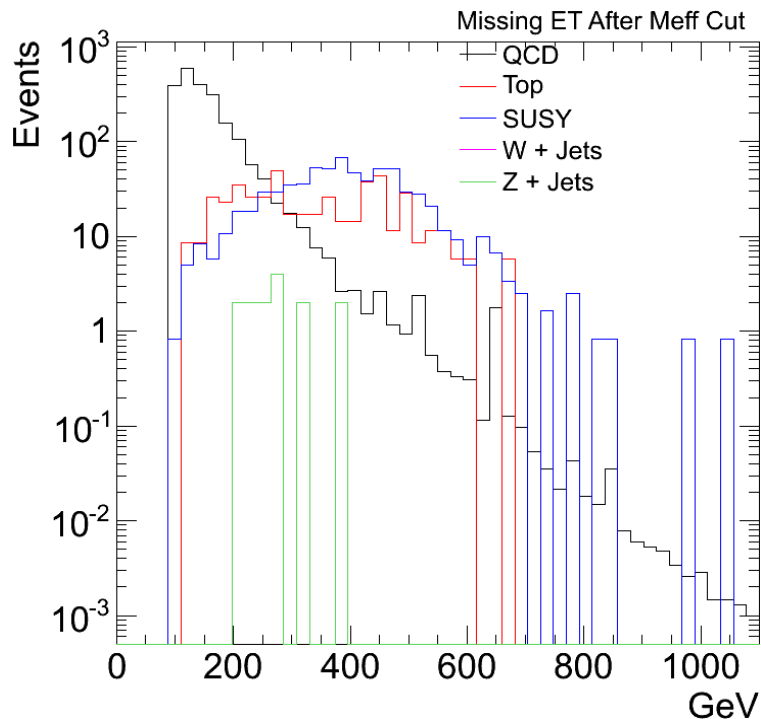


- Number of jets/event ≥ 2



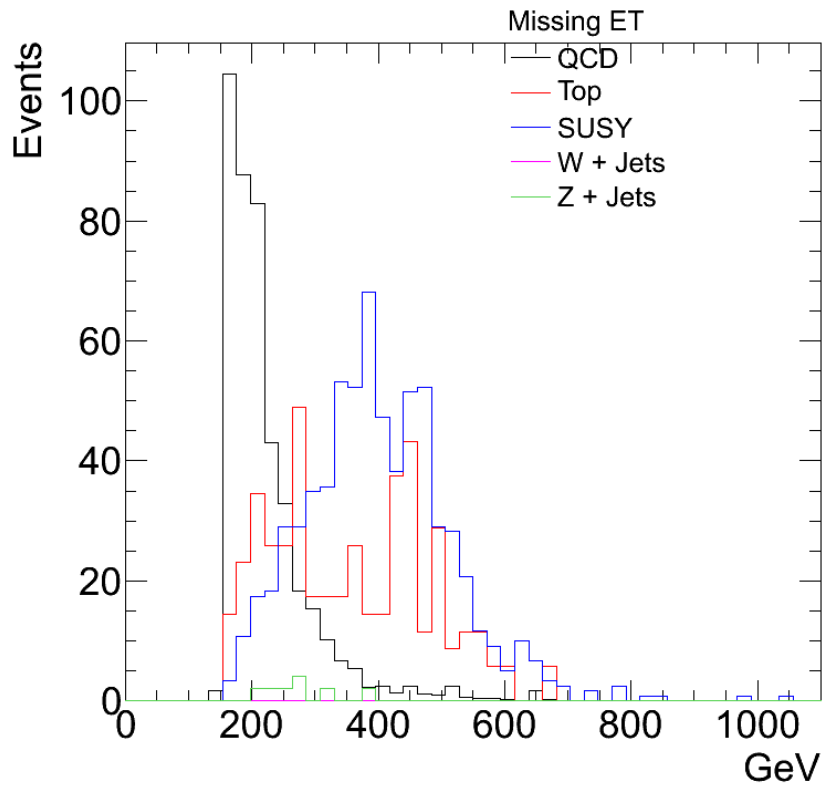
MET - Minimum MET and Effective

- $M_{\text{eff}} = \text{Jet Pt} + \text{MET}; M_{\text{eff}} > 500 \text{ GeV}$
- $\text{MET} > 100 \text{ GeV}$
- Delta Phi Absolute Value > 0.4
- $\text{Jet Pt} > 40 \text{ GeV}$

