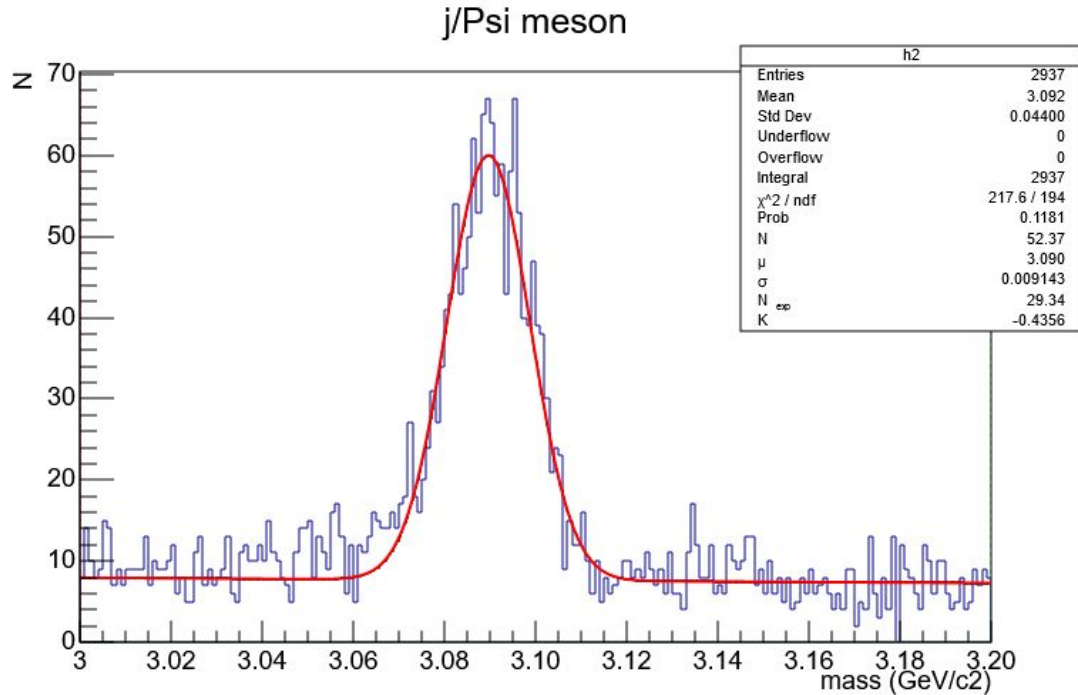
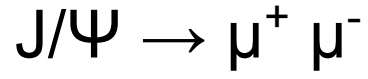


