CDF Lepton+Jet Event Selection

- **1 High E_t Lepton (e or μ)**
  - E_t >20 GeV
  - Central ($|\eta| < 1.1$)
  - Isolated
- $\not{E}_{\mathrm{T}} > 20\ GeV$
- **3 Jets with $E_T > 15\ GeV$ and $|\eta| < 2.0$**
- **Require at least 1 jet to be b-tagged**

  Either
  - Displaced Vertex SVX b tag
  - Soft Lepton (SLT) b tag

Summary of CDF Lepton+Jets Results

Total Integrated Luminosity = 109 pb^{-1}

SVX b-Tagging Results

	Total Background Events	Observed Events (Tags)
W+1 Jet	69 ± 1	70 (70)
W+2 Jet	29.1 ± 3.7	45 (51)
W+3 Jet	6.7 ± 0.9	18 (24)
W+$\geq$ 4 Jet	2.6 ± 0.5	16 (18)

Soft Lepton b-Tagging Results

	Total Background Events	Observed Events (Tags)
W+1 Jet	273 ± 35	70 (70)
W+2 Jet	79 ± 10	45 (51)
W+3 Jet	17.4 ± 2.8	25 (27)
W+$\geq$ 4 Jet	7.8 ± 1.0	15 (17)

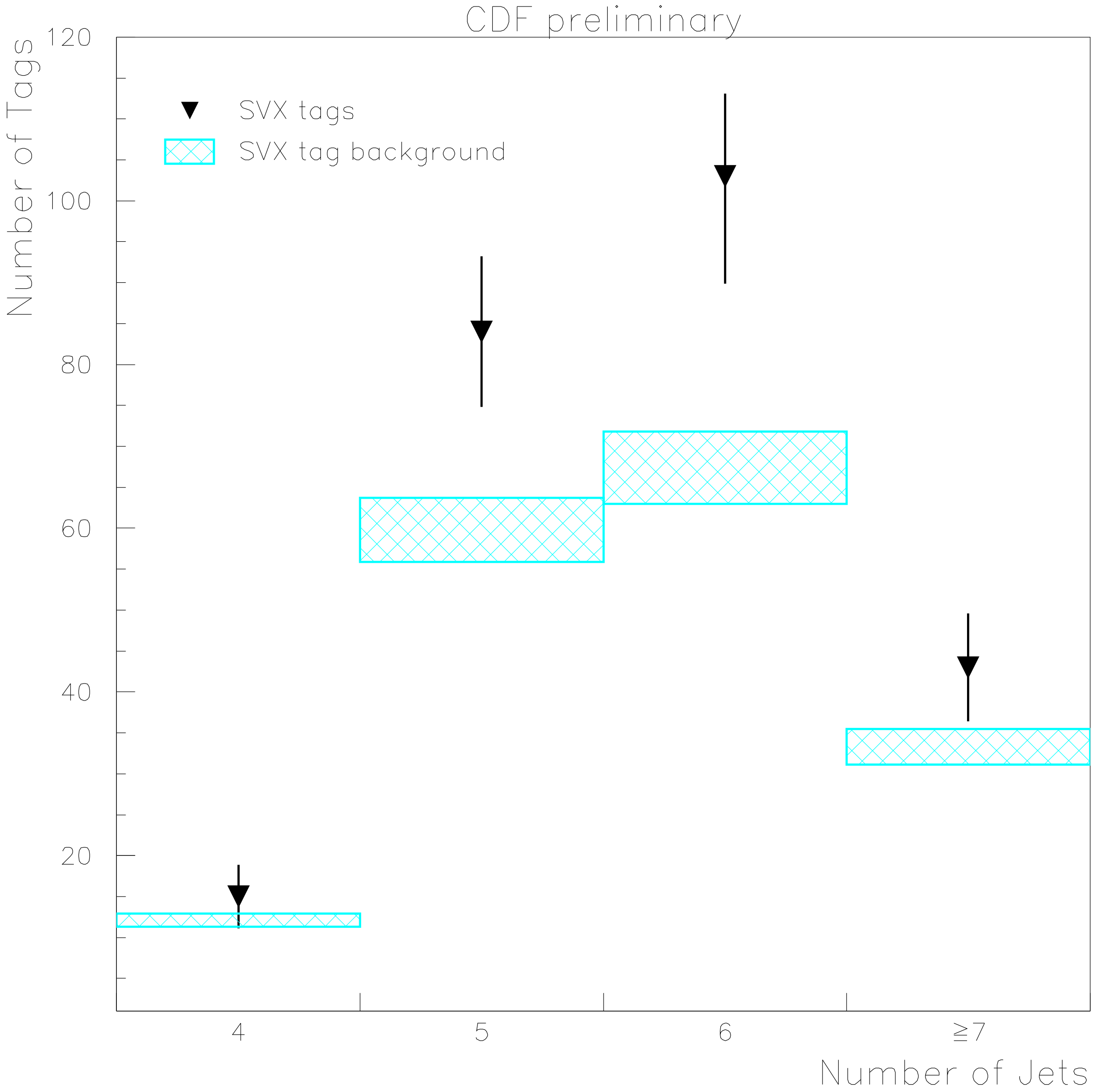
CDF All Hadronic Event Selection

From events that passed the multijet trigger (clustered $\Sigma\, E_t >$ 125 GeV), we further require:

- $N_{jet} \geq 5$
- $\Delta R_{min} \geq 0.5$
- $\Sigma\, E_t \geq 300\ GeV$
- $\Sigma\, E_t/\sqrt{\hat{s}} \geq 0.75$
- Selection in the Aplanarity-$\Sigma\, E_t$ plane.

$$A + 0.0025 \times \sum_3^N E_T \ \geq \ 0.54$$

- **$\geq$ 1 SVX b-tagged jet**


CDF preliminary
Number of Tags
120
100
80
60
40
20
SVX tags
SVX tag background
4
5
6
≥7
Number of Jets

CDF Dilepton Event Selection

- **2 High E_t Leptons (e or μ)**
  - E_t >20 GeV
  - Central ($|\eta| < 1.1$)
  - Oppositely charged
- **At least 1 lepton must be Isolated:**
  - $I = \frac{E_T^{0.4} - E_T^{Lep}}{E_T^{Lep}}$
  - $I_{cal} < 0.1$
  - $I_{track} < 0.1$