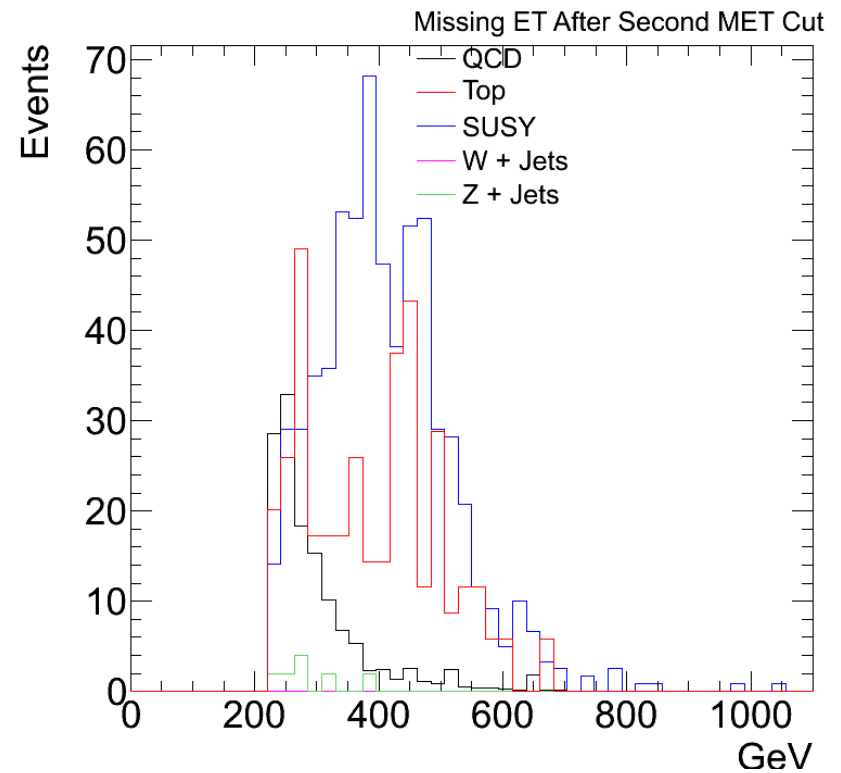


Final Cuts

- $MET/M_{eff} > 0.3$

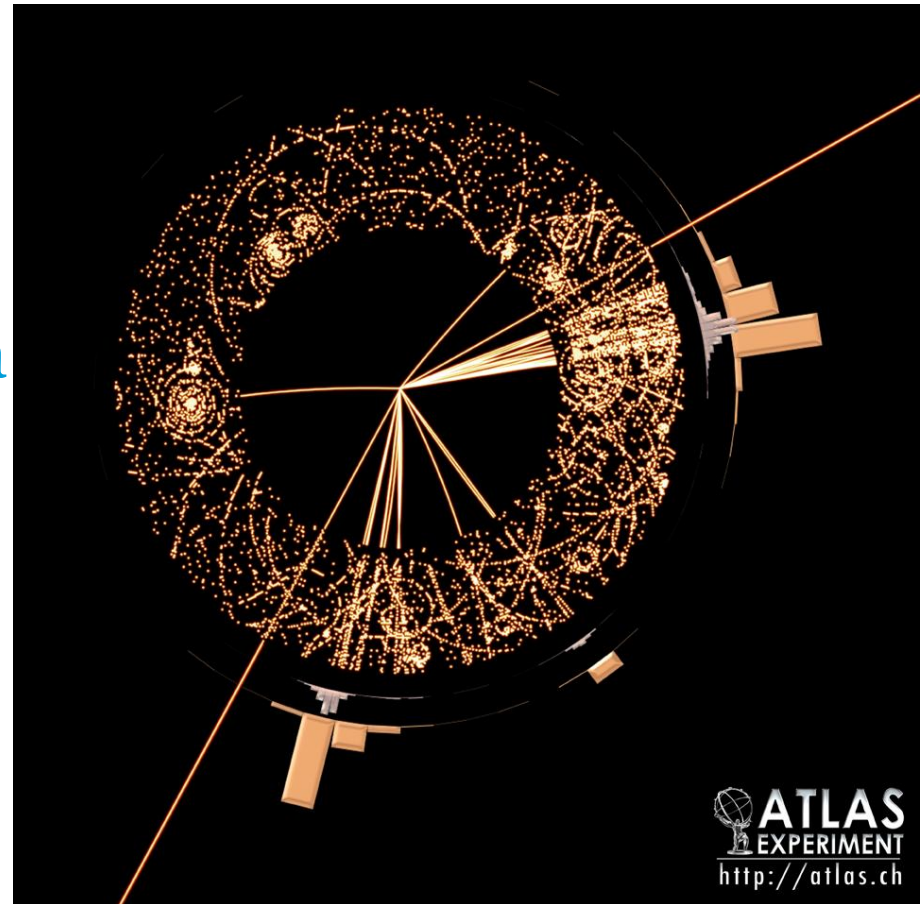


- Extra Cut: $MET > 225$ GeV

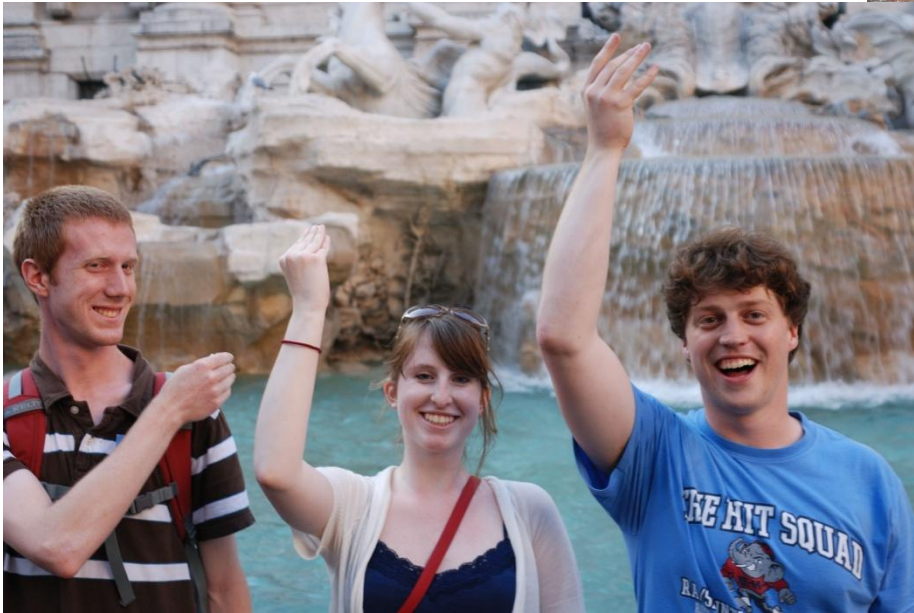


The Next Few Weeks

- Real Data
 - Cleaning Cuts
 - Comparison with MC simulation data



Rome



Backup - Cut Flow Chart

| Cut | Number of Events | | | | | | Signal Efficiency | |
|--------------------------|------------------|----------|--------|----------|---------|-------|-------------------|----------|
| | Total SM | QCD | Top | W+ Jets | Z+ Jets | SUSY | | |
| No Cut | 3.00E+07 | 1.23E+07 | 499655 | 1.32E+07 | 3992455 | 49945 | 1 | 100 |
| Leading Jet Pt > 120 GeV | 6.95E+06 | 6790645 | 153863 | 6918 | 778 | 30363 | 0.607928722 | 60.79287 |
| ≥ 2 Jets Per Event | 6.95E+06 | 6790645 | 153863 | 6916 | 763 | 30362 | 0.6079087 | 60.79087 |
| MET > 100 GeV | 1.41E+05 | 96568 | 44372 | 4 | 243 | 21958 | 0.439643608 | 43.96436 |
| Meff > 500 | 5.95E+05 | 594525 | 167 | 0 | 7 | 834 | 0.016698368 | 1.669837 |
| MET/Meff > 0.3 | 5.81E+04 | 57915 | 157 | 0 | 7 | 813 | 0.016277906 | 1.627791 |
| Jet Pt Min | 5.81E+04 | 57915 | 157 | 0 | 7 | 813 | 0.016277906 | 1.627791 |
| Delta Phi | 5.81E+04 | 57915 | 157 | 0 | 7 | 813 | 0.016277906 | 1.627791 |
| MET > 225 GeV | 5.51E+04 | 54999 | 130 | 0 | 6 | 770 | 0.015416959 | 1.541696 |