

# $\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^-$ Lifetime Measurement

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# Introduction

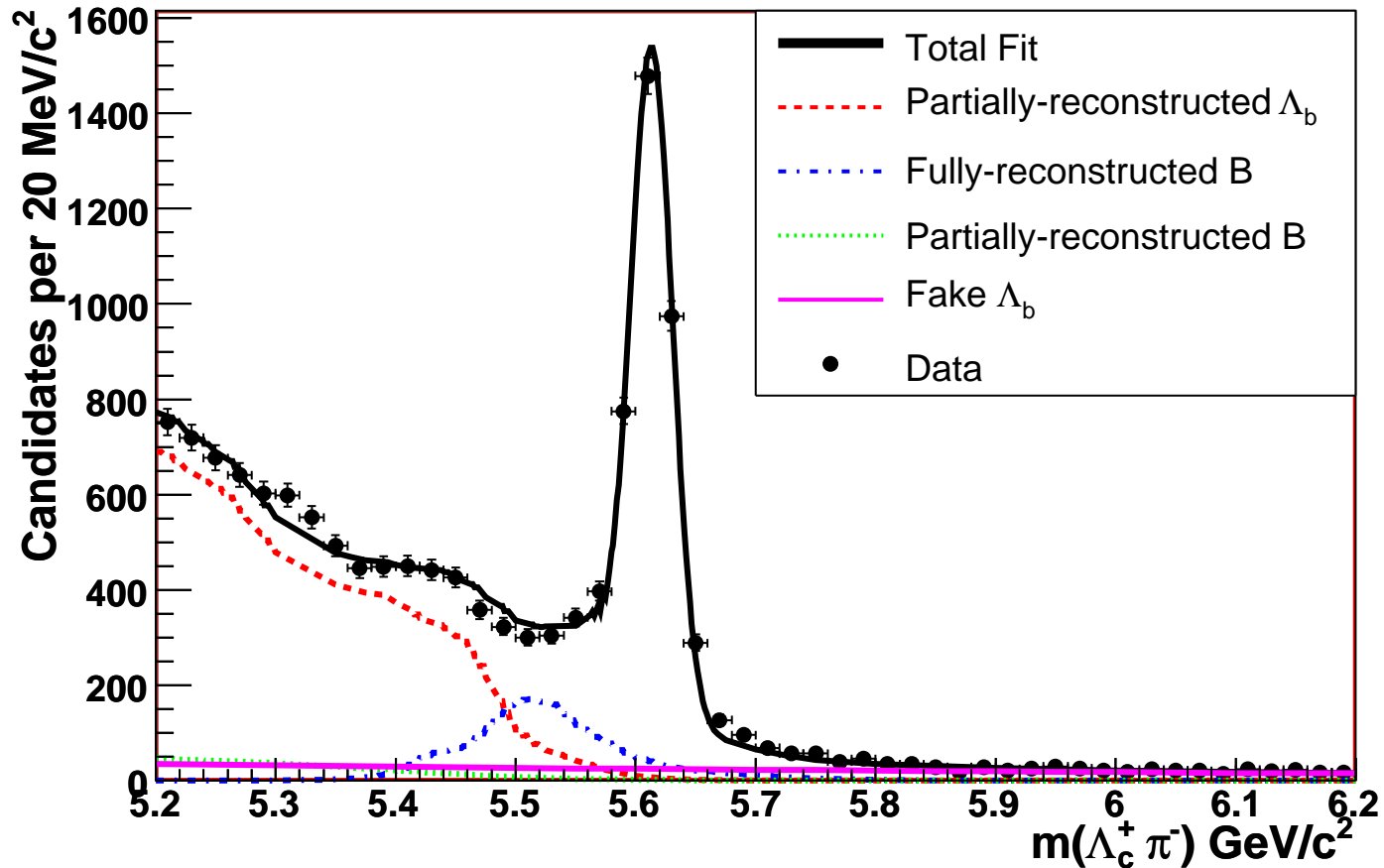
Last Time (14 November 2006): presented details of the lifetime fit, SVT efficiency correction, and a first look at systematics.

