# Positronium intensity measurement preparation (GBAR)

SNU

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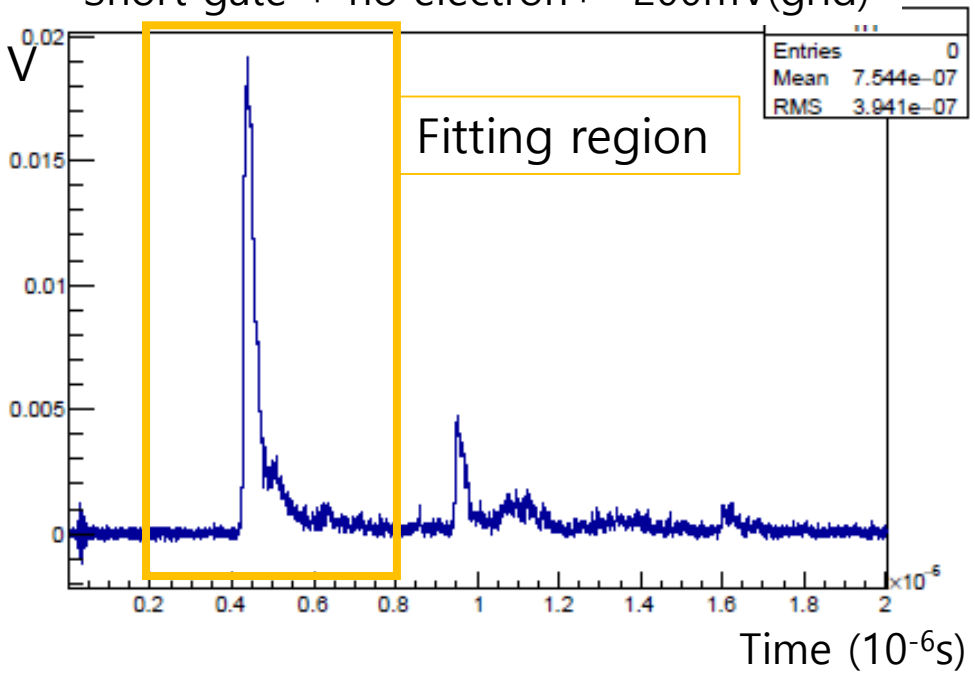
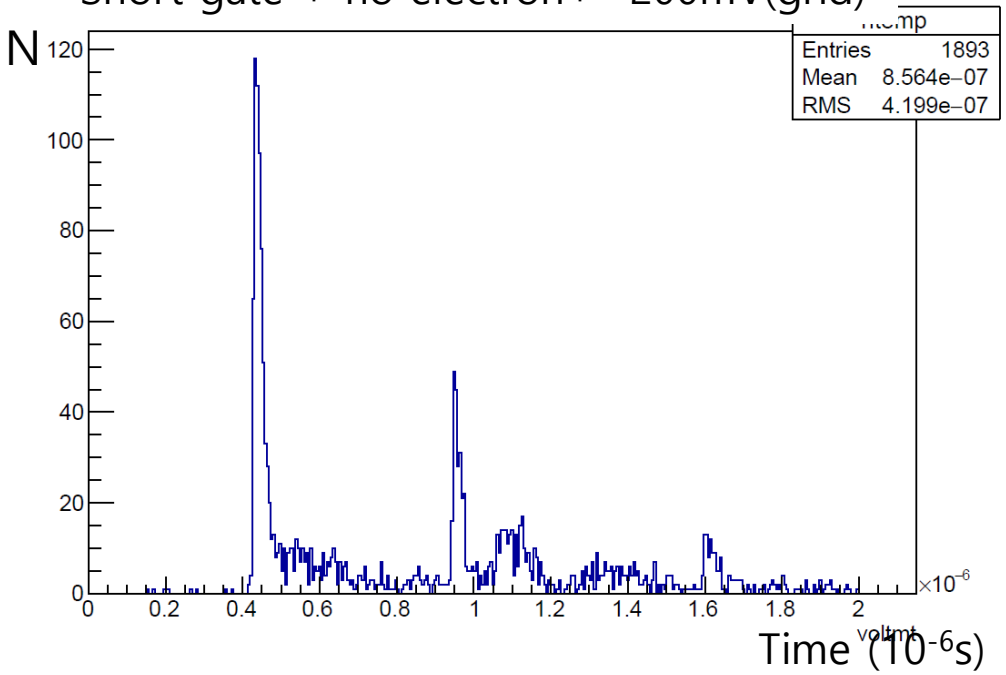
# BG trap data

Raw signal distribution (accumulated)
Short gate + no electron+ -200mV(grid)

