



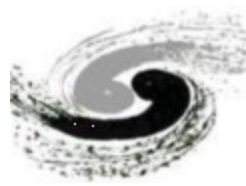
# The reference AN



CADI	Analysis note	total
BPH-11-021	AN-12-222	Measurement of the Prompt Double $J/\psi$ Production Cross Section in pp Collisions at $\sqrt{s} = 7$ TeV
BPH-14-008	AN-14-138	Observation of $Y(1S)$ pair production at CMS
BPH-18-002	AN-17-341	Search for a light resonance decaying to $Y(1S)\mu^+\mu^-$ , and measurement of the $Y(1S)$ pair production cross section with 2016 data



# Acceptance and efficiency systematics



## ➤ Acceptance event by event Corrector

- The acceptance correction  $a_i$  for a given event  $i$  is the number of times the resulting decay muons pass the muon acceptance criteria,  $N_{acc}$ , divided by the total number of trials for the event,  $N_{tot}$ :  $a_i = N_{acc}/N_{tot}$

## ➤ Use the closure test get the acceptance systematics(BPH-11-021 , BPH-14-008, BPH-18-002)

- For each sample of  $N_j$  events within the  $J/\psi$  acceptance region
- Calculate the corrected number of signal events within the  $J/\psi$  acceptance:  $N'_j = \sum_i 1/a_i$
- Systematics uncertainty is calculate as :Error =  $|N'_j - N_j|/N'_j + N_j$ (BPH-11-021) or  
Error =  $|N'_j - N_j|/N_j$ (BPH-14-008)

## ➤ Efficiencies event by event Corrector

- BPH-11-021 and BPH-14-008 efficiencies corrector method are different from us
- BPH-18-002 efficiencies corrector are same as us and it also use the closure test get the efficiencies systematics