$B^0 \to K^0_S \eta'$ time-dependent analysis meeting

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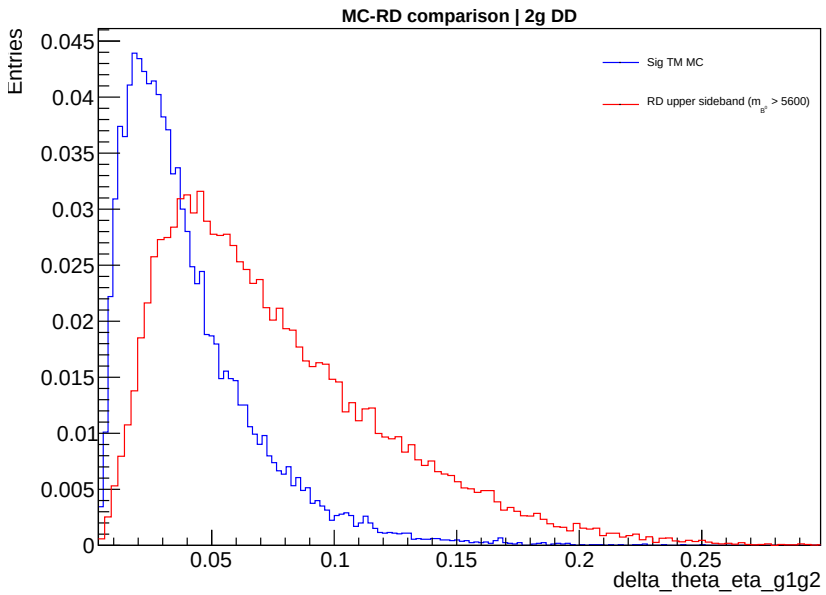
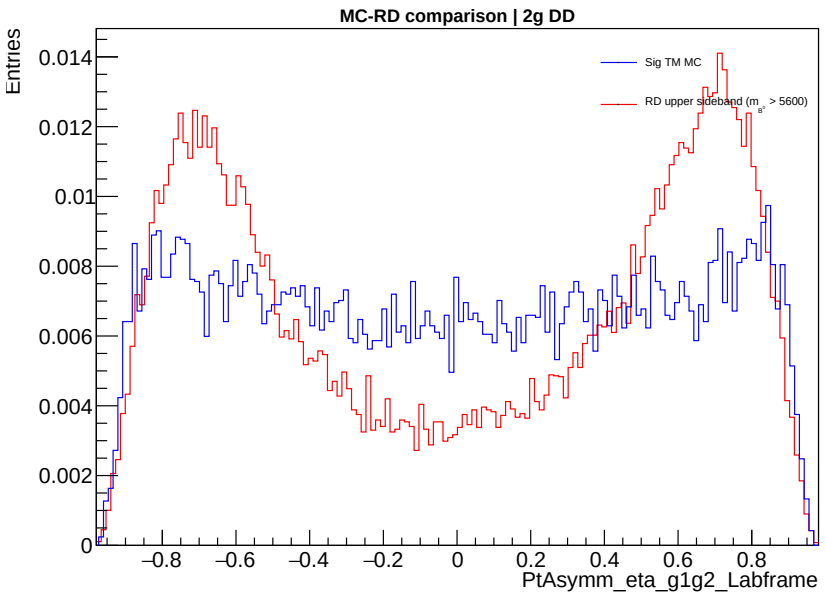
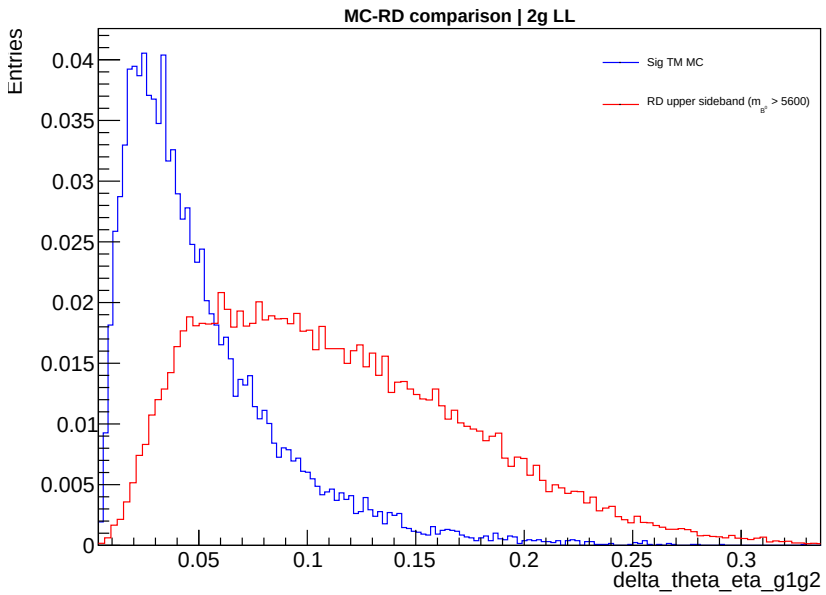
Look to $A^{P_T}(\gamma_1, \gamma_2)$ for 2g final states

