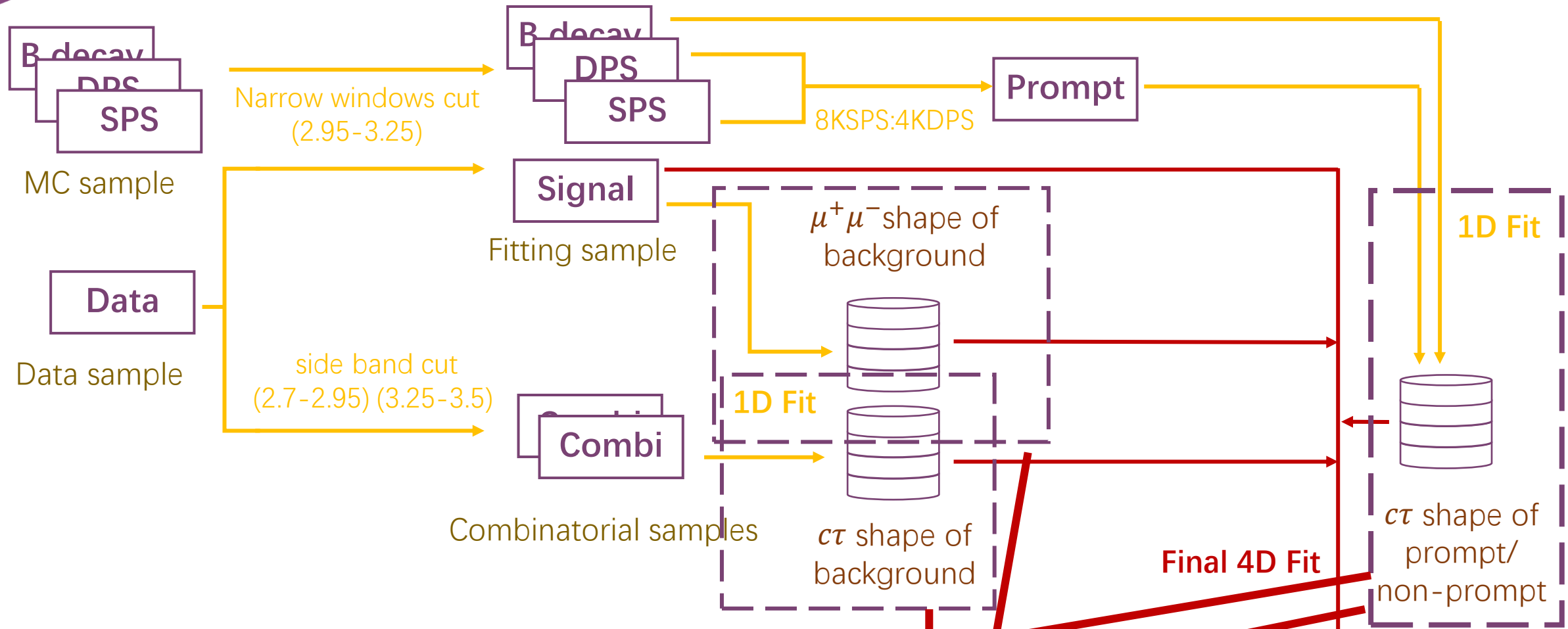
About the last week

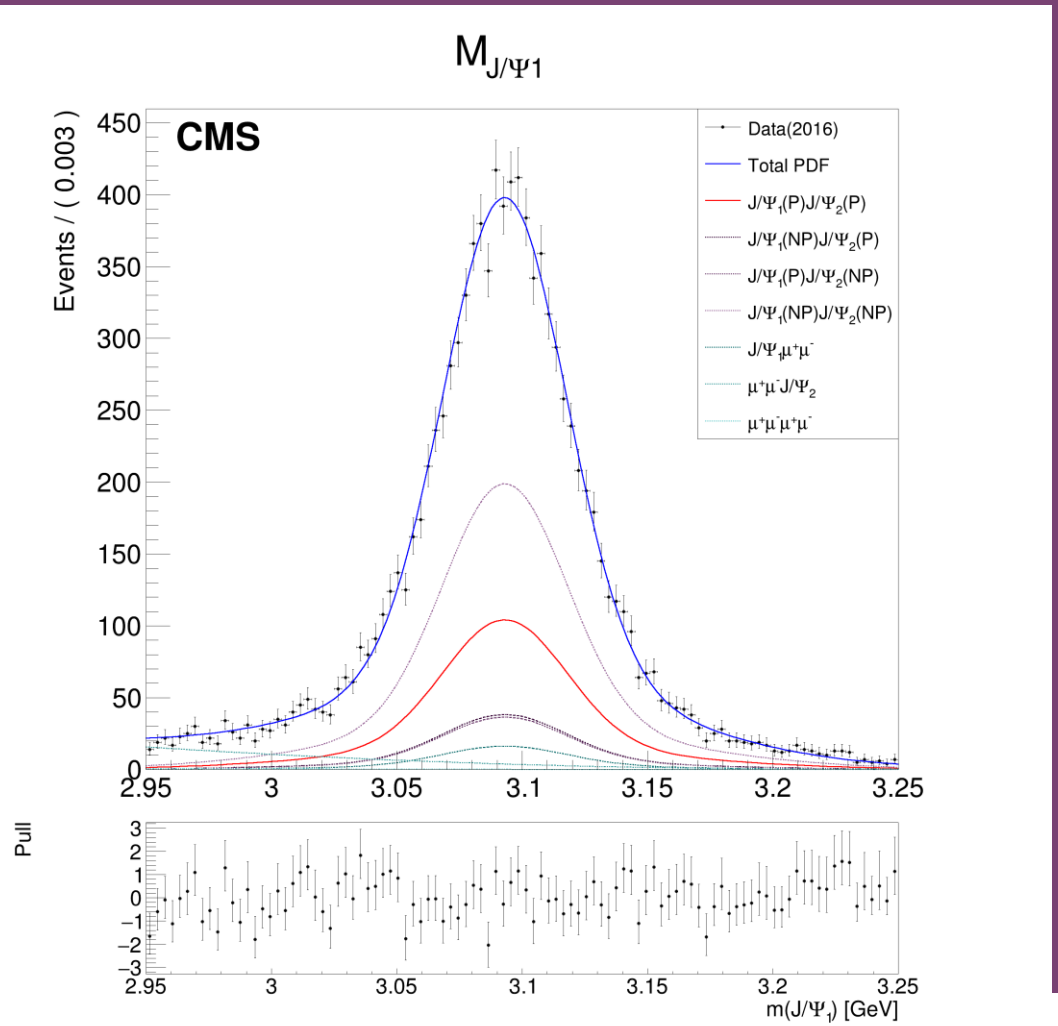
- Redid the closure test for the distinguishment variables
  - No big difference can be