# Belle II international masterclasses

IPHC Strasbourg

13 March 2024

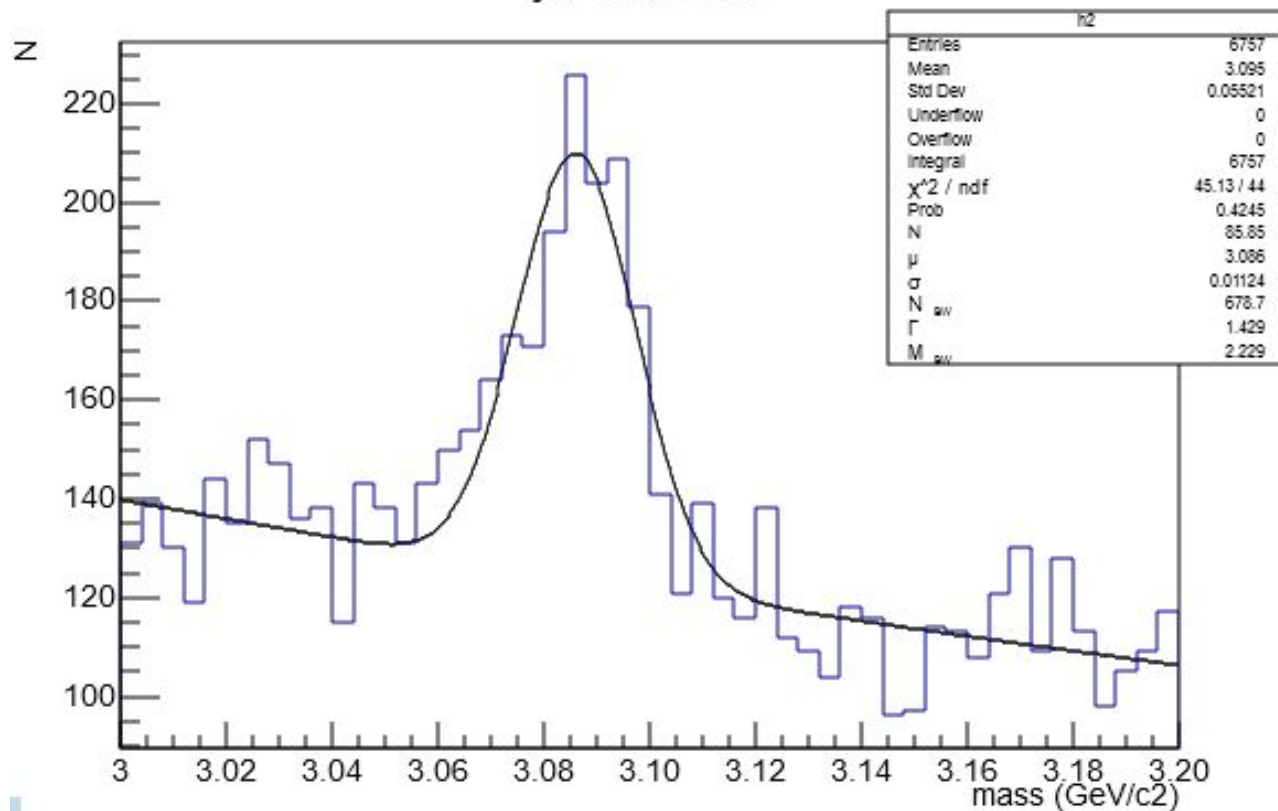




Measured J/ $\Psi$  mass:  $\sim 3.092$  GeV  
Actual mass: 3.097 GeV

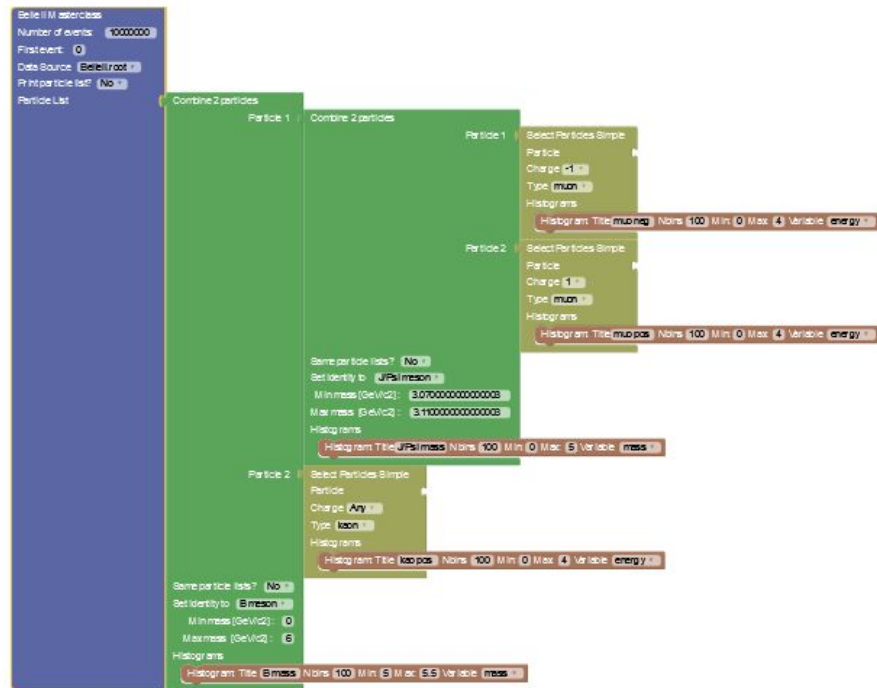
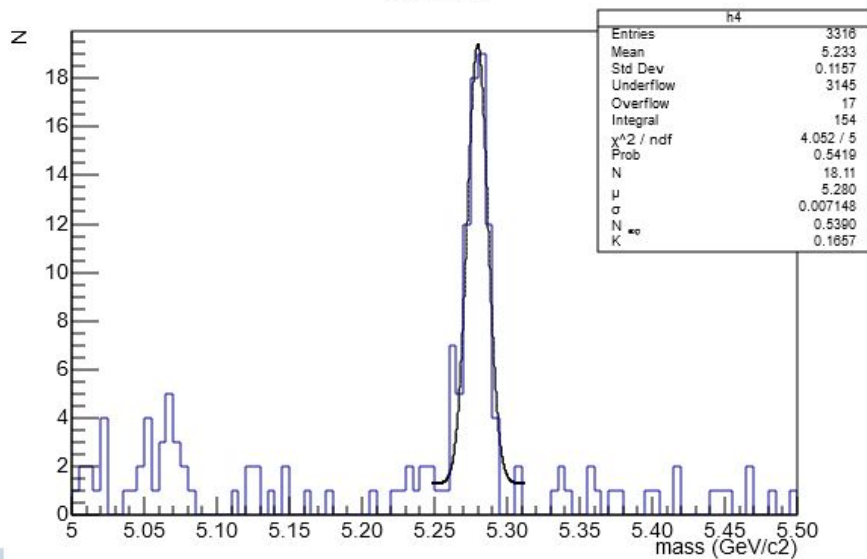
$$J/\Psi \rightarrow e^+ e^-$$

