$$D_S^{*+} \rightarrow D_S^+ e^+ e^-$$

Work in progress…

Data and Monte Carlo

- Use data collected at E_{CM} = 4170 MeV
- $D_S^{*+}D_S^-$ cross section ~ 1 nb at this energy.
- CLEO-c has 602 pb-1 of data at this energy.
- Hence we expect ~602,000's D_S^{*+} and an equal number of at D_S^{*-} this energy

- For MC, we added a decay channel we like to EVT Gen.
- Only the phase space distribution was simulated, the exact distribution taking into QED into account not yet in place.

Software Version and Dataset

- Using CLEO tag 20080624_MCGEN for generation & detector simulation
- Using CLEO tag 20080228_FULL for reconstruction
- MC according to run number 231576

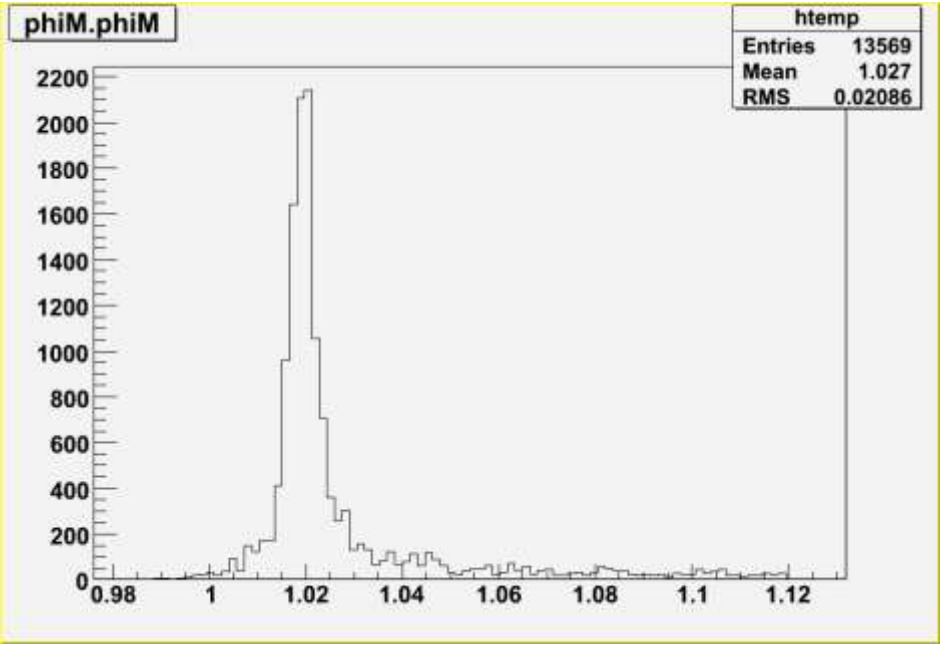
Decay Chain

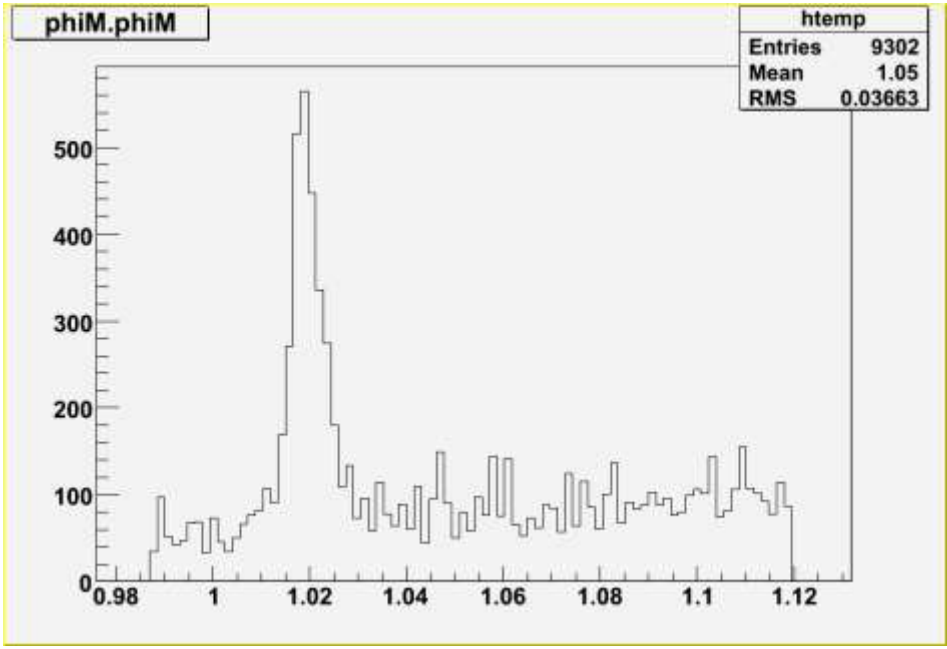
$$D_S^{*+} \rightarrow D_S^+ e^+ e^-$$

$$D_S^+ \rightarrow \phi\pi^+$$

$$\phi \rightarrow K^+ K^-$$