noticed between different variables combinations
  - Decided to abandon the vertex cut and use $c\tau_1 + c\tau_2$

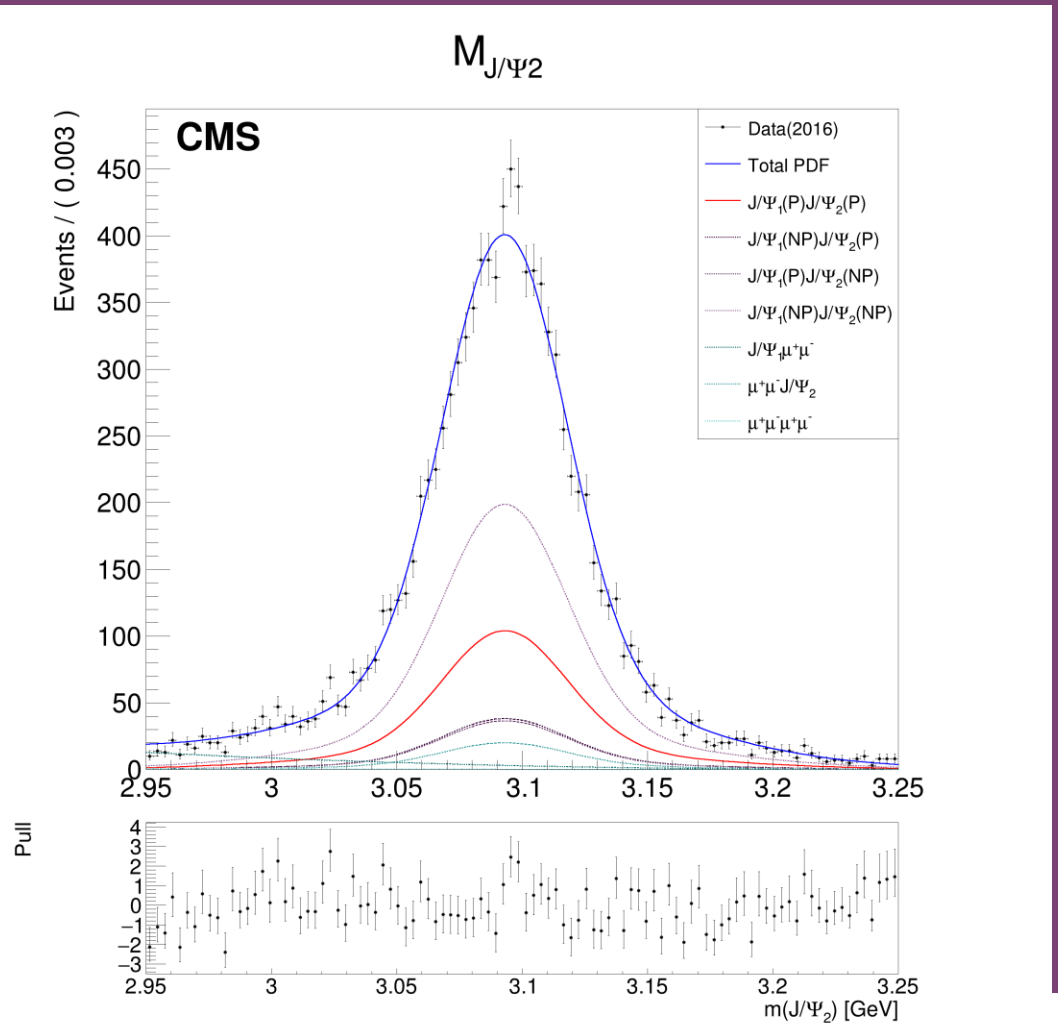
Test of the fitting (2016 dataset)



