Benchmark Mass Spectrum

\[ M(\text{gluino}) = 649.78 \text{ GeV} \quad \alpha = 4.5 \]
\[ M(\text{squarkL}) = 650.52 \text{ GeV} \quad \tan\beta = 30. \]
\[ M(\text{sbottom1}) = 520.46 \text{ GeV} \quad m_{3/2} = 14000. \text{ GeV} \]
\[ M(\text{stop1}) = 338.55 \text{ GeV} \quad n_M = 0. \]
\[ M(\text{neutralino2}) = 338.21 \text{ GeV} \quad n_H = 0.5 \]
\[ M(\text{stau1}) = 315.08 \text{ GeV} \]
\[ M(\text{neutralino1}) = 286.21 \text{ GeV} \]

Total cross section = 24780 fb
luminosity = 400 fb\(^{-1}\)
mJetTauTau-end vs M(squarkL)

The graph shows the relationship between mJetTauTauEnd and mSquarkL. The graph includes several lines representing different simulations and theoretical values.

- Green line: Theoretical formula
- Red line: Experiment simulation
- Pink line: Pure simulation (true tau)
- Blue line: Pure simulation (visible tau)
- Pink square: Reference point
mJetTauTau-end vs M(neutralino2)
mJetTauTau-end vs M(neutralino1)
benchmark:

10 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.206554
End = 269.1 ± 1.12 GeV

50 previous events

30 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.206554
End = 274 ± 0.223 GeV

20 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.206554
End = 270.8 ± 1.58 GeV

Counts / 10 GeV

Counts / 50 GeV
Visible jet-tau-tau mass

- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.785483

End = 246.5 ± 0.699 GeV

Counts / 10 GeV

Counts / 30 GeV

Visible jet-tau-tau mass

- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.785483

End = 261.4 ± 3.04 GeV

Counts / 20 GeV

10 GeV / Bin

0510D40: SquarkL = 609.59 GeV

50 previous events

30 GeV / Bin

20 GeV / Bin
Visible jet-tau-tau mass

**Counts / 10 GeV**

**Counts / 50 GeV**

**scaleFactor = 0.793769**

**30 GeV / Bin**

**End = 253.4 ± 1.52 GeV**

**20 GeV / Bin**

**End = 262.7 ± 0.814 GeV**

10 GeV / Bin  0510D20: SqaurkL = 630.13 GeV  50 previous events
Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.785151
End = 270.8 ± 0.626 GeV

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.785151
End = 274.8 ± 0.1 GeV

Counts / 10 GeV

Counts / 50 GeV

Counts / 30 GeV

Counts / 30 GeV
Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.860419
End = 287.2 ± 1.4 GeV

Counts / 10 GeV

Counts / 50 GeV

10 GeV / Bin

50 previous events

20 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.860419
End = 285.0 ± 0.044 GeV
Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.74638

End = 326.1 ± 1.32 GeV

Counts / 10 GeV

Counts / 50 GeV

$M_{j\tau\tau}$ (GeV)

$M_{j\tau\tau}$ (GeV)
10 GeV / Bin

$M_{j\tau\tau}$

**Visible jet-tau-tau mass**
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.809693
End = 285.6 ± 4.46 GeV

20 GeV / Bin

$M_{j\tau\tau}$

**Visible jet-tau-tau mass**
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.809693
End = 280.9 ± 0.609 GeV
23A10: Neutralino1 = 295.50 GeV

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.79037
End = 231.2 $\pm$ 0.546 GeV

Counts / 10 GeV

Counts / 50 GeV

30 GeV / Bin

20 GeV / Bin

scaleFactor = 0.79037
End = 229.9 $\pm$ 0.649 GeV
23A20: Neutralino1 = 304.54 GeV

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.804726
End = 218.3 ± 0.776 GeV

Counts / 10 GeV

30 GeV / Bin

Counts / 30 GeV

scaleFactor = 0.804726
End = 220.2 ± 0.716 GeV

20 GeV / Bin

Counts / 50 GeV

scaleFactor = 0.804726
End = 224.5 ± 0.27 GeV
$24D17: \text{Neutralino}_2 = 323.83 \text{ GeV}$

50 previous events

$10 \text{ GeV / Bin}$

$30 \text{ GeV / Bin}$

$20 \text{ GeV / Bin}$

scaleFactor = 0.793719
$24A12: \text{Neutralino}_2 = 348.21 \text{ GeV}$

10 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.737332
End = $276.7 \pm 0.546 \text{ GeV}$

30 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.737332
End = $284.4 \pm 0.215 \text{ GeV}$

20 GeV / Bin

Visible jet-tau-tau mass
- $M_{j\tau\tau}$ for the same event
- $M_{j\tau\tau}$ for the bi-event
- $M_{j\tau\tau}$ after subtraction

scaleFactor = 0.737332
End = $285.5 \pm 0.825 \text{ GeV}$

50 previous events
Visible jet-tau-tau mass

- $M_{jj\tau\tau}$ for the same event
- $M_{jj\tau\tau}$ for the bi-event
- $M_{jj\tau\tau}$ after subtraction

scaleFactor = 0.730527
End = 292.4 ± 0.81 GeV

Counts / 30 GeV

Counts / 50 GeV

10 GeV / Bin

20 GeV / Bin

50 previous events

24A24: Neutralino2 = 358.02 GeV