

A⁰H⁰ Production at 1 TeV

- ◇ Configuration
- ◇ Analysis
- ◇ Mass distribution revisited
- ◇ Comments/Future?

Work done by JDH and John Butler(BU)

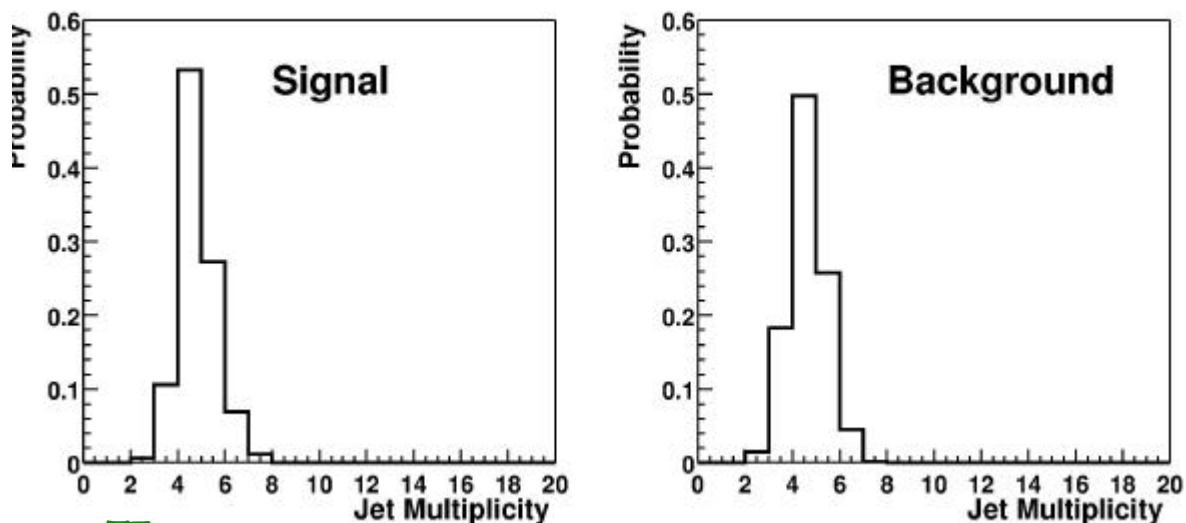
Configuration

- ◇ Mostly, LCD software at Snowmass
 - A few glitches because WNT
- ◇ Pythia
 - $E_{CM} = 1 \text{ TeV}$
 - Signal and bkg ($t\bar{t} \rightarrow \text{hadrons}$).
 - Cross checked cross-sections with Tesla study.
 - No Circe (problem on WNT...)
- ◇ "Silicon detector" configuration
- ◇ Tagging
 - Flavor from closest MC particle
this is not foolproof...
 - If very close ($\cos \gamma > 0.975$), prefer heavy quarks

Basic Analysis

◇ Jet finding

- Calorimeter only
- Durham, $\gamma = 0.004$
- Use only events with 4 jets
(tried forcing 4, code crashed...)



◇ Tagging

- fixed efficiency using MC flavor
- numbers from Tesla TDR
b-jets, 0.8, c-jets 0.1, others, 0