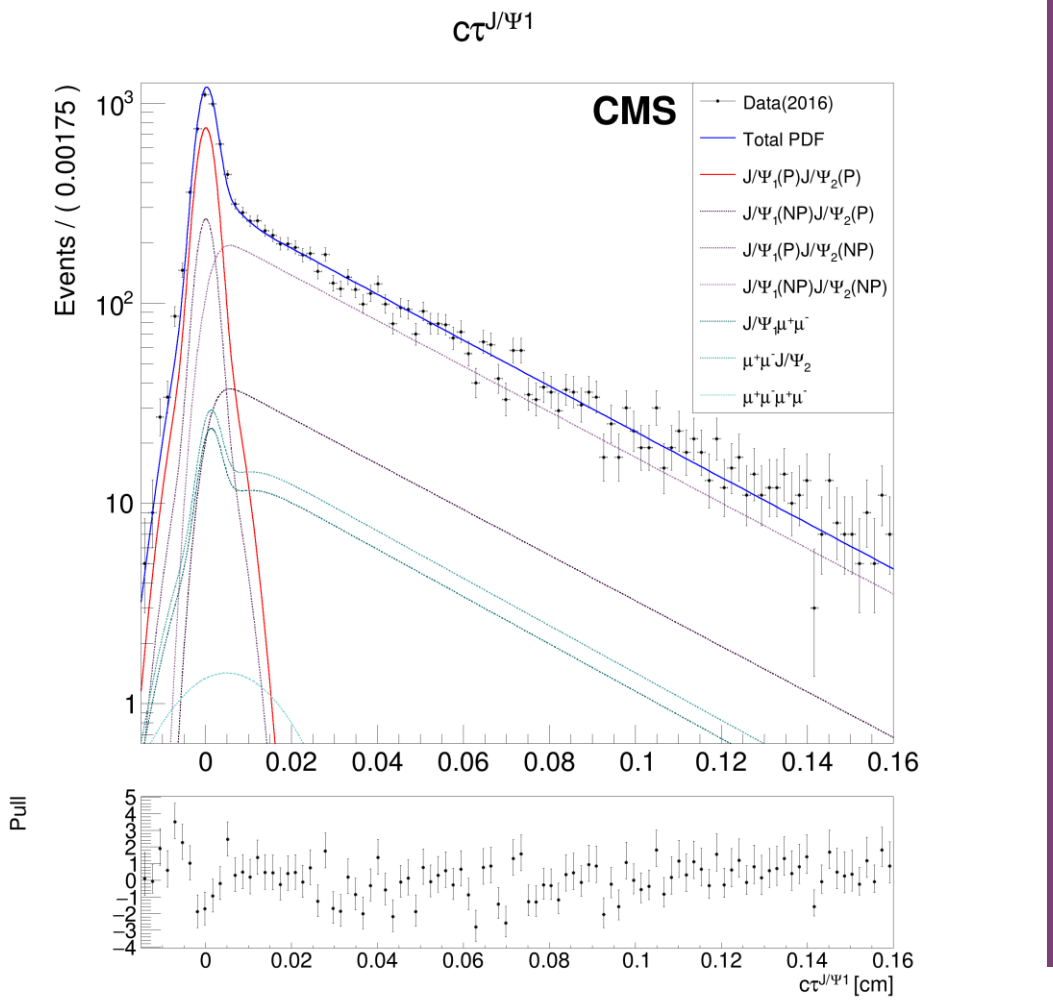
	Prompt $J/\psi J/\psi$	Non-prompt $J/\psi J/\psi$	Combinatorial
$M_{J/\psi 1}, M_{J/\psi 2}$	Float	Float	Fixed by data
$c\tau_1, c\tau_2$	Fixed by MC	Fixed by MC	Fixed by side band

