

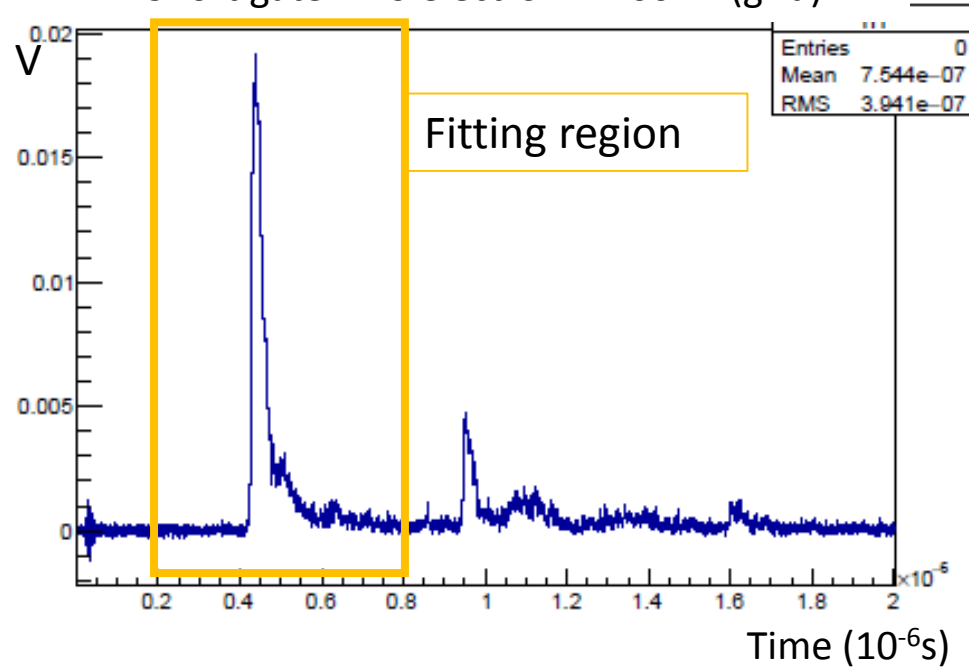
Positronium intensity measurement preparation (GBAR)

SNU

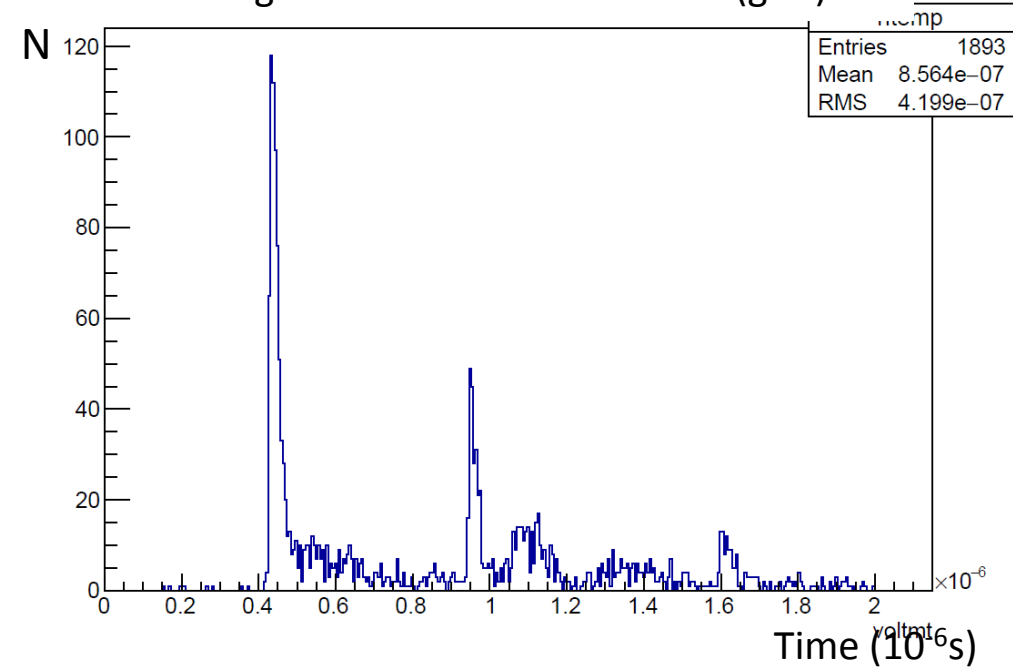
Bongho Kim

BG trap data

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



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

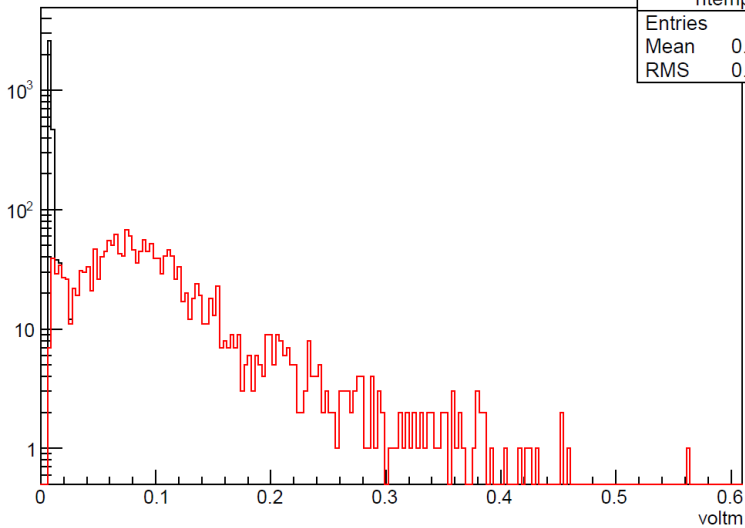


- BG trap data analysis is ongoing to check more information (O-Ps effect?)