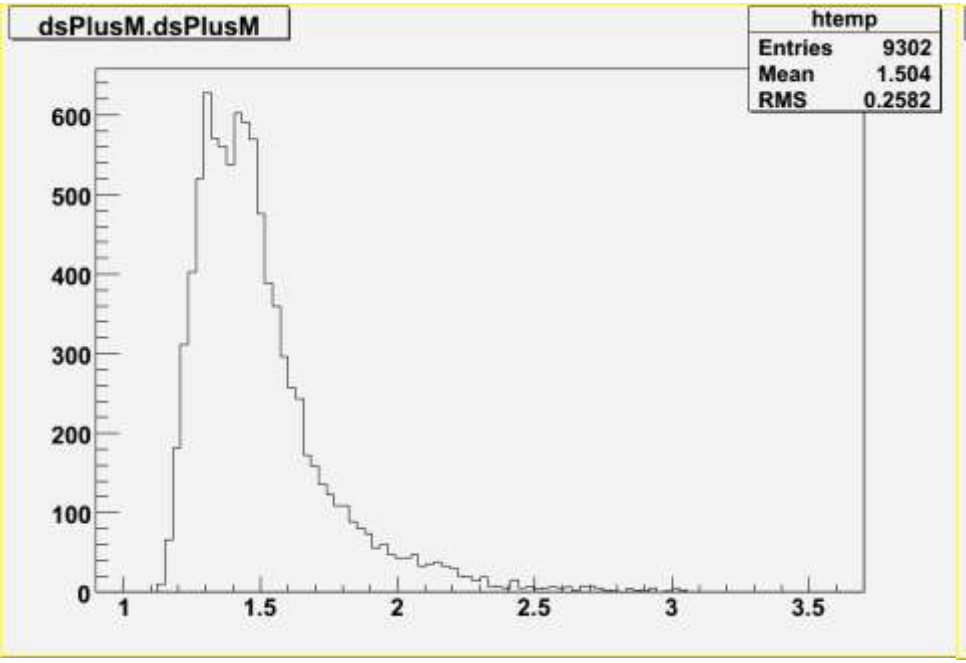
Φ mass peak

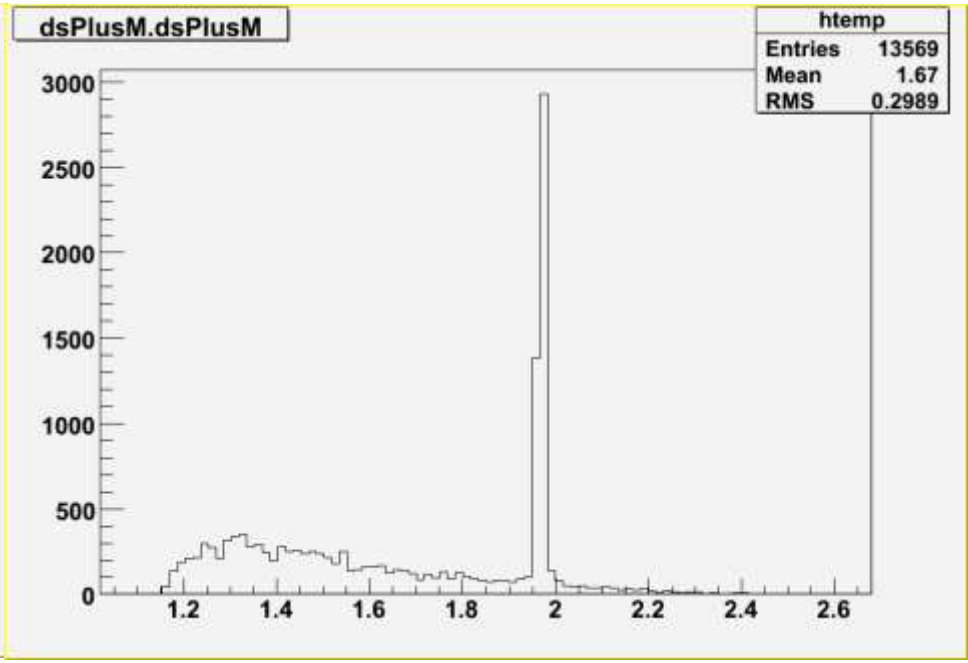




- Reconstruct phi mass peak from decay into charged kaons. $\phi \rightarrow K^+K^-$
- Kaon tracks must pass track quality cuts
  - 50 MeV < Track Momentum < 2.0 GeV
  - Number of hits / number expected > 0.5
  - chiSquared < 100,000
  - helix.d0 < 5 mm, helix.z0 < 5 cm
- Kaon tracks are fitted to the hypothetical kaon dE/dx within 3.0 σ