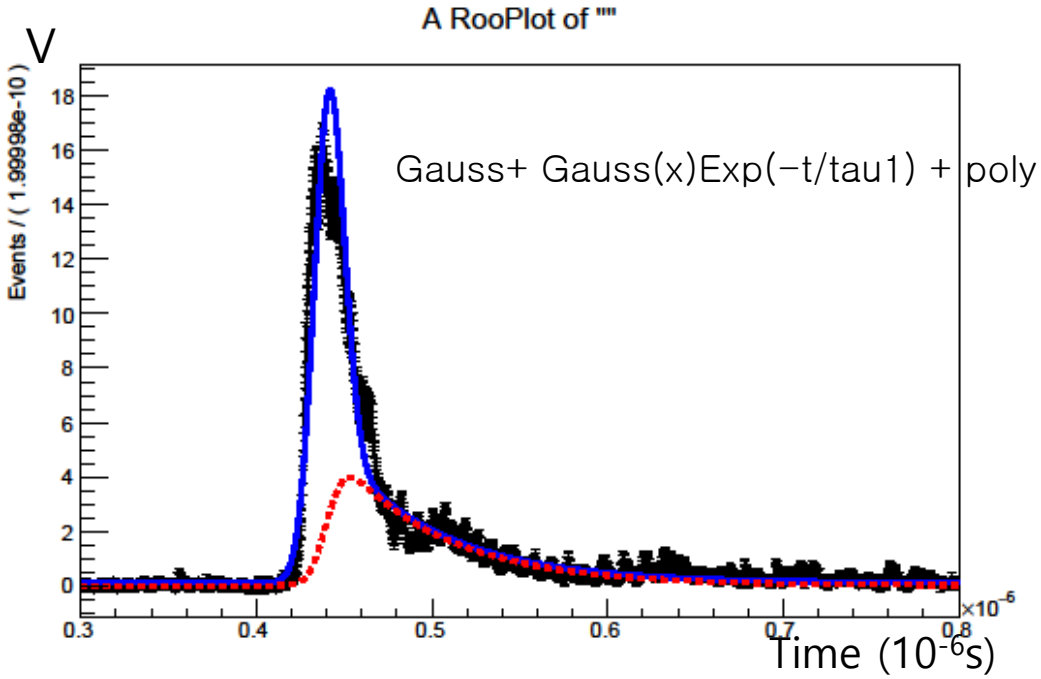



Time distribution for selected signal
Short gate + no electron+ -200mV(grid)




- To estimate o-Ps effect, I have tried to fit for yellow area.
- Same method will be used o-Ps measurement at Antion chamber.
- Raw signal and analyzed data are fitted by same function.

# Raw signal fitting




- Left histrogram is just accumulated raw signal samples.
- Each bin error is estimated as below
- $\sigma_{sys}$= sqrt($\sigma_{fedest}^2$ (baseline fluctuation) +$\sigma_{bin}^2$(quantization) +$\sigma_{gain}^2$ (gain error:1.5% for gain))
- $\sigma_{stat}$= sqrt(N)*standard deviation for mean V per each bin

  → Ringing is one of main problem.
- fr(main)= 55%, tau_a = 59.8+-1.1 ns, sigma = 8.6+-0.1ns

Chisquare : 4.626461e+03 (Too big)

# Raw signal

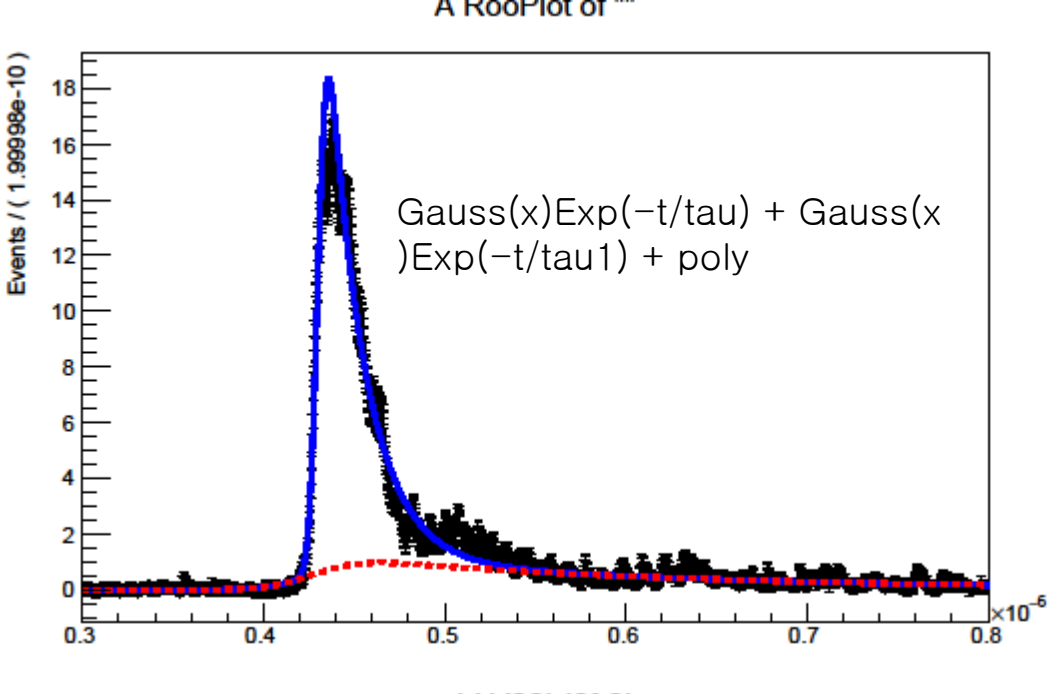
- Upper panel: Gauss(x)Exp(−t/tau) + Gauss(x)Exp(−t/tau1) + poly