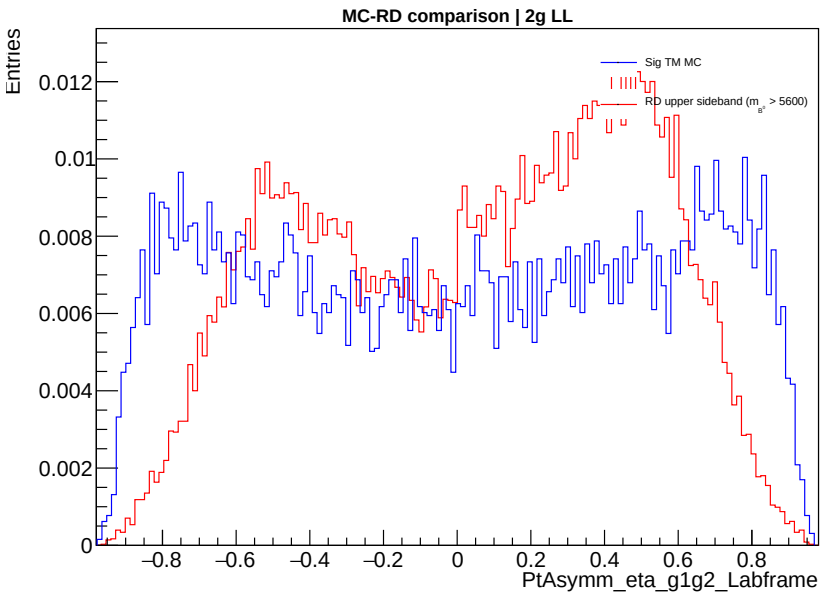
RUN2 RD sideband - Sig TM MC comparison for $A^{P_T}(\gamma_1, \gamma_2)$ and $\Delta\theta(\gamma_1, \gamma_2)$ [2g DD]





RUN2 RD sideband - Sig TM MC comparison for $A^{P_T}(\gamma_1, \gamma_2)$ and $\Delta\theta(\gamma_1, \gamma_2)$ [2g LL]