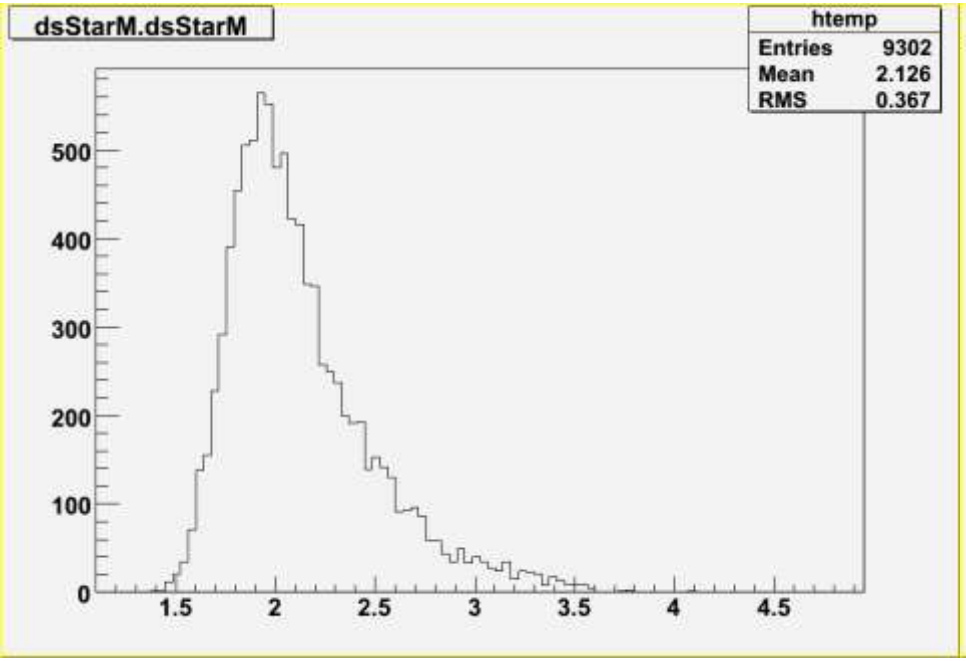
D_S^+ mass peak

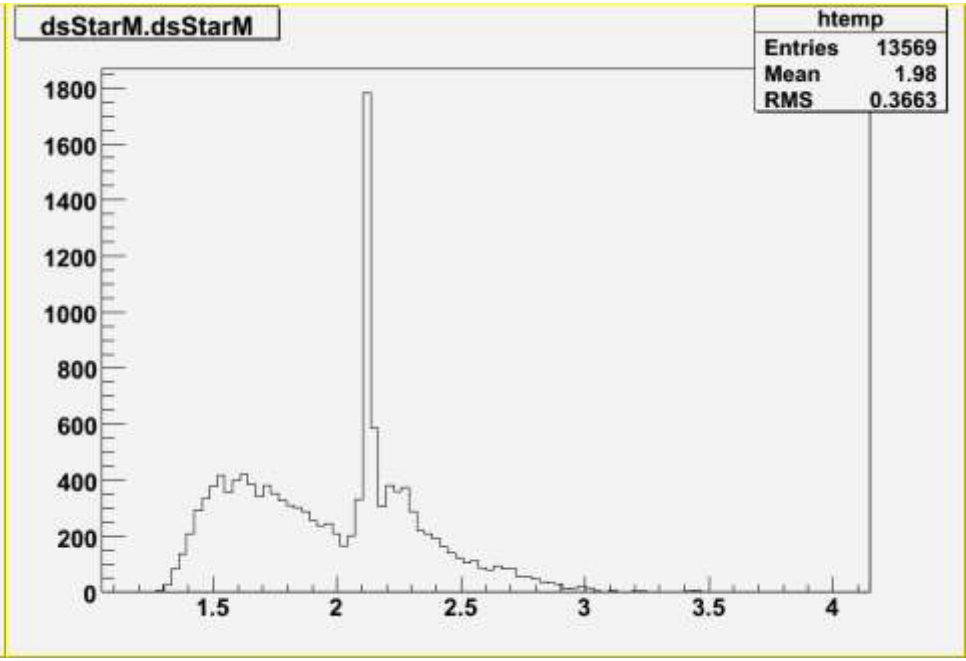




- Reconstruct D_s+ mass peak from decay into phi and charged pion. $D_S^+ \rightarrow \phi\pi^+$
- Pion tracks must pass track quality cuts
  - 50 MeV < Track Momentum < 2.0 GeV
  - Number of hits / number expected > 0.5
  - chiSquared < 100,000
  - helix.d0 < 5 mm, helix.z0 < 5 cm
- Pion tracks are fitted to the hypothetical pion dE/dx within 3.0 σ

D_S^{*+} mass peak





- Reconstruct D_s*+ mass peak from decay into D_s+ and electrons. $D_S^{*+} \rightarrow D_S^{+} e^{+} e^{-}$
- Electron tracks must pass relaxed track quality cuts
  - 10 MeV < Track Momentum < 2.0
  - GeVchiSquared < 100,000
  - helix.d0 < 5 mm, helix.z0 < 5 cm
- Electron tracks are fitted to the hypothetical electron dE/dx within 3.0 σ

Kinematic Quantities to Plot

$$\Delta E = E(K^+K^-\pi^\vdash e^+e^-) - E(D_S^{*+}beam)$$

$$\Delta m = M(K^+K^-\pi^\vdash e^+e^-) - M(K^+K^-\pi^\vdash)$$

$$m_{BC} = \sqrt{E^2(D_S^{*+}beam) - P^2(K^+K^-\pi^\vdash e^+e^-)}$$