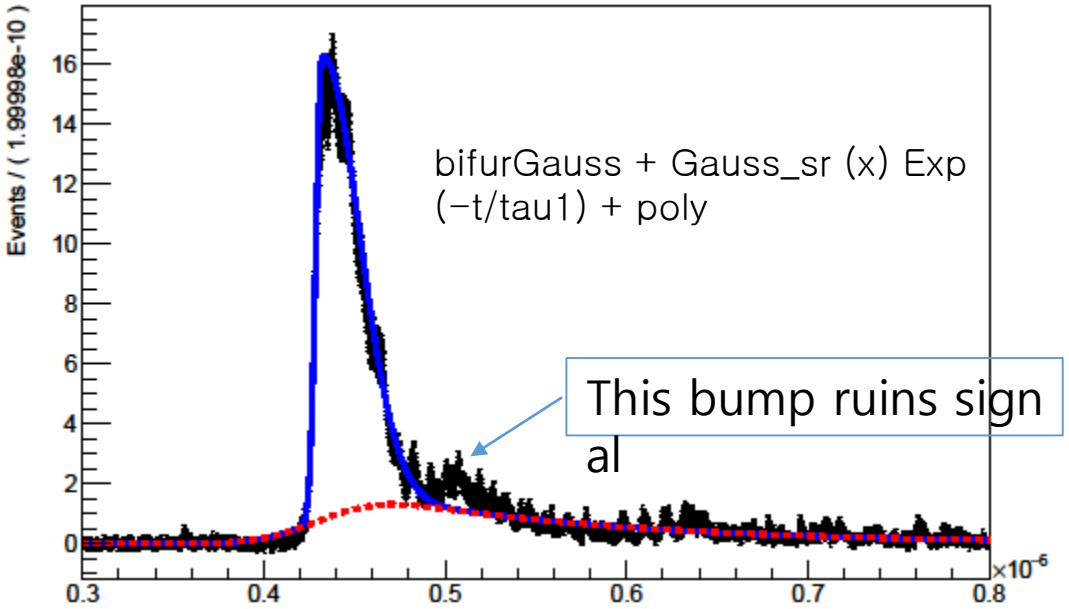
fr(main)= 72%, tau_a = 186+-5ns

Chisquare : 3175 ( because of  wrong error?)

- Lower panel : fr(main) = 66%, tau_a = 133.6+-2.4ns, sigma_l = 3.3+-0.1ns, sigma_r = 20.4+-1.7ns