## Today...

- Mass Fit
- Overview of current projects...
  - Trigger confirmation
  - SVT efficiency function
  - Goodness of fit for lifetime
  - B cross check sample
- Systematics and Cross-checks
- Schedule and Plan

# Blessed Mass Fit

⇒ Last week, Jen Pursley blessed the  $\Lambda_b^0$  mass plot for  $\Sigma_b$  PRL



$\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^-$  signal region  $\in [5.565, 5.670]$

# Trigger Confirmation

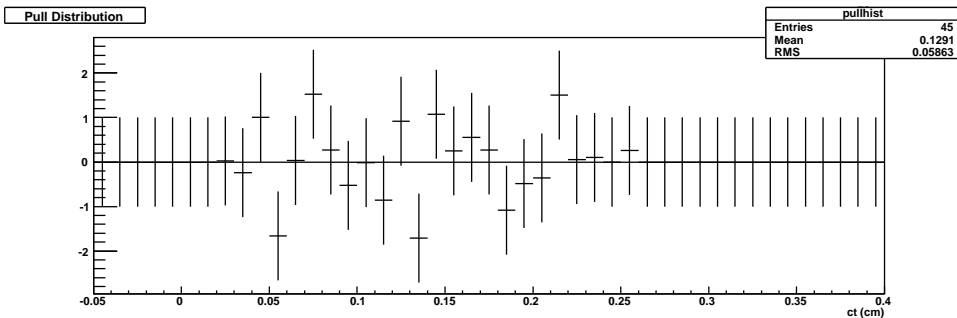
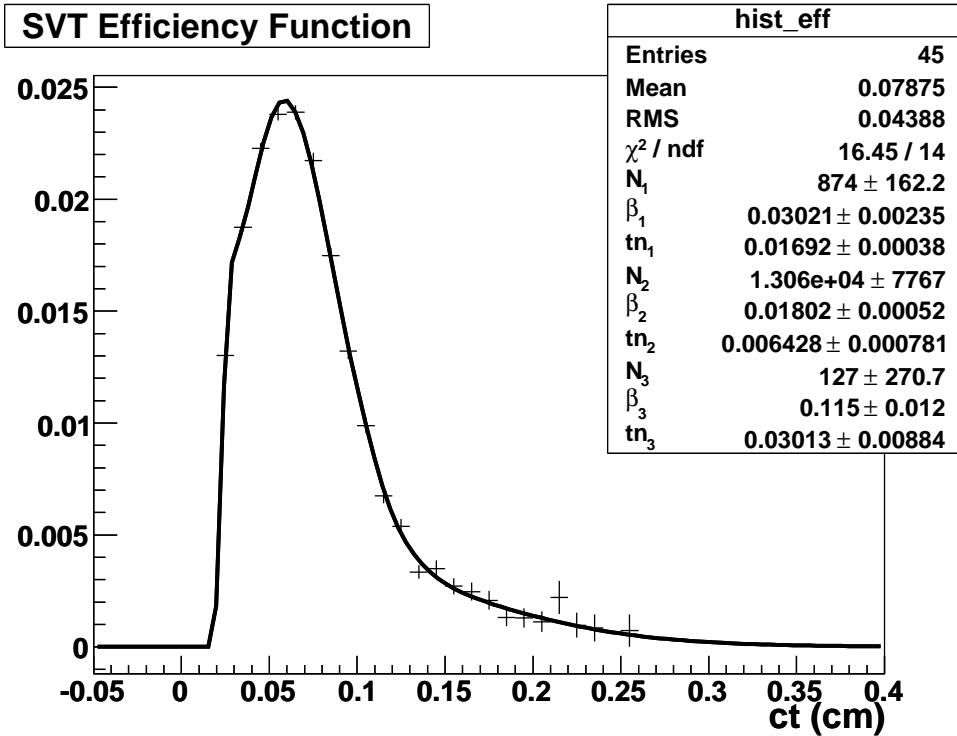
$Q(trk1) \times Q(trk2)$	$< 0$
$p_T(trk1) + p_T(trk2)$	$> 5.5\text{GeV}/c$
$p_T(trk1)$	$> 2.0\text{GeV}/c$
$p_T(trk2)$	$> 2.0\text{GeV}/c$
$ z0(trk1) - z0(trk2) $	$< 5.0\text{cm}$
$ D0_{SVT}(trk1) $	$[0.012, 0.1]\text{cm}$
$ D0_{SVT}(trk2) $	$[0.012, 0.1]\text{cm}$
$p_{T(SVT)}(trk1)$	$> 2.0\text{GeV}/c$
$p_{T(SVT)}(trk2)$	$> 2.0\text{GeV}/c$
$\Delta\phi(trk1, trk2)$	$[2^\circ, 90^\circ]$

SVT matching done with TrackAssoc module

Upper cut on  $\Delta\phi(trk1, trk2)$  was formerly  $135^\circ$ .

Change to  $90^\circ$  results in  $\sim 30$  candidate difference.

