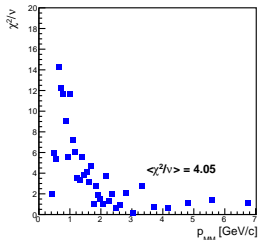
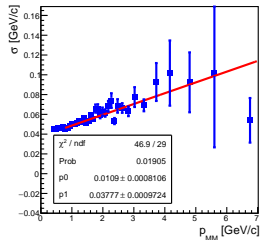
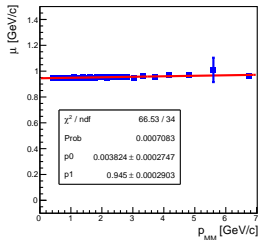
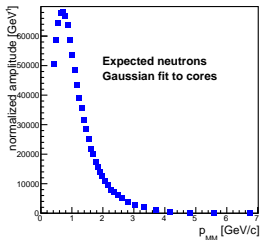


Data file:
data10p6nosidiscutv4.root

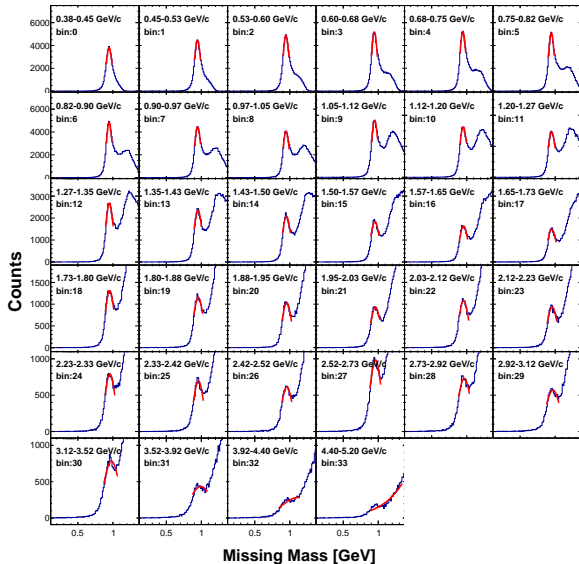
Histograms:
expMM_Pmmbin

Vary μ and σ , range fixed: 0.895166-1.00242 GeV



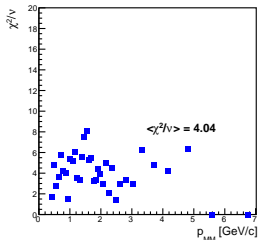
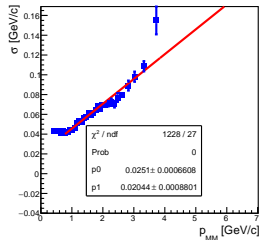
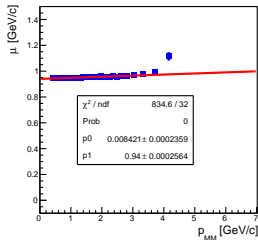
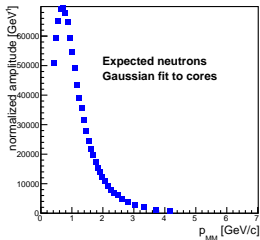
Wed Aug 17 19:31:43 2022