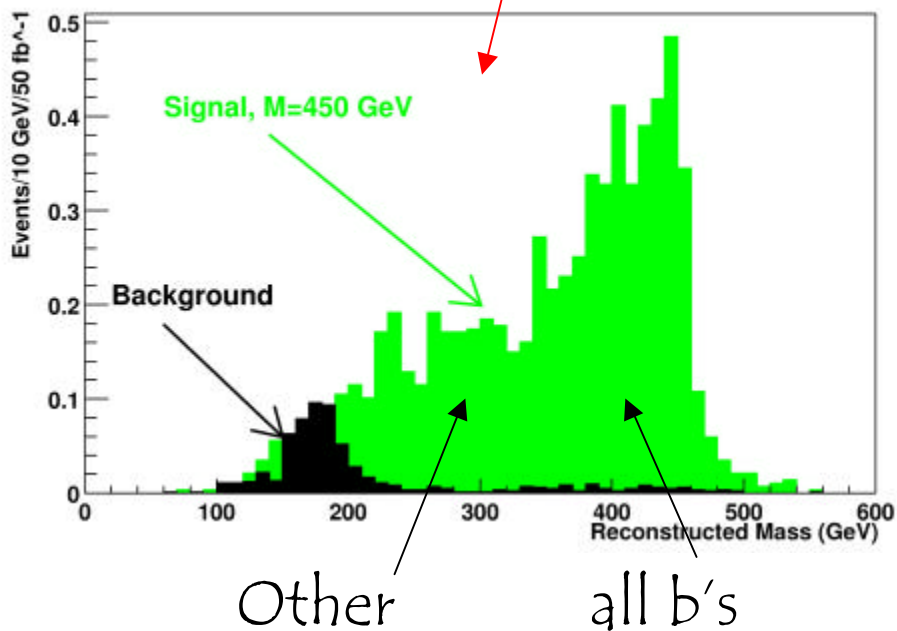
Basic Analysis, con't

- ◇ Initially, a counting experiment to look at sensitivity
- ◇ Background ala Tesla, consider only $t\bar{t}$.
- ◇ Assume 50 fb^{-1} integrated luminosity
- ◇ Efficiencies (all mass dependent):
 - =4 jets, 55%
 - All are b's, 70%
 - 4 tags, $0.8^4 = 40\%$

M_H^0 = M_{A^0}	Production σ (fb)	BR($X \rightarrow b\bar{b}$)		Number of Events
		$X = A^0$	$X = H^0$	
400	2.4	0.80	0.88	20.
425	1.5	0.78	0.86	12.
450	0.85	0.77	0.84	7.
460	0.59	0.77	0.84	4.6
475	0.28	0.76	0.83	2.1
$t\bar{t}$	$\sigma \times \text{BR}(t\bar{t} \rightarrow b\bar{b}c\bar{s}s\bar{c}) = 19$			0.64

Mass Reconstruction

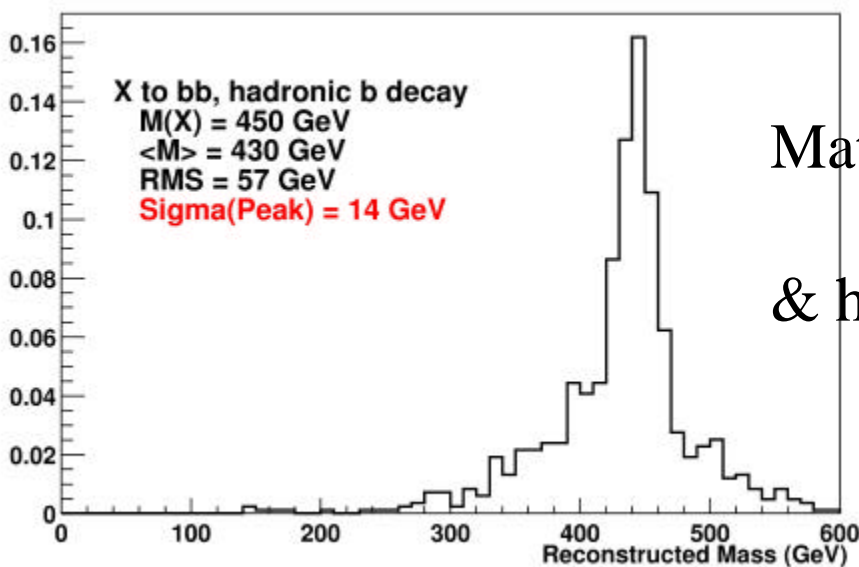
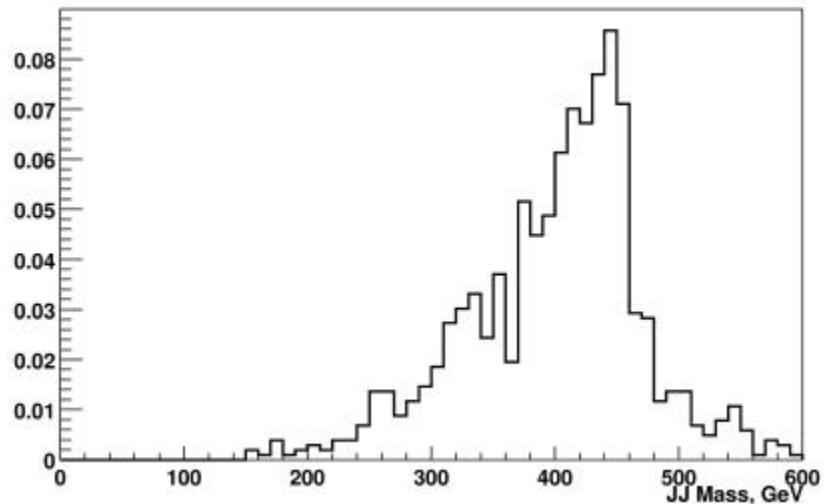
- ◇ Mass reconstruction
 - Original intent: $\tan\beta$ from width?
 - Use only four-jet events
 - Choose pairs from smallest mass difference between "A⁰" & "H⁰"
 - Look at either all decays (include top and τ) or only b-decays