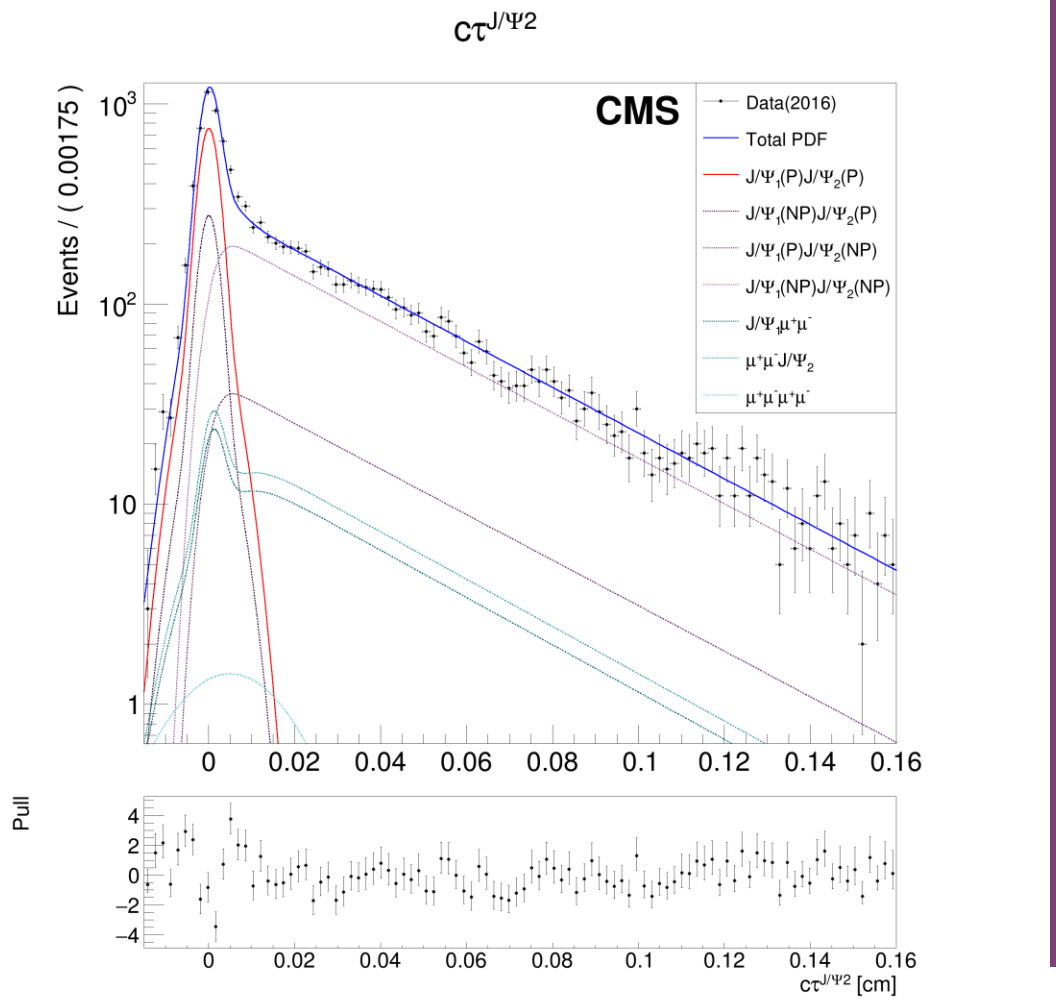
Test of the fitting (2016 dataset)





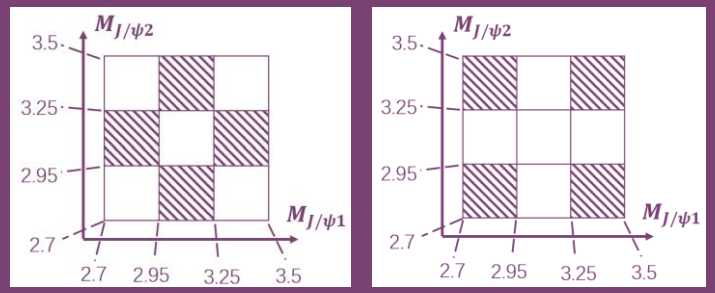
Test of the fitting (2016 dataset)