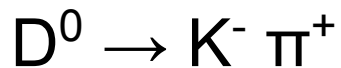
j/Psi meson



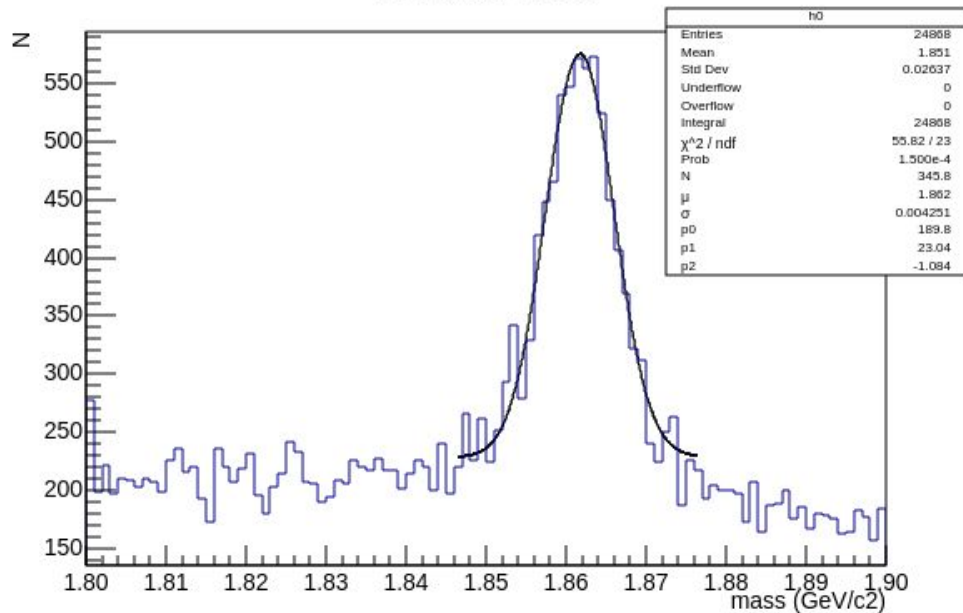
$$B^- \rightarrow J/\Psi K^- \quad J/\Psi \rightarrow \mu^+ \mu^-$$

B mass





D meson Mass



Belle II Masterclass  
Number of events: 1000000  
First event: 0  
Data Source: Belle-2.root  
Print particle list? No  
Particle List

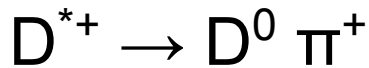
Combine 2 particles

Particle 1  
Select Particles Simple  
Particle  
Charge: -1  
Type: kaon  
Histograms