Data selection

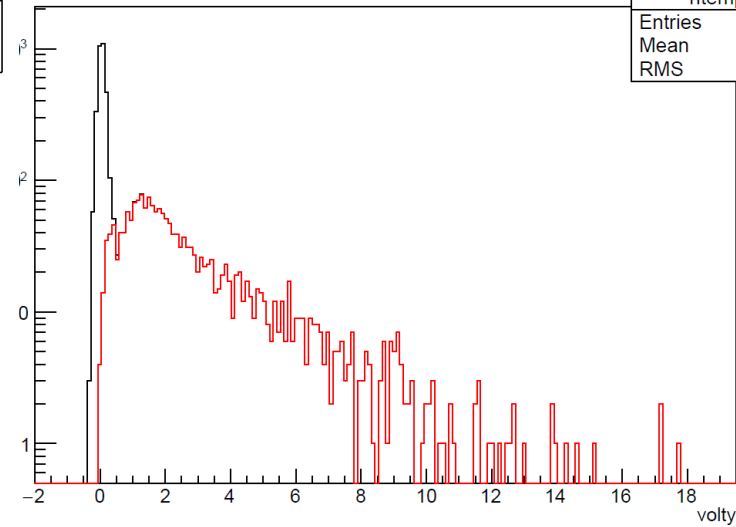
voltm {voltmt>0.2e-6&&voltmt<2.0e-6}

htemp	
Entries	4924
Mean	0.04343
RMS	0.06284

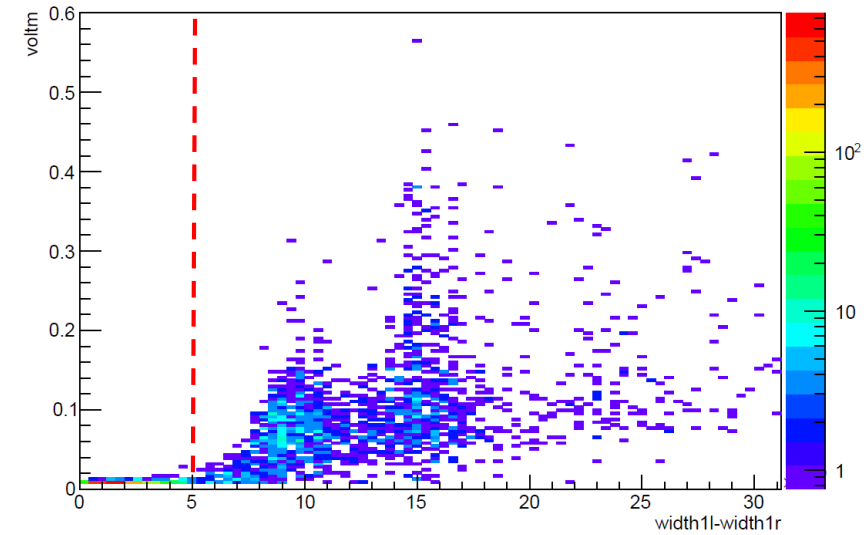


volty {voltmt>0.2e-6&&voltmt<2.0e-6}

htemp	
Entries	4924
Mean	1.099
RMS	2



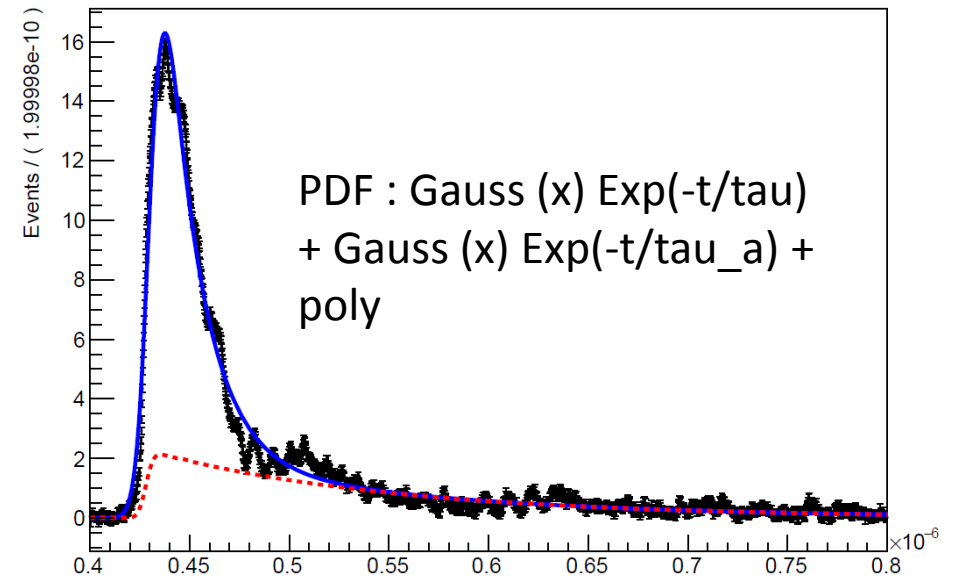
voltm:width1l-width1r {voltmt>0.2e-6&&voltmt<2.0e-6}