- Dilepton Invariant mass not in Z region $75 - 105\ GeV/c^2$
- $\not{E}_T > 25\ GeV$
- If $\not{E}_T < 50$ GeV, require $\Delta\phi(\not{E}_T - l\ or\ jet) > 20°$
- 2 Jets with $E_T > 10\ GeV$

Summary of CDF Dilepton Results

Total Integrated Luminosity = 109 pb^{-1}

Requirement	ee	$\mu\mu$	$e\mu$
Lepton ID	2857	3452	68
Opp. Charge	2847	3444	55
Isolation	2798	3457	49
Invariant Mass	316	375	49
$\not{E}_{\mathrm{T}}$	6	7	16
2 Jets	**1**	**2**	**7**

CDF τ-Dilepton Event Selection

Look for *hadronic* tau decay to 1 or 3 prong. Require:

- 1 primary lepton (e or μ)
- ≥ 2 jets
- $\not{E}_{\rm T}$ significance greater than 3 σ
- $H_T = E_T^l + P_T^\tau + \not{E}_{\rm T} + \Sigma E_T^{jets} \geq 180\ GeV$
- 1 hadronic τ candidate

  τ identification via:
  - Require 1 or 3 tracks in a 10° cone
  - E/P consistent with τ Monte Carlo
  - e and μ removal
  - Track Isolation
  - $P_T^\tau > 15\ GeV/c$

Observe 4 Events, expect 2.0 $\pm$ 0.4 from background processes.

Of the 4 Events, 3 are b tagged with displaced Vertex or Soft Lepton b tag

Summary of CDF $\sigma_{t\bar{t}}$ Results

Channel	acc.×Br. (%)	Background	N_{obs}	$\sigma_{t\bar{t}}(pb)$
SVX	3.5 ± 0.7	8.0 ±1.4	34	$6.8^{+2.3}_{-1.8}$
SLT	1.7 ± 0.3	24.3 ±3.5	40	$8.0^{+4.4}_{-3.6}$
DIL	0.77 ± 0.08	2.1 ±0.4	10	$9.3^{+4.4}_{-3.4}$
τ-DIL	0.119 ± 0.014	1.96 ±0.35	4	$15.6^{+18.6*}_{-13.2}$
b-Tag DIL	0.51 ± 0.03	1.4 ±0.3	4	$4.6^{+4.4}_{-3.1}$
All Had.	4.7 ± 1.6	137.1 ± 11.3	192	$10.7^{+7.6}_{-4.0}$

*Statistical uncertainty only.

Combined Dilepton, SVX, Soft Lepton b-Tagged Cross Section:

$$\sigma_{t\bar{t}} = 7.5^{+1.9}_{-1.6} \text{ pb}$$