Back Up

Fitting procedure



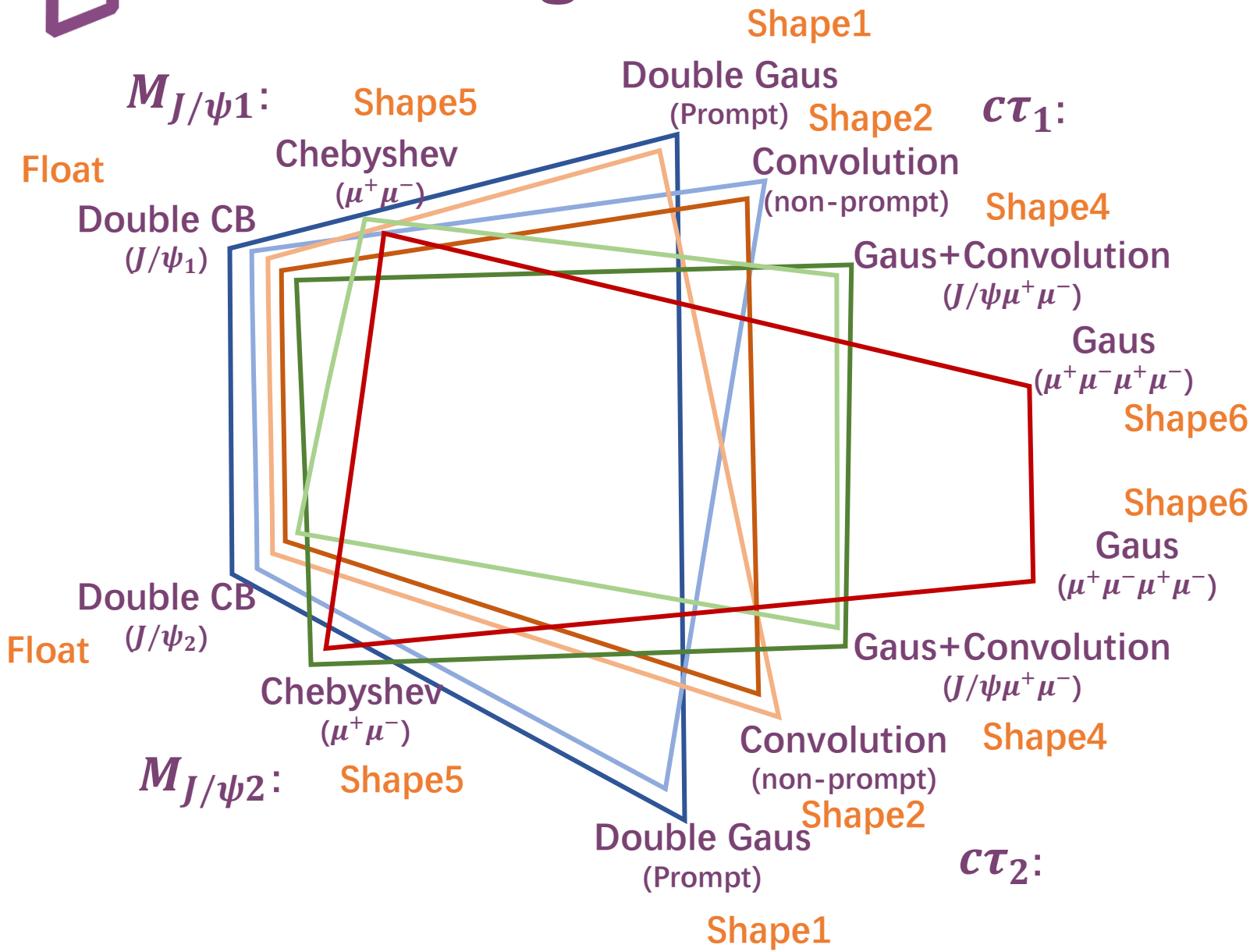
- Mix SPS and DPS samples into the prompt sample (8K:4K)
- 1D fit to the prompt sample on the $c\tau_1$ dimension to acquire the **shape1** (double gaussian)
- 1D fit to the non-prompt sample on the $c\tau_1$ dimension to acquire the **shape2** (convolution of an exponent and gaussian)
- 1D fit to the prompt sample on the $M_{J/\psi 1}$ dimension to acquire the **shape3** (double CB)
- 1D fit to the data sample on the $M_{J/\psi 1}$ dimension to acquire the **shape4** (second order Cheb, the fitting is applied with a merging of the float Cheb and the **shape3**)
- Side band cut to the data sample to acquire two combinatorial backgrounds ($J/\psi\mu^+\mu^-$, $\mu^+\mu^-\mu^+\mu^-$)
- 1D fit to the $J/\psi\mu^+\mu^-$ on the $c\tau_1$ dimension to acquire the **shape5** (merging of a gaussian and a convolution)
- 1D fit to the $\mu^+\mu^-\mu^+\mu^-$ on the $c\tau_1$ dimension to acquire the **shape6** (gaussian)
- Final fitting

Final fitting

Components		$M_{J/\psi 1}$	$M_{J/\psi 2}$	$c\tau_1$	$c\tau_2$
$J/\psi_1 J/\psi_2$	P+P	Double CB	Double CB	Shape1	Shape1
	NP+P			Shape2	Shape1
	P+NP			Shape1	Shape2
	NP+NP			Shape2	Shape2
$J/\psi_1 \mu^+\mu^-$		Double CB	Shape4	Shape5	Shape5
$\mu^+\mu^- J/\psi_2$		Shape4	Double CB		
$\mu^+\mu^-\mu^+\mu^-$		Shape4	Shape4	Shape6	Shape6

- The functions that share the same name listed in the table also share the same set of parameters (because of the smearing between two J/ψs)
- The parameters for the shape1/2/3/5/6 are fixed from the previous fitting
- The parameters for the double CB are float

Final fitting



$J/\psi_1 J/\psi_2$ (prompt + prompt)

$J/\psi_1 J/\psi_2$ (non-prompt + prompt)

$J/\psi_1 J/\psi_2$ (prompt + non-prompt)