Vary μ and σ , range fixed: 0.895166-1.00242 GeV



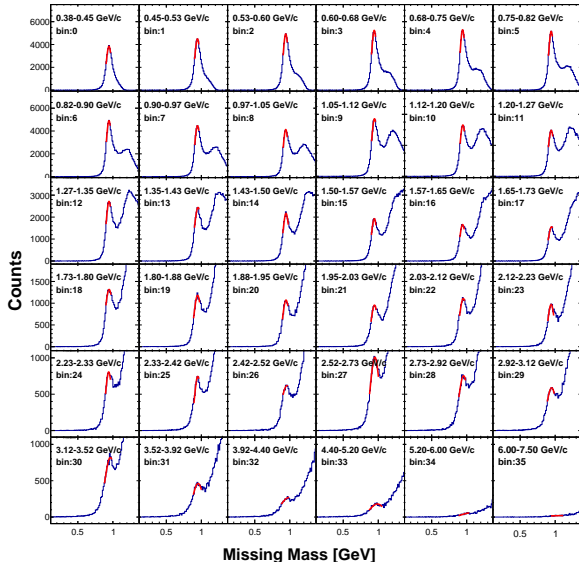
Data file:
data10p6nosidiscutv4.root

Histograms:
expMM_Pmmbin



Thu Aug 18 10:18:44 2022

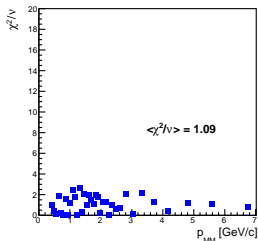
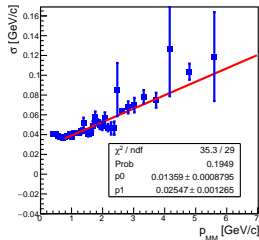
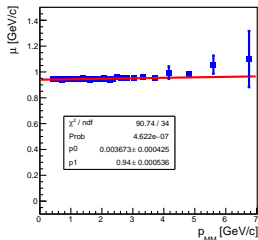
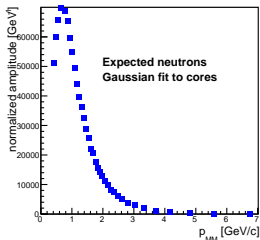
Vary μ and σ , range $\mu \pm \sigma$



Data file:
data10p6nosidiscutv4.root

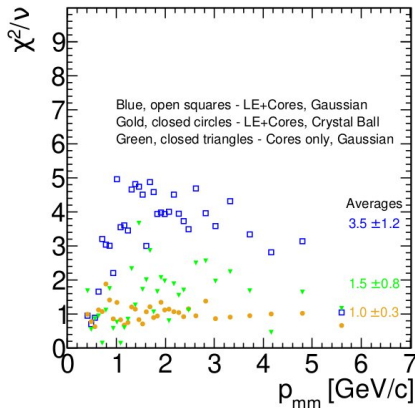
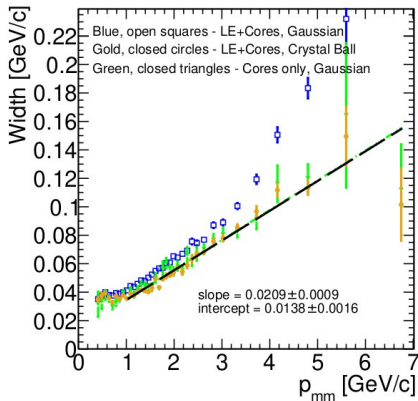
Histograms:
expMM_Pmmbin