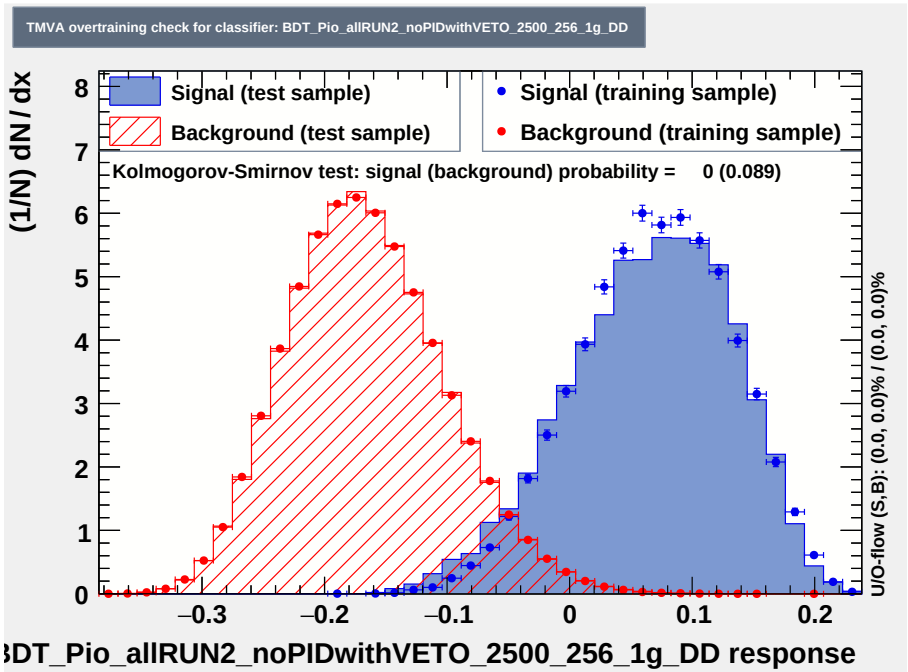




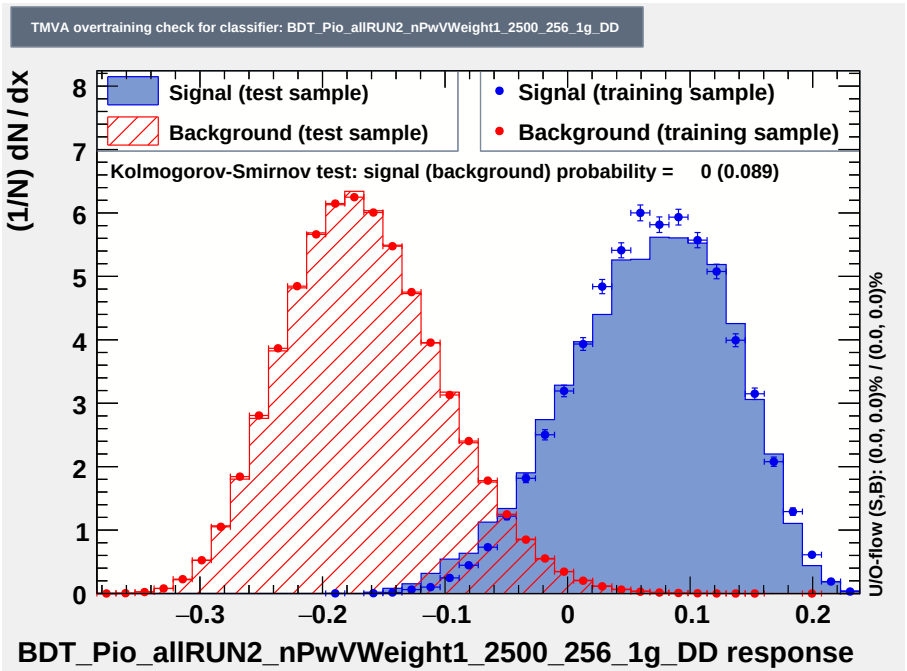
Investigation of KS test

Classifier output distributions for 1g DD

- $w_s/w_b = 1/600$



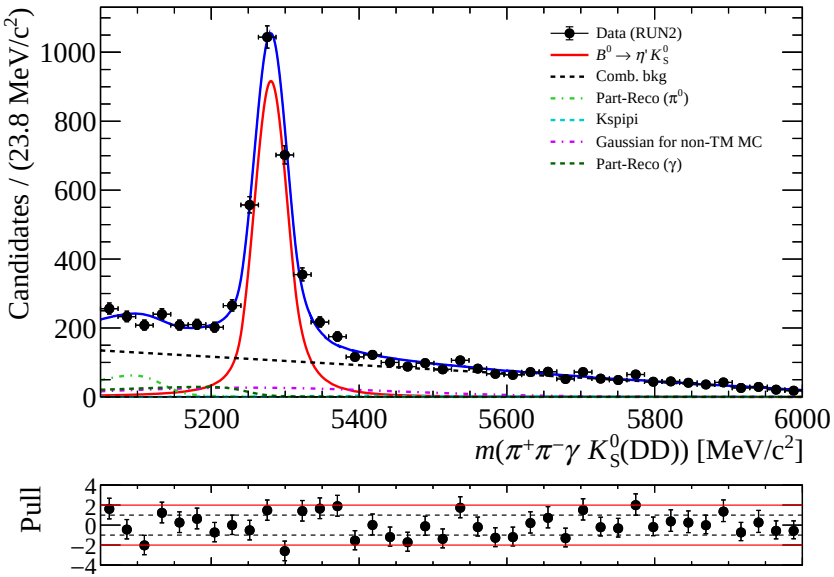
- $w_s = 1$ & $w_b = 1$

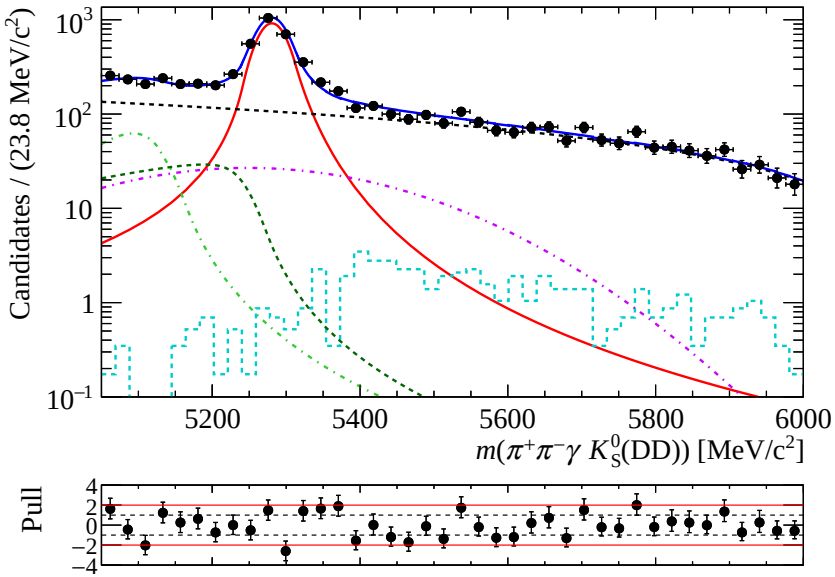


"Optimization" of $P_T(\gamma)$ cut for 1g final states

	$P_T(\gamma) > 400$	$P_T(\gamma) > 450$	$P_T(\gamma) > 500$	$P_T(\gamma) > 550$