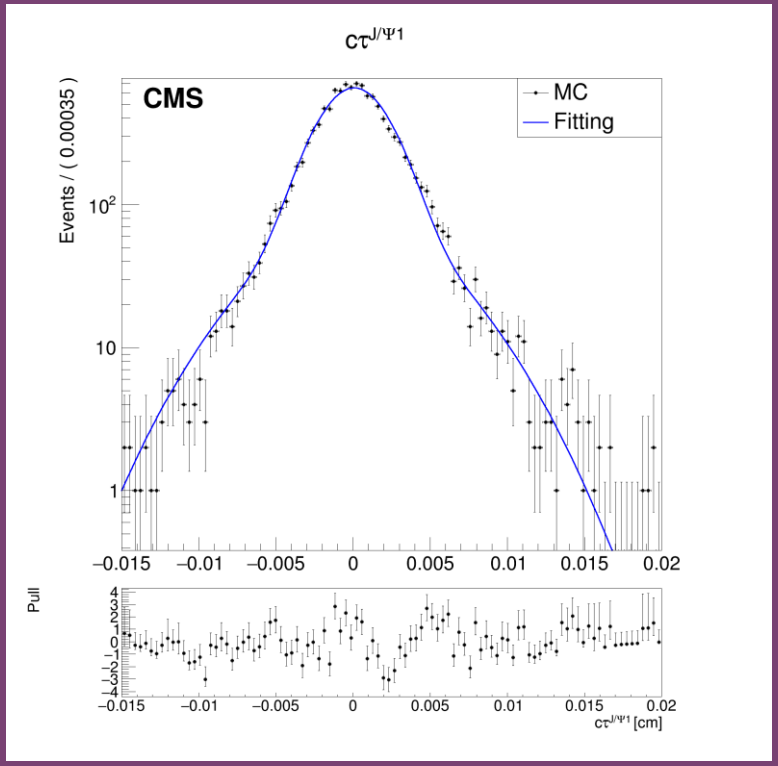
$J/\psi_1 J/\psi_2$ (non-prompt + non-prompt)