Vary μ and σ , range: $\mu - \sigma \rightarrow \mu + \frac{\sigma}{2}$

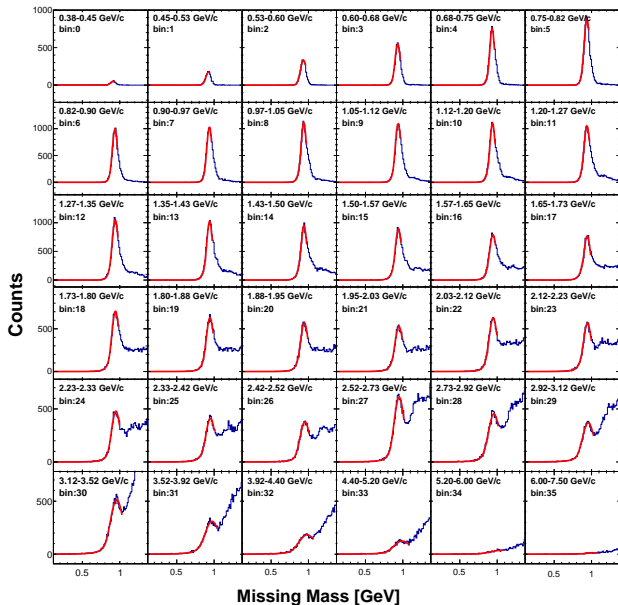


Thu Aug 18 09:48:17 2022

Vary μ and σ , range: $\mu - \sigma \rightarrow \mu + \frac{\sigma}{2}$



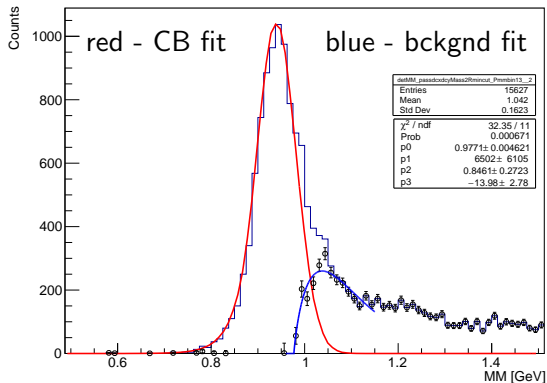
Additional Slides



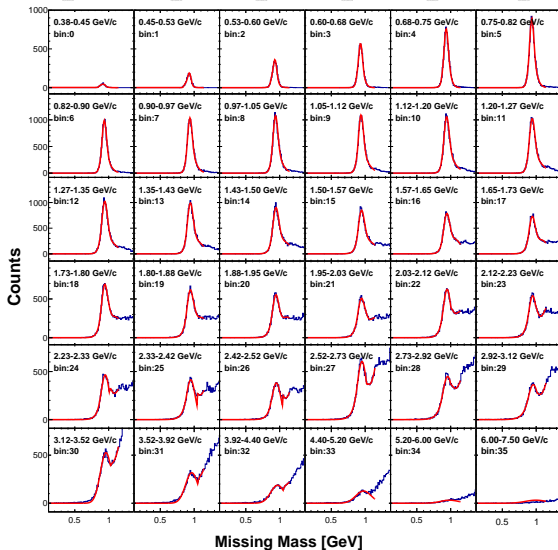
Data file:
data10p6nosidiscutv4.root

Histograms:
detMM_passdcxcycyMass2Rmncut_Pmmbin

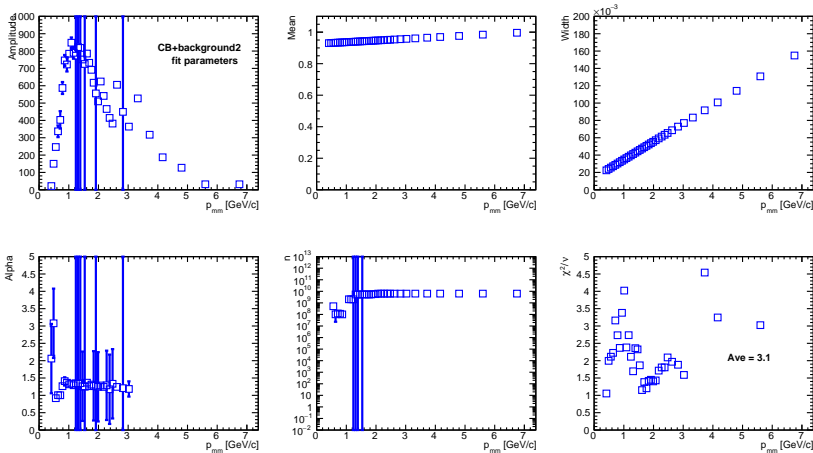
detMM_passdcxdcyMass2Rmincut_Pmmbin13



- 1 Fit the range from $MM = 0 \rightarrow \overline{MM} + \sigma$ with Crystal Ball fn.
- 2 Using full data range subtract fit from data $\Delta = N_{data} - M_{fit}$
- 3 Use result to guide choice of fitting function.
- 4 $bckgnd = N(MM - MM_0)^n e^{\lambda(MM - MM_0)}$