1g DD	**41.71**	41.55	41.03	40.81
1g LL	**34.84**	34.33	14.44	23.71

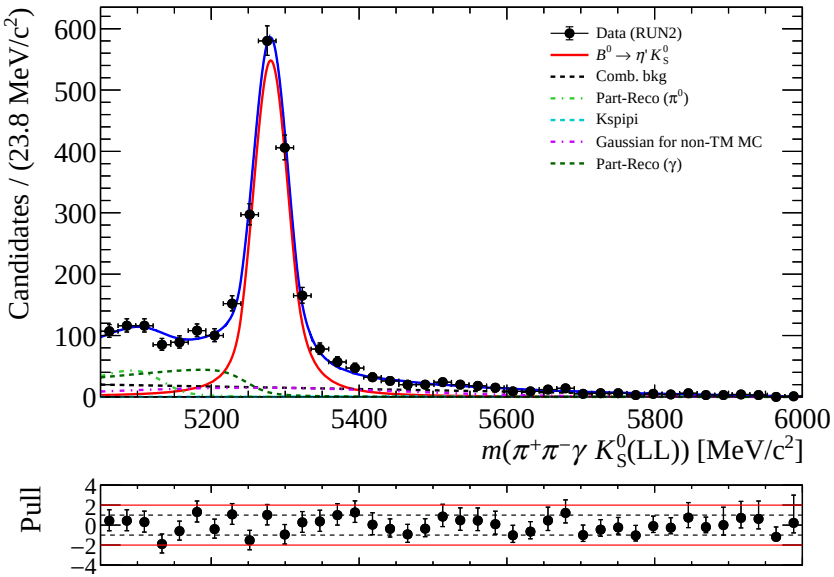
m_{B^0} fit plot for RUN2 $K_S\eta'$ RD [1g DD] with $P_T(\gamma) > 400\text{MeV}/c^2$

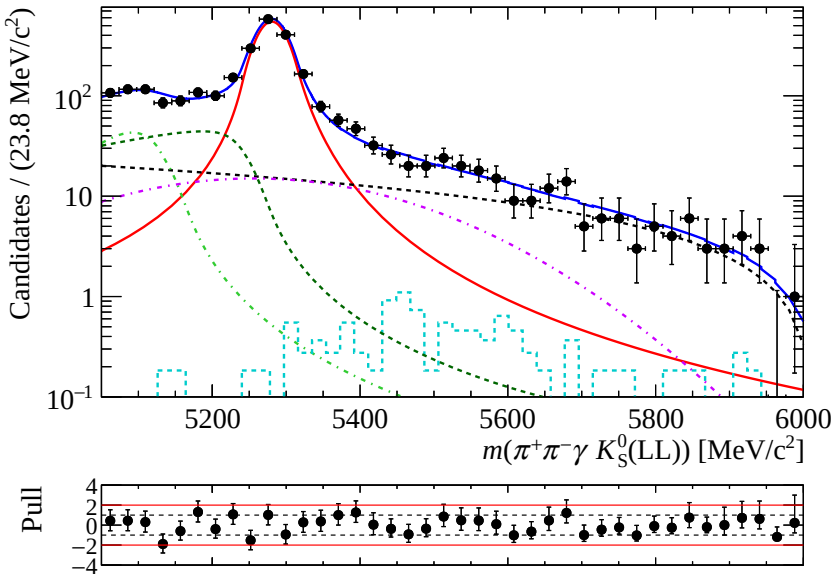




Param	Val $\pm$ Err
μ	5280.6 ± 0.7
σ_{data}	22.4 ± 0.8
$N_{B^0 \to K_S\eta'}$	2463 ± 68
N_{comb}	3081 ± 108
$N_{PR}^{(\gamma)}$	231 ± 81
$N_{PR}^{(\pi^0)}$	238 ± 53
$N_{B^0 \to K_S\pi^+\pi^-}$	43

