ANALYSIS UPDATE

Manmohan Dash

Virginia Tech

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Reconstruction and fitting
a) $D^0 \to K_S\pi^0$
b) $D^0 \to K_L\pi^0$
c) $D^0 \to K_S\pi^+\pi^-$
d) $D^0 \to K_L\pi^+\pi^-$

$D^0 \to K_S\pi^0$

- Reconstruction

  π^0 : mdstpi0

  π^+ : mdstcharged

  K_S : mdstvee2

  . track and kind cut

  . mass cut, $\pm 3\sigma$ of mean in M_{K_S} distribution

  D^0 : $K_S + \pi^0$

  . mass cut, $\pm 3\sigma$ of mean in M_{D^0} distribution

  D^{*+} : $D^0 + \pi_s^+$

  . π_s^+ : $\pi_s^+ - \pi_s^+$ used in K_S(K_S veto)

  . signal region : $(0.143 < dm = M_{D^{*+}} - M_{D^0} < 0.148)$

$D^0 \to K_S\pi^0$ continues

- Fitting

  K_S :
  - . backgound : 1st order Polynomial
    - . offset fixed at 0.4700
  - . signal : Gaussian

  D^0 :
  - . background : falling exponential
    - . offset fixed at 1.1
  - . signal : Gaussian

  dm :
  - . background : threshold function
    - . offset fixed at $M_{\pi^+} = 0.13957 GeV$
  - . signal : double Gaussian
    - . this is signal region for efficiency of D^{*+}

  D^{*+} :
  - . background : threshold function
    - . offset fixed at 1.9430 GeV
  - . signal : Gaussian

$D^0 \to K_L \pi^0$

- Reconstruction
  π^0 : mdstpi0
  π^+ : mdstcharged
  K_L , D^0 : mdstklong and mdstpi0
    . $D^0 and K_L$ mass constrained
    . imaginary solution for p_{K_L} rejected
  D^{*+} : $D^0 + \pi_s^+$
    . π_s^+ : all π^+ (no veto on π^+)
    . signal region :$\pm 3\sigma$ of mean in $M_{D^{*+}}$ distribution

- Fitting
  D^{*+} :
    . background : threshold function
      . offset fixed at 2.0040 GeV
    . signal : Gaussian
      . this is signal region for efficiency of D^{*+}

$D^0 \to K_S\pi^+\pi^-$

- Reconstruction

  $\pi^\pm$: mdstcharged

  K_S : mdstvee2

  . track and kind cut

  . mass cut, $\pm 3\sigma$ of mean in M_{K_S} distribution

  K^{*-} : $K_S + \pi_c^-$:

  . π_c^- : K_S veto on π^-

  . mass cut, $\pm 3\sigma$ of mean in $M_{K^{*-}}$ distribution

  D^0 : $K^{*-} + \pi_c^+$:

  . π_c^+ : K_S veto on π^+

  . mass cut, $\pm 3\sigma$ of mean in M_{D^0} distribution

  D^{*+} : $D^0 + \pi_s^+$

  . π_s^+ : K_S and D^0 veto on π^+

  . signal region : $(0.143 < dm < 0.148)$

$D^0 \to K_S\pi^+\pi^-$ continues

- Fitting

  K_S :
  - . backgound : 1st order Polynomial
    - . offset fixed at 0.470
  - . signal : Gaussian

  K^{*-} :
  - . backgound : threshold function
    - . offset fixed at 0.6400
  - . signal : Gaussian
    - . mean fixed at PDG mass of K^{*-}

  D^0 :
  - . background : 1st order polynomial
    - . offset fixed at 1.8400
  - . signal : Gaussian

  dm :
  - . background : threshold function
    - . offset fixed at $M_{\pi^+} = 0.13957 GeV$
  - . signal : double Gaussian
    - . difference in mean fixed to 0
    - . this is signal region for efficiency of D^{*+}

$D^0 \to K_S\pi^+\pi^-$ continues

- Fitting
  D^{*+} :
  - . background : threshold function
    - . offset fixed at 1.9960 GeV
  - . signal : Gaussian

$D^0 \to K_L \pi^+ \pi^-$

- Reconstruction

  $\pi^\pm$: mdstcharged

  $K_L\,, K^{*-}\,, D^0$: mdstklong, π^+ and π^-

  . $D^0 and K_L$ mass constrained

  . imaginary solution for p_{K_L} rejected

  . K^{*-} : $K_L + \pi^-$:

  . mass cut, $\pm 3\sigma$ of mean in $M_{K^{*-}}$ distribution

  . D^0 : $K^{*-} + \pi_c^+$:

  D^{*+} : $D^0 + \pi_s^+$

  . π_s^+ : D^0 veto on π^+

  . signal region : $\pm 3\sigma$ of mean in $M_{D^{*+}}$ distribution

$D^0 \to K_L\pi^+\pi^-$ continues

- Fitting

  K^{*-} :

  . background : threshold function

  . . offset fixed at 0.6300 GeV

  . signal : Gaussian

  . . mean fixed at 0.89166

  D^{*+} :

  . background : threshold function

  . . offset fixed at 2.0040 GeV

  . signal : Gaussian

  . . signal region for efficiency of D^{*+}