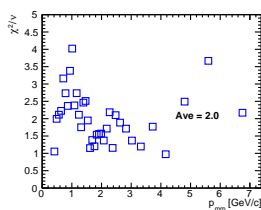
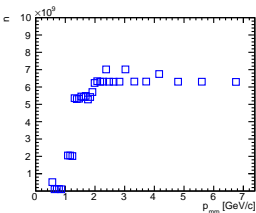
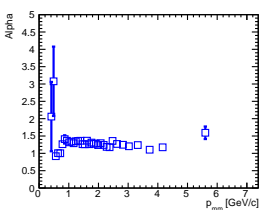
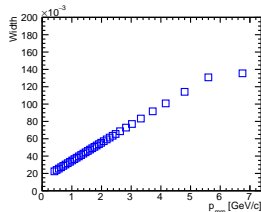
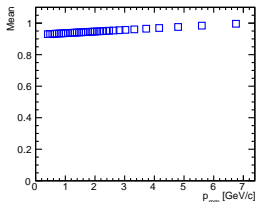
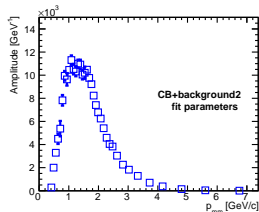


fix μ and σ , range to 1.15 GeV



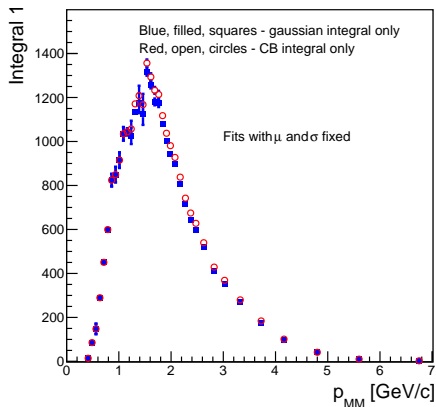
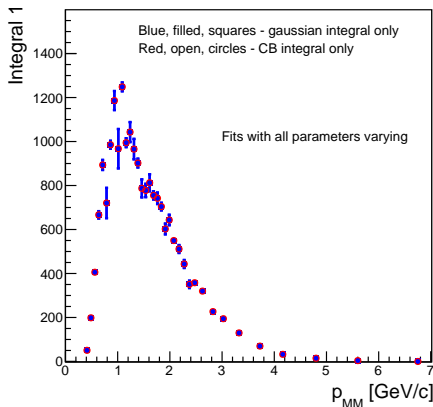
Thu Jul 14 13:07:53 2022

fix μ and σ , range to 1.15 GeV



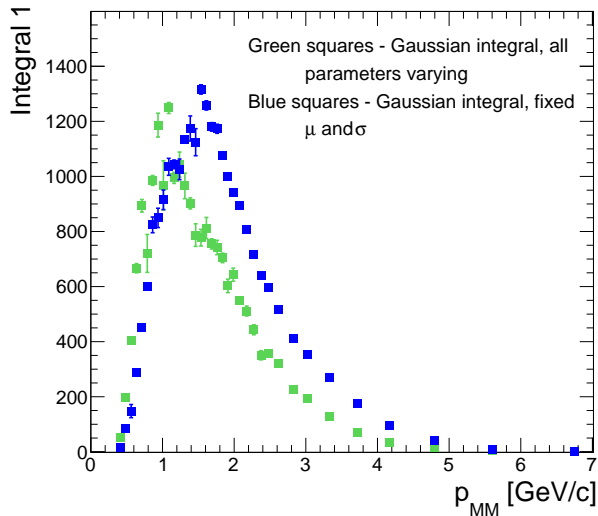
Wed Aug 10 10:16:43 2022

fix μ and σ , range to 1.15 GeV



Red: fix μ and σ , range to 1.15 GeV

Blue: allow μ and σ to vary, MM range to 1.15 GeV



$$\langle \chi^2/\nu \rangle = 2.0 \text{ (blue)}$$

$$\langle \chi^2/\nu \rangle = 1.7 \text{ (green)}$$

The Crystal Ball function is given by

$$f(x; \alpha, n, \bar{x}, \sigma) = N \exp\left(-\frac{(x - \bar{x})^2}{2\sigma^2}\right), \quad \text{for } \frac{x - \bar{x}}{\sigma} > -\alpha$$

$$= N \cdot A \cdot \left(B - \frac{x - \bar{x}}{\sigma}\right)^{-n}, \quad \text{for } \frac{x - \bar{x}}{\sigma} < -\alpha$$