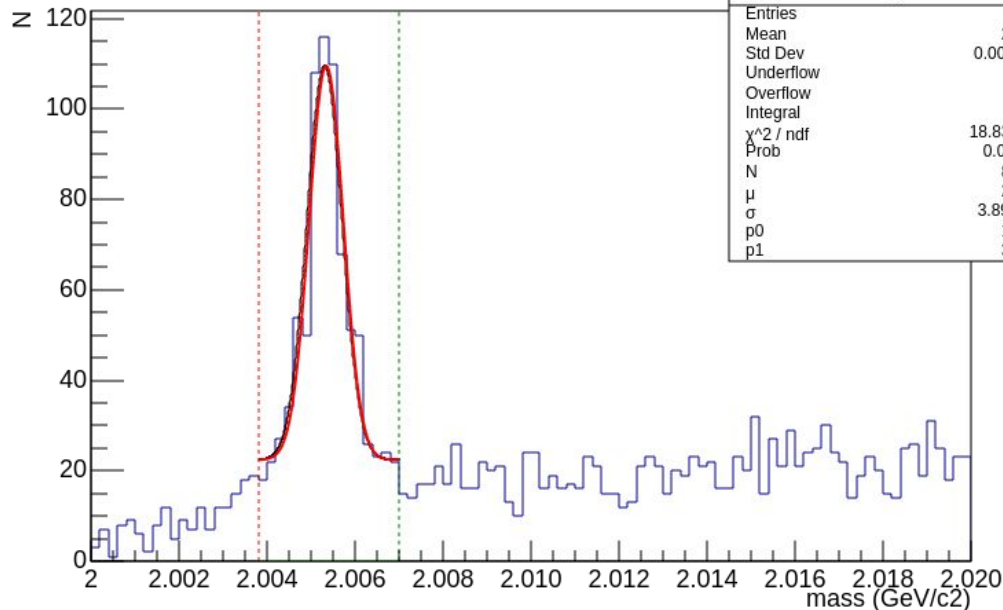
Particle 2  
Select Particles Simple  
Particle  
Charge: 1  
Type: pion  
Histograms

Same particle lists? No  
Set identity to: D meson  
Min mass [GeV/c<sup>2</sup>]: 1.8  
Max mass [GeV/c<sup>2</sup>]: 1.9000000000000001  
Histograms

Histogram: Title D meson Mass Nbins 100 Min: 1.8 Max: 1.9000000000000001 Variable mass



D\* Mass



Belle II Masterclass  
 Number of events: 1000000  
 First event: 0  
 Data Source: Belle-2.root  
 Print particle list? No  
 Particle List

Combine 2 particles  
 Particle 1: Select Particles Simple  
 Particle:   
 Charge:   
 Type:   
 Histograms

Particle 2: Select Particles Simple  
 Particle:   
 Charge:   
 Type:   
 Histograms

Same particle lists? No  
 Set identity to: D meson  
 Min mass [GeV/c^2]: 1.7000000000000002  
 Max mass [GeV/c^2]: 1.9000000000000001  
 Histograms  
 Histogram: Title: D mass Nbins: [200] Min: [1.7000000000000002] Max: [1.9000000000000001] Variable: mass

Particle 2: Select Particles Simple  
 Particle:   
 Charge:   
 Type:   
 Histograms

Same particle lists? No  
 Set identity to: D\* meson  
 Min mass [GeV/c^2]: 2  
 Max mass [GeV/c^2]: 2.02  
 Histograms  
 Histogram: Title: D\* Mass Nbins: [100] Min: [2] Max: [2.02] Variable: mass

Click to fit Visualize functions

Range: min = .038, max = .007

$\chi^2/\text{ndf} = 22.20 / 11 = 2.018$  ||  $N_{\text{Gauss}} = 436$  ||  $N_{\text{poly}} = 380$

Function: Gauss , Poly , Exp , Breit-Wigner , Power

$$N \cdot e^{-\frac{1}{2} \left( \frac{x-\mu}{\sigma} \right)^2} + p_0 + p_1 \cdot x$$

Name:	Value	Min	Set	Max	Step
• $\mu$ :	2.0053	2	<input type="range"/>	2.02	0.0001
• $\sigma$ :	0.0004	0	<input type="range"/>	0.004000000	0.0001
• N:	87.1679	0	<input type="range"/>	232	0.0001

Polynomial order: 1

Name:	Value	Min	Set	Max	Step
• p0:	15.8393	-10	<input type="range"/>	17.18845636	0.0001
• p1:	3.2679	-10	<input type="range"/>	10	0.0001
• p2:	0	-10	<input type="range"/>	10	0.0001
• p3:	0	-10	<input type="range"/>	10	0.0001
• p4:	0	-10	<input type="range"/>	10	0.0001