$J/\psi_1 \mu^+\mu^-$

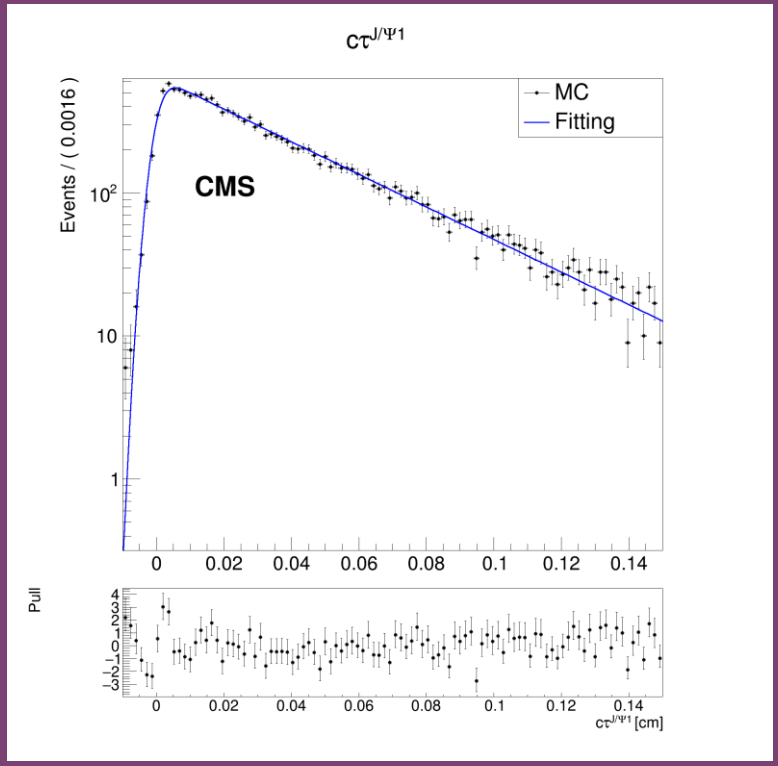
$\mu^+\mu^- J/\psi_2$

$\mu^+\mu^-\mu^+\mu^-$

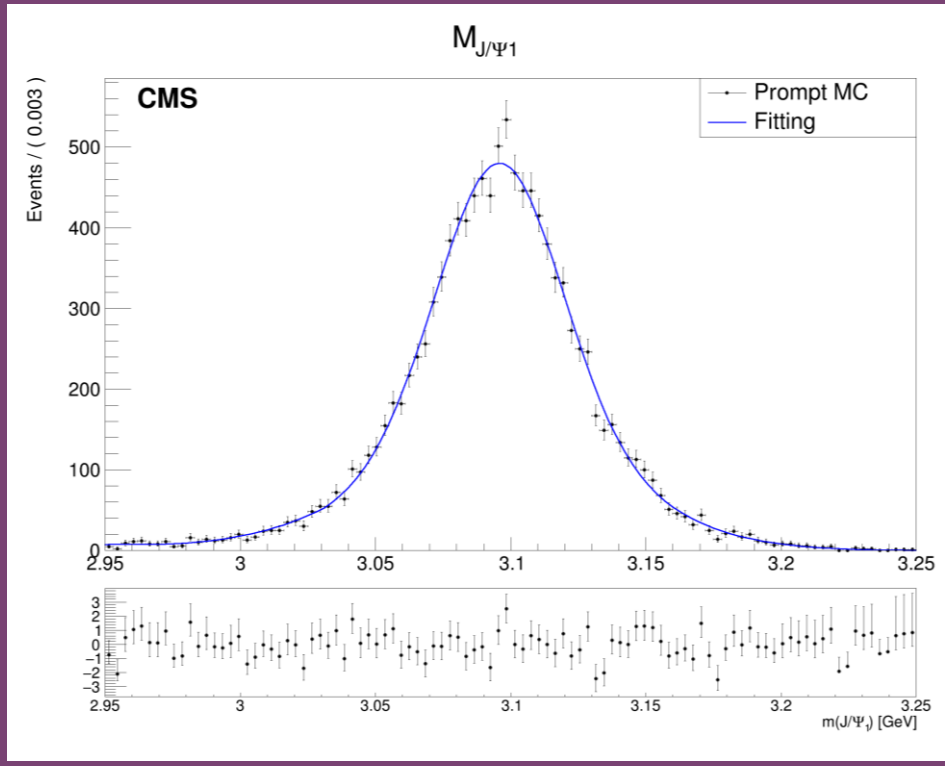
The shapes



Shape1, the prompt MC on the $c\tau_1$ dimension, double gaussian

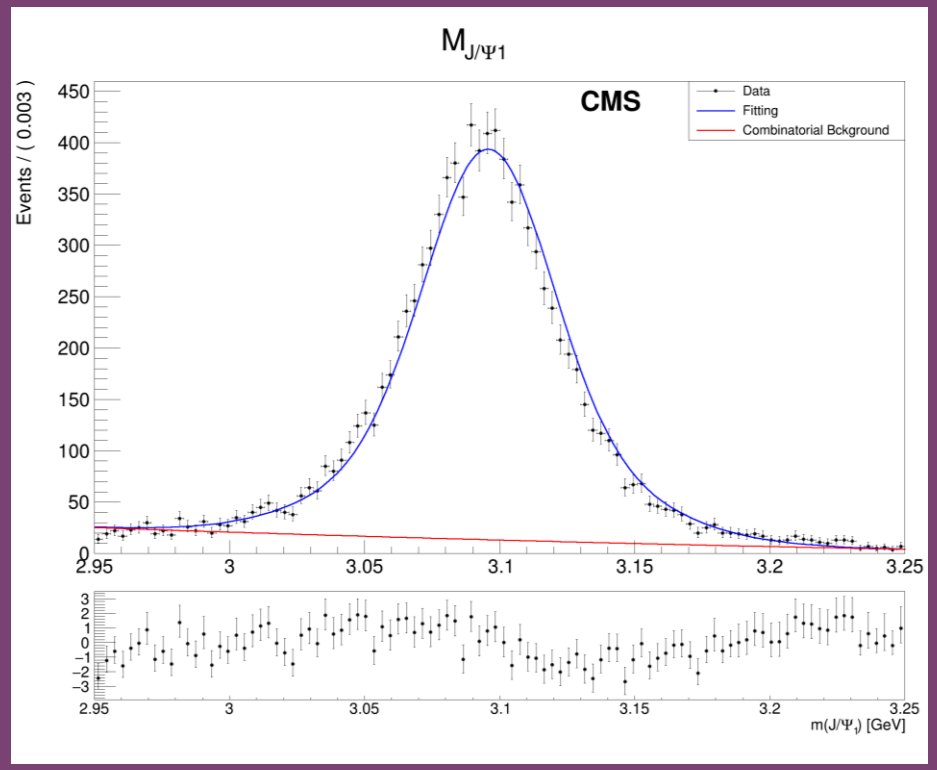


Shape2, the non-prompt MC on the $c\tau_1$ dimension, convolution

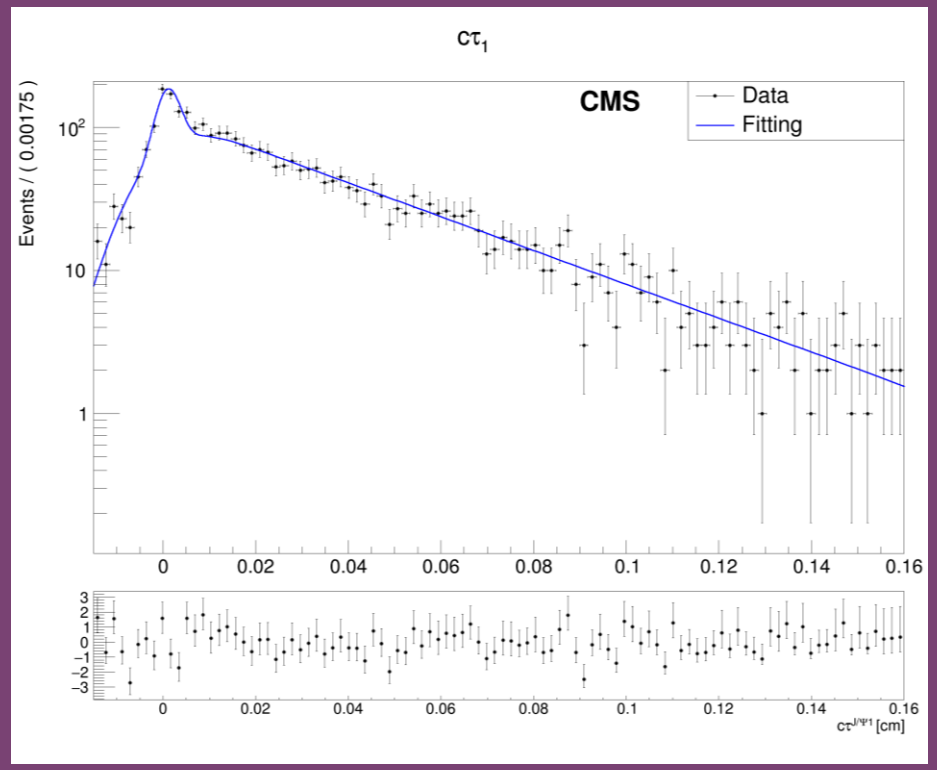


