The reference AN

CADI	Analysis note	total
BPH-11-021	AN-12-222	Measurement of the Prompt Double J/ψ Production Cross Section in pp Collisions at $\sqrt{s}$ = 7 TeV
BPH-14-008	AN-14-138	Observation of Y(1*S*) 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/ψ acceptance region
- Calculate the corrected number of signal events within the J/ψ 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