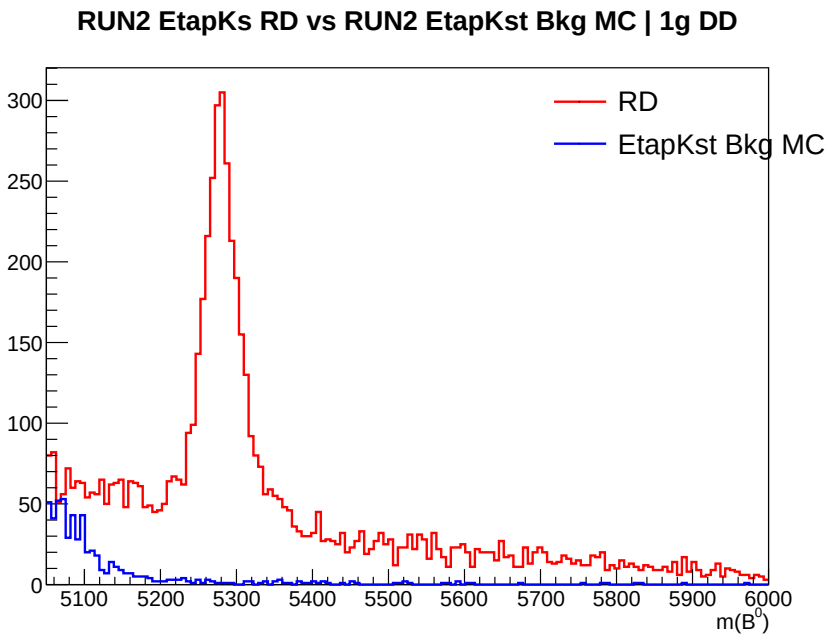
m_{B^0} fit plot for RUN2 $K_S\eta'$ RD [1g LL] with $P_T(\gamma) > 400\text{MeV}/c^2$



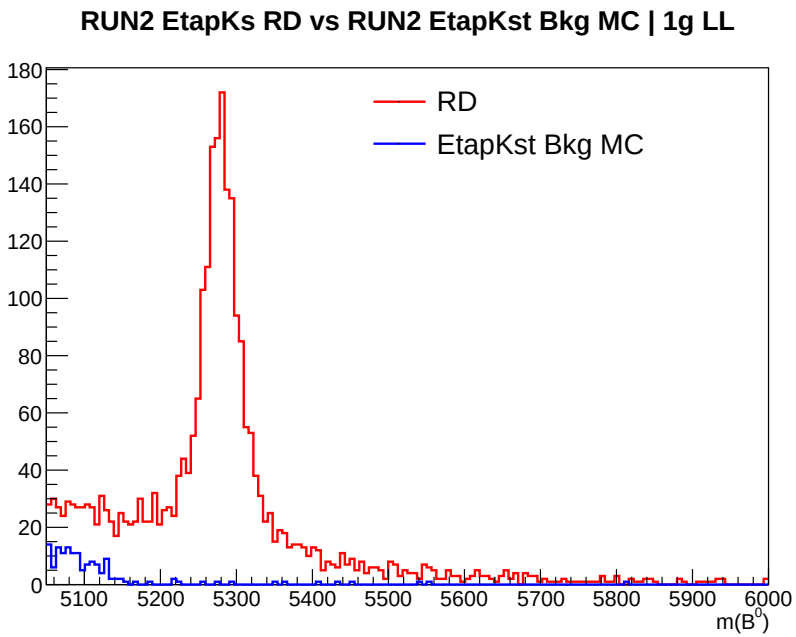


Param	Val $\pm$ Err
μ	5280.4 ± 0.9
σ_{data}	24 ± 1
$N_{B^0 \to K_S\eta'}$	1562 ± 49
N_{comb}	408 ± 46
$N_{PR}^{(\gamma)}$	355 ± 54
$N_{PR}^{(\pi^0)}$	168 ± 36
$N_{B^0 \to K_S\pi^+\pi^-}$	10

Comparison of m_{B^0} between RUN2 $K_S\eta'$ RD and RUN2 $B^+ \to K^{*+}\eta'$ Bkg MC