where

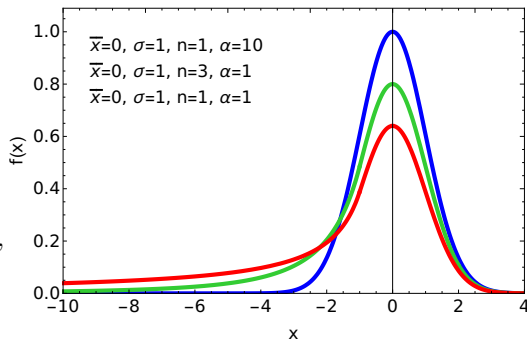
$$A = \left(\frac{n}{|\alpha|}\right)^n \cdot \exp\left(-\frac{|\alpha|^2}{2}\right),$$

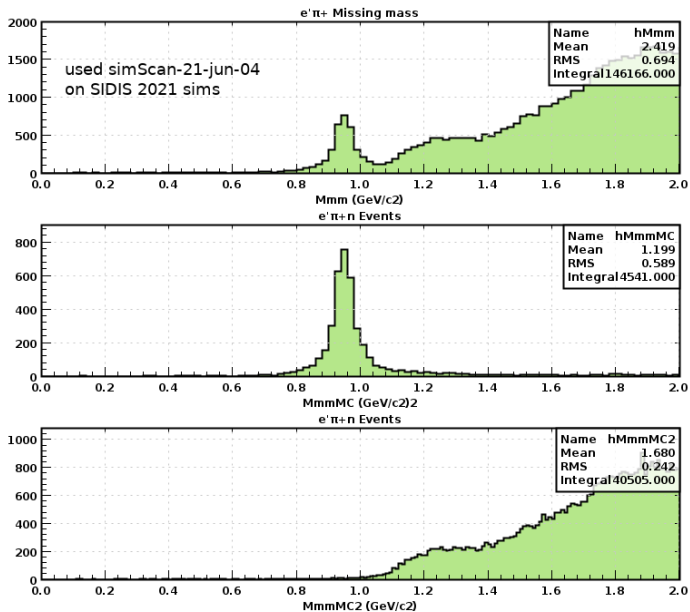
$$B = \frac{n}{|\alpha|} - |\alpha|,$$

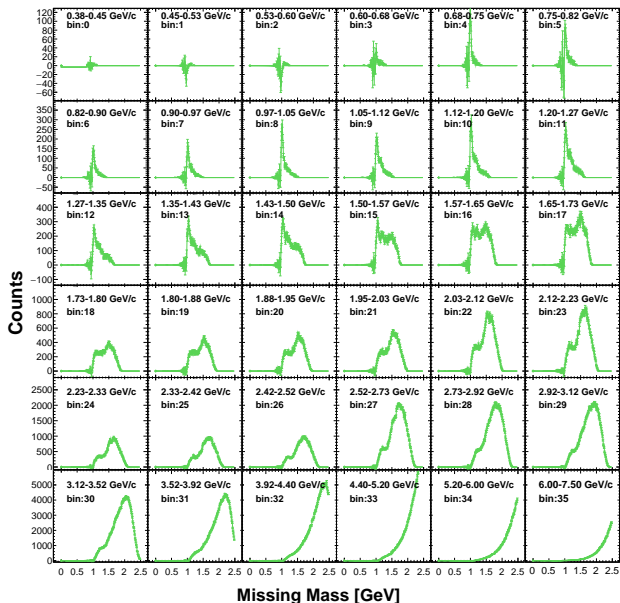
$$N = \frac{1}{\sigma(C + D)},$$

$$C = \frac{n}{|\alpha|} \cdot \frac{1}{n-1} \cdot \exp\left(-\frac{|\alpha|^2}{2}\right),$$

$$D = \sqrt{\frac{\pi}{2}} \left(1 + \operatorname{erf}\left(\frac{|\alpha|^2}{2}\right)\right)$$







- 1 Fit the range $MM = 0 \rightarrow \overline{MM} + \sigma$ with Crystal Ball fn.
- 2 Using full data range subtract fit from data $\Delta = N_{data} - M_{fit}$
- 3 Use result to guide choice of fitting function.