Chisquare : 4303



# Analyzed data

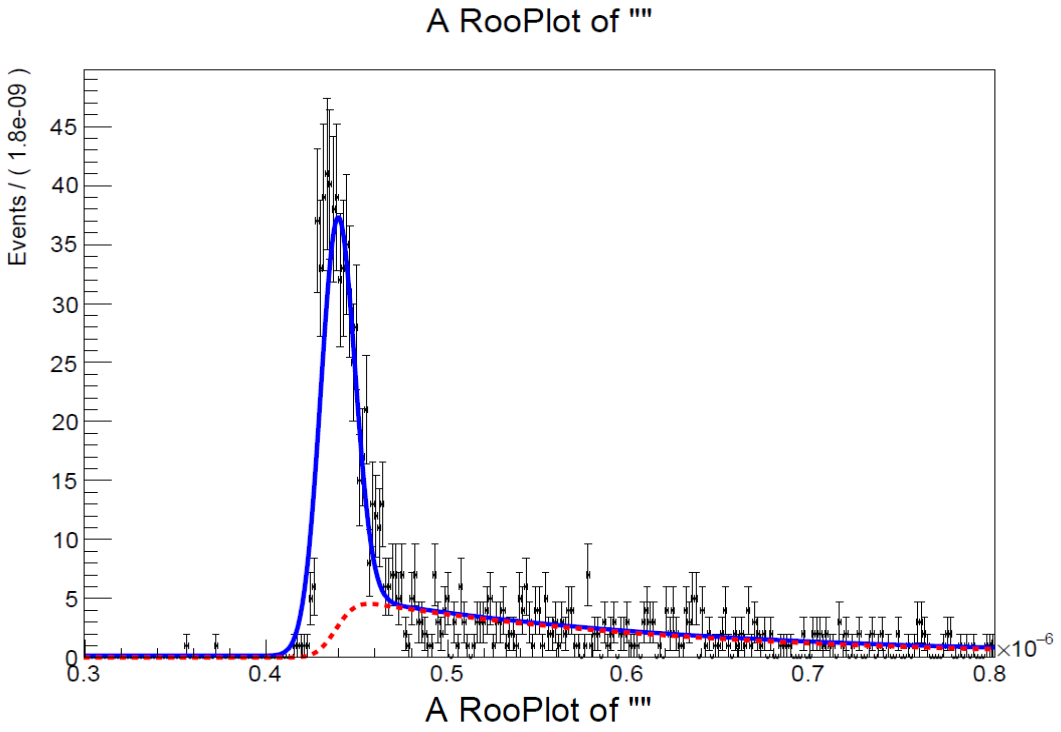
- PDF : Gauss + Gauss (x) Exp(-t/tau_a) + poly

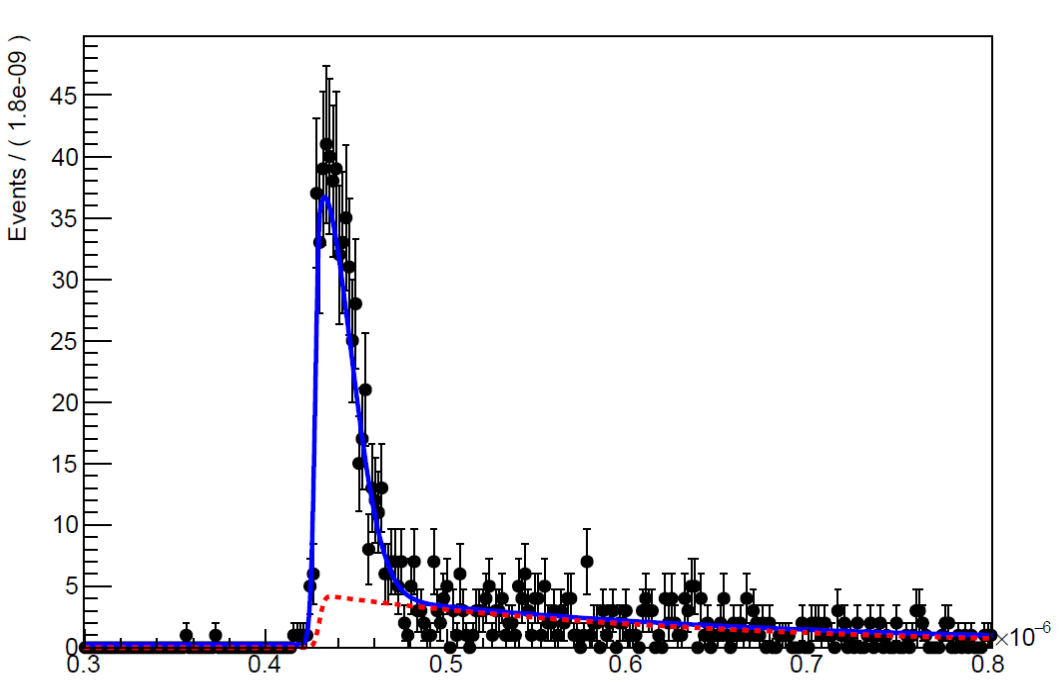
- Tau_a (O-Ps candidate) = 1.8 +-0.2 e-8s
- Fr(main PDF) = 0.53, chisquare = 9.3

- PDF : Bifur Gauss + Gauss (x) Exp(-t/tau_a) + poly

- Tau_a : 2.1+-0.3 e-7 (too big)
- Fr(main PDF) = 0.55, chisquare = 7.8

➔ Almost no difference btw two PDF



# To do list

- Anti-P tracker simulation
- PWO detector test with light guide.
- Try to reduce ringing