Mass Reconstruction

- ◇ What's the tail from?
 - non-b decays
 - Also, leptonic decays in jets

Matched b's
to closest jet

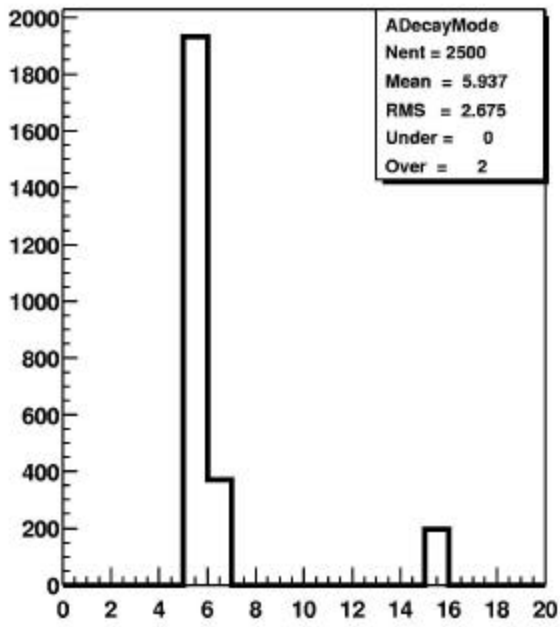


Matched b's to
closest jet
& hadronic
b-decay

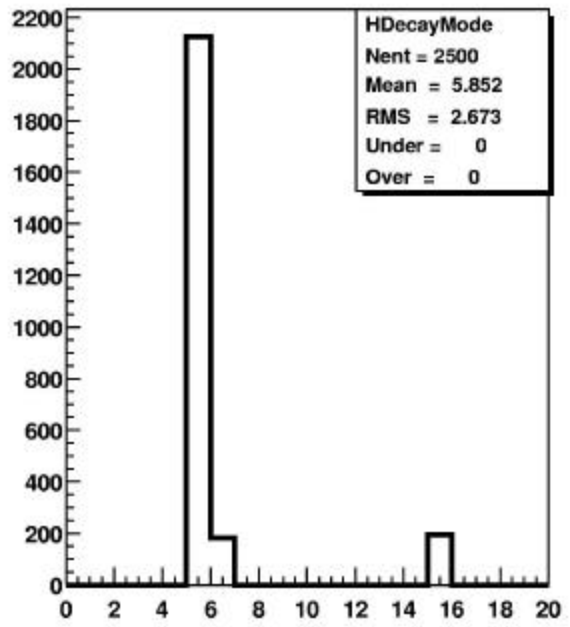
Comments

- ◇ Questions in **current result**:
 - ISR, Circe?
 - Is flavor ID code robust enough?
(and bug free?)
- ◇ **Original intent**: $\tan\beta$ from width.
 - Distracted by mass shape, shooting for < 10 GeV resolution,,,
 - Clearly need high purity b-decays,
 - Also need ability to have high purity hadronic-only modes
 - Did not implement lepton veto or E_T requirements...

+ld of A0 decay



+ld of H0 decay



Jet flavor