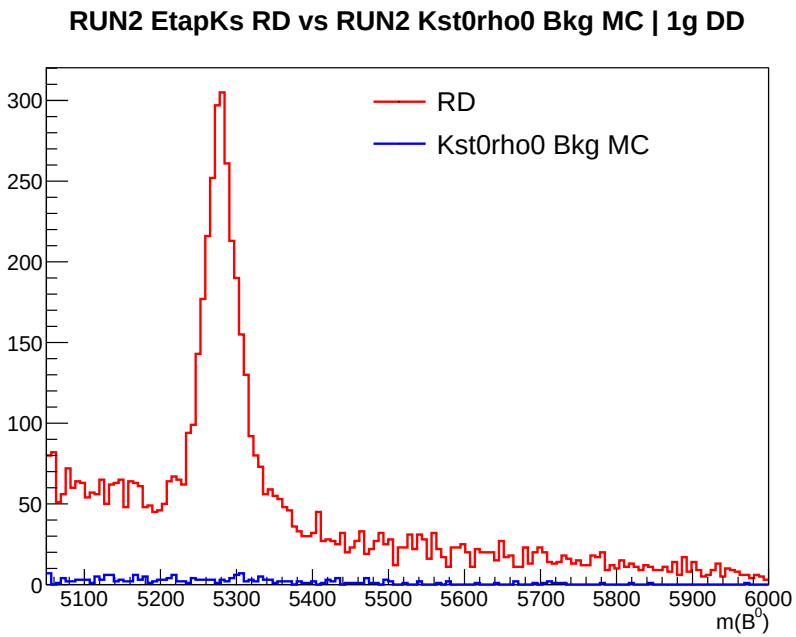


1g DD
564 events

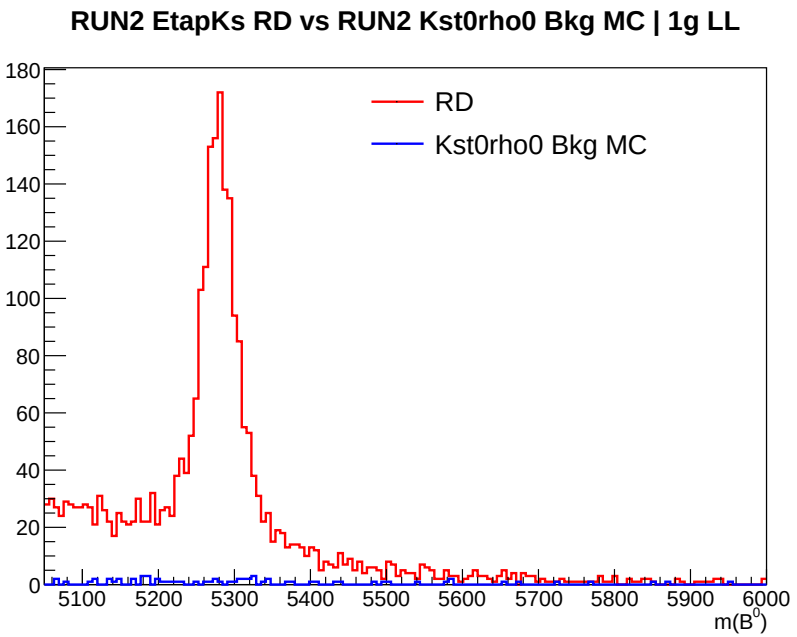


1g LL
142 events

Comparison of m_{B^0} between RUN2 $K_S\eta'$ RD and RUN2 $B^0 \to K^{*0}\rho^0$ Bkg MC