# SVT Efficiency Function



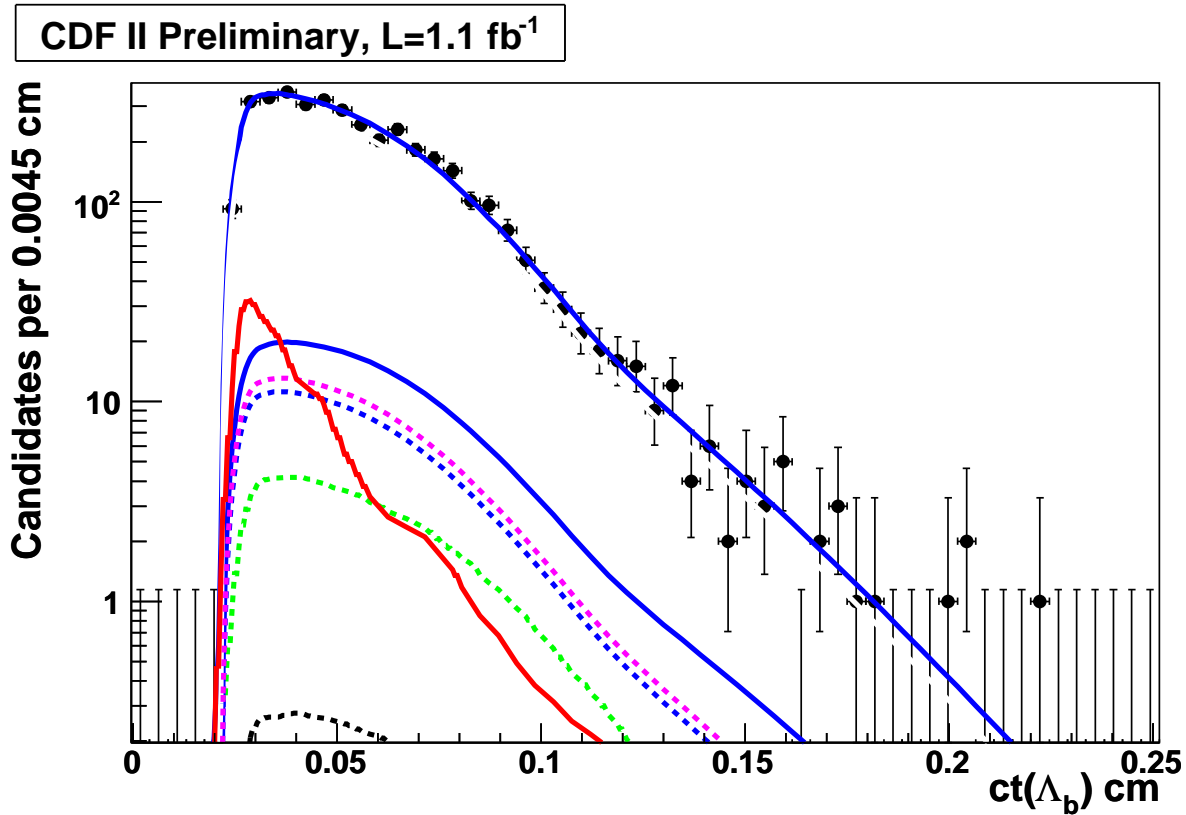
Eff. fn. computed on  $\sim 43.7k$  MC sample

Fitting only  $\sim 22$  points

More MC is being generated to add statistics to the existing sample

In the meantime... we are experimenting with different binning and parameterization

# Goodness of Lifetime Fit



Blinded lifetime fit

Need a handle to compare different lifetime fit scenarios

Hoping to lift LBL RooFit goodness of fit implementation

## $B^0 \rightarrow D^{*+} \pi^-$ Cross-Check

- Similar topology to our  $\Lambda_b^0$  decay
  - Already studied by Amanda and LBL folks
  - Thanks Amanda for providing the code and data files we need
  - Amanda also uses RooFit: general code pieces are the same!
- ⇒ Setting up a more general framework:
- un-plug our  $\Lambda_b^0$ -specific code
  - replace with Amanda's  $B^0$  code
- Generalized framework should be ready by the end of the week

# Systematics

- Most systematics are setup
- Still need to setup SVT-SVX correlation
- Will need to re-run once SVT efficiency is set
- Will further investigate  $3\mu m$  fitter bias

## Other Cross-Checks

- Run lifetime fit splitting on 0d, 0h, and 0i run-ranges
- Run lifetime fit splitting on low mass region and high signal region
- Run lifetime fit on revised signal window

# Schedule and Plan

## This Week

- Setup the  $B^0$  cross-check
- More Monte Carlo generation
- SVT efficiency function studies

## Holidays and 1st Week of January

- Finalize Systematics and Cross-checks
- Update cdfnote 8578

## 2nd Week of January

- Present Updates in BML (9 Jan 2007)
- Hopefully Pre-Bless (11 Jan 2007)

## Mid-January

- Bless