Shape3, the prompt MC on the $M_{J/\psi 1}$ dimension, double CB

The shapes

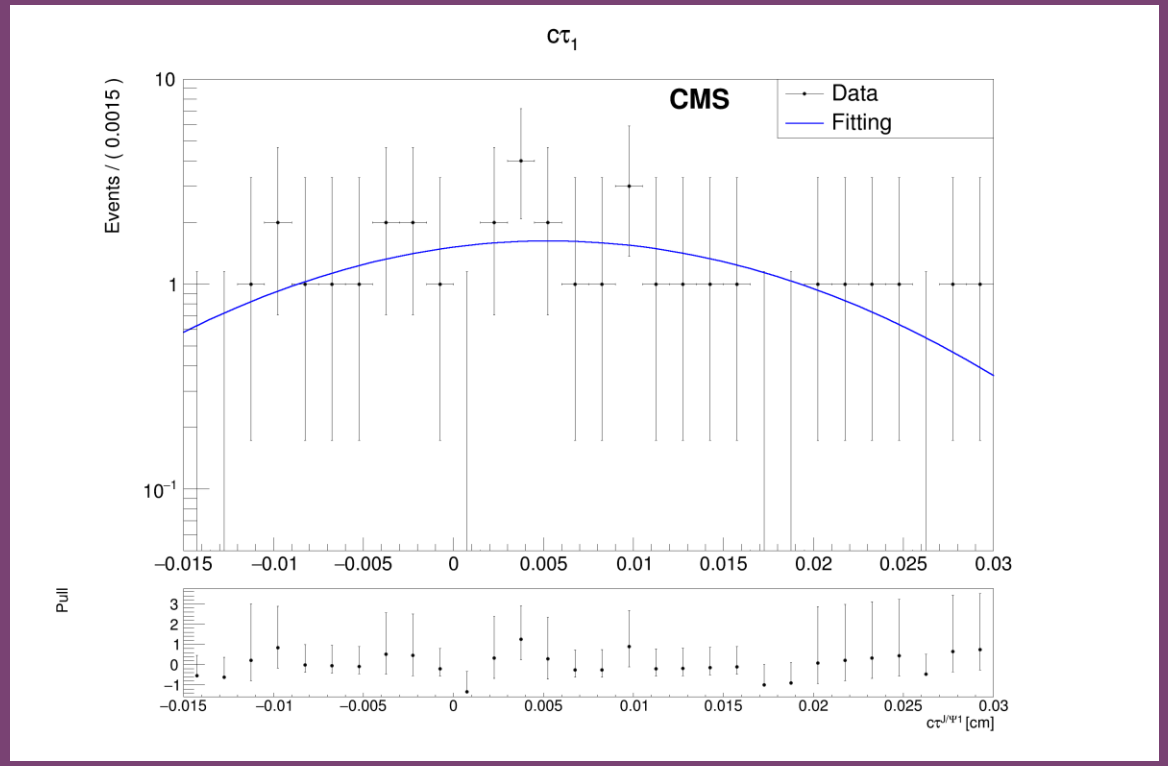


Shape4(red line), the data sample on the $M_{J/\psi 1}$ dimension, second order Chebyshev



Shape5, the $J/\psi\mu^+\mu^-$ on the $c\tau_1$ dimension, gaussian + convolution

The shapes



Shape6, the $\mu^+\mu^-$ $\mu^+\mu^-$ on the $c\tau_1$ dimension, gaussian

(Plotting may get improved)