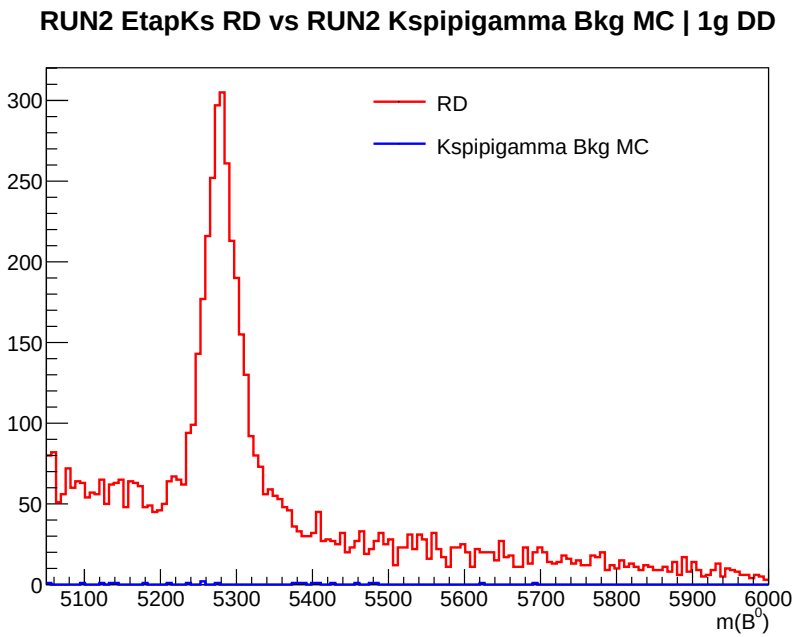


1g DD
209 events

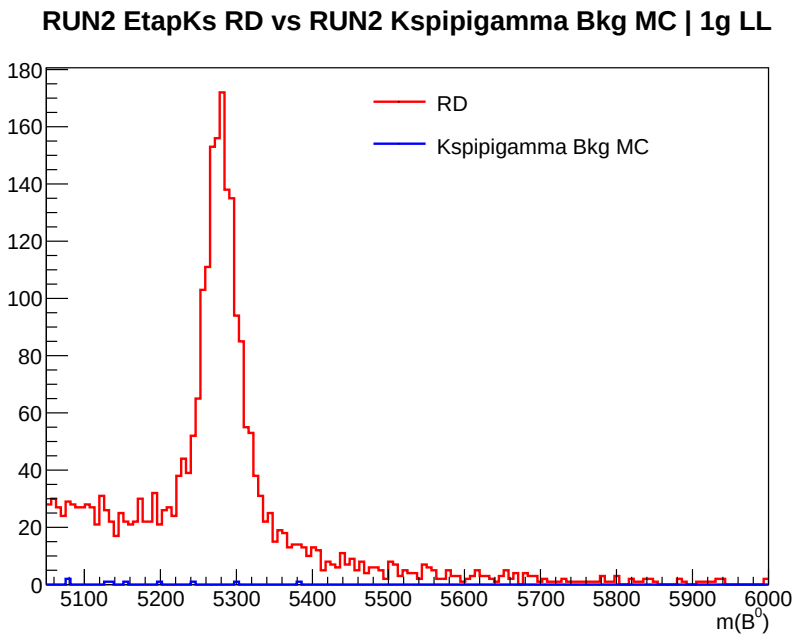


1g LL
66 events

Comparison of m_{B^0} between RUN2 $K_S\eta'$ RD and RUN2 $B^0 \to K_S\pi^+\pi^-\gamma$ Bkg MC

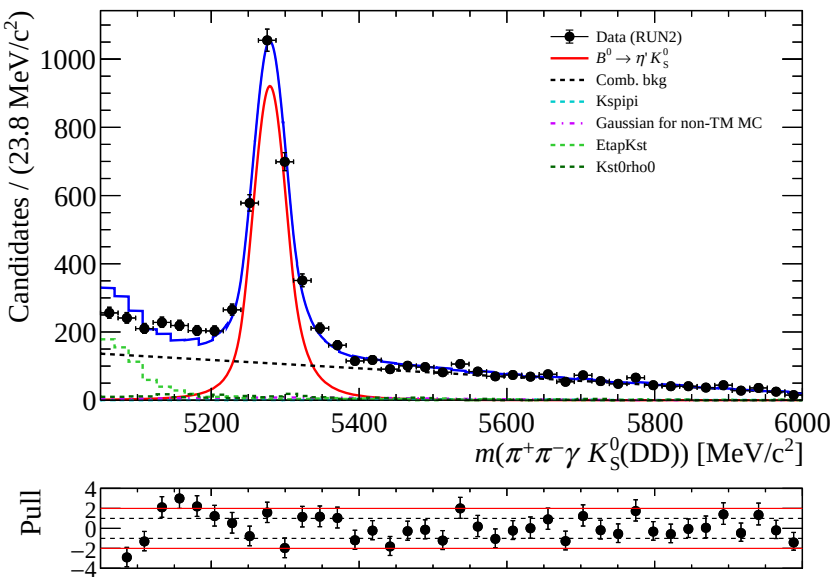


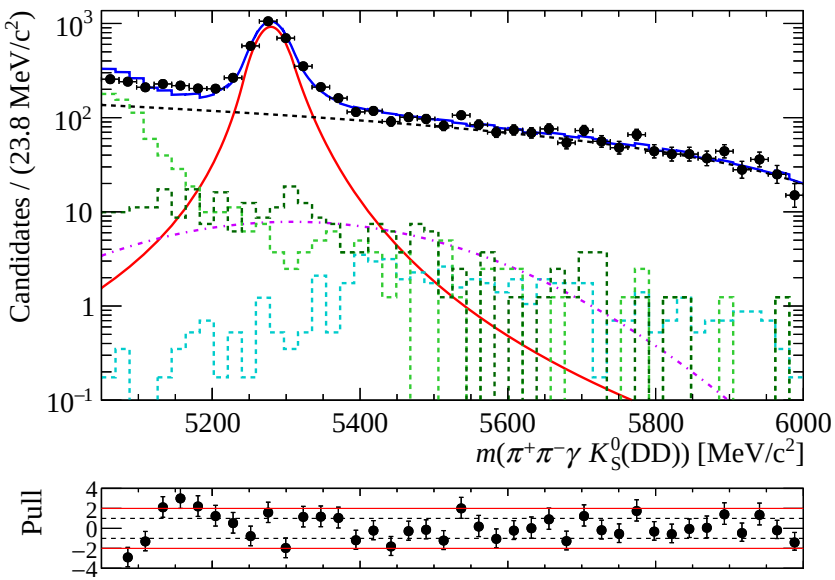
1g DD
22 events



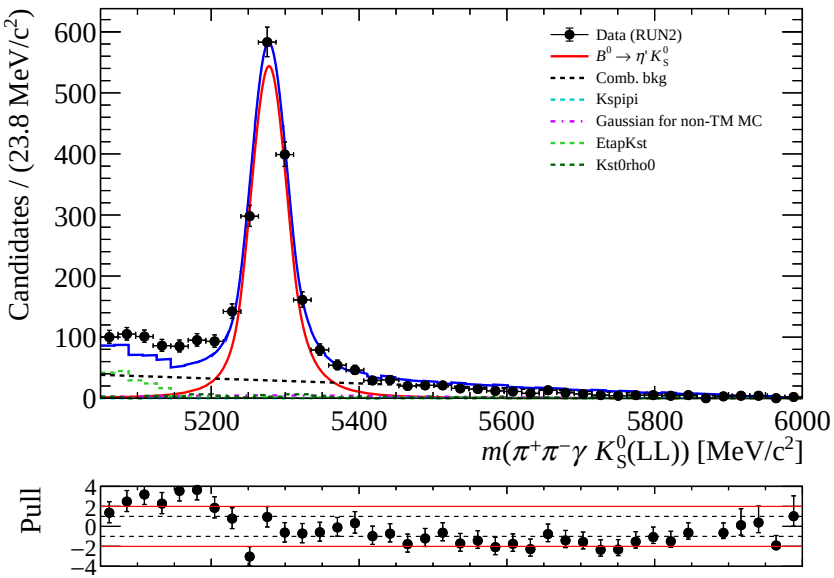
1g LL
9 events

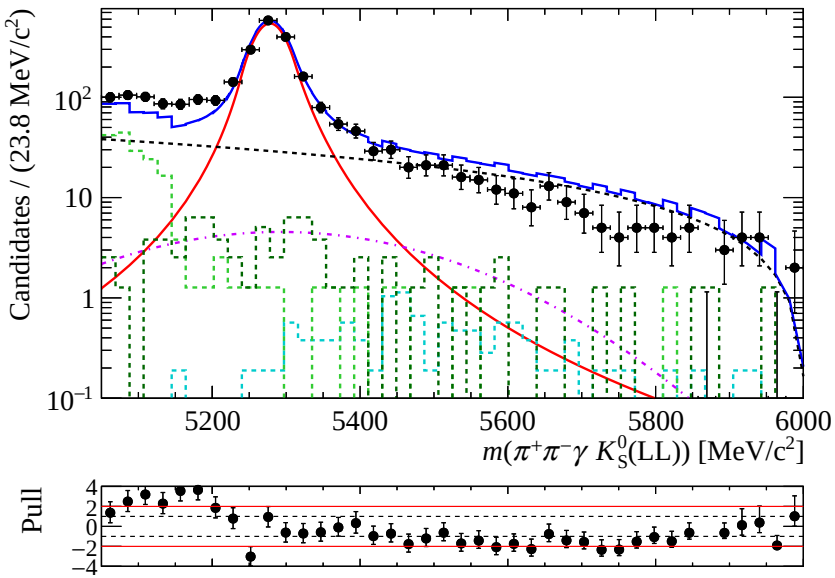
Preliminary m_{B^0} fit plot for RUN2 $K_S\eta'$ RD [1g DD] with $B^+ \to K^{*+}\eta'$ and $B^0 \to K^{*0}\rho^0$ Bkg MCs





Preliminary m_{B^0} fit plot for RUN2 $K_S\eta'$ RD [1g LL] with $B^+ \to K^{*+}\eta'$ and $B^0 \to K^{*0}\rho^0$ Bkg MCs





Outline

- Run2 RD AnaProd ready (to me merged)
  - Inclusive taggers cannot be included cause running on mDST
- Run3 Sig MC AnaProd ready
  - Needed asap for data-MC comparison and selection on Run3
- Similarly:
  - Run2 Sig MC AnaProd to be set for taggers
  - Run3 data AnaProd to be re-run for taggers
    - After re-sprucing campaign to remove duplicate files ($\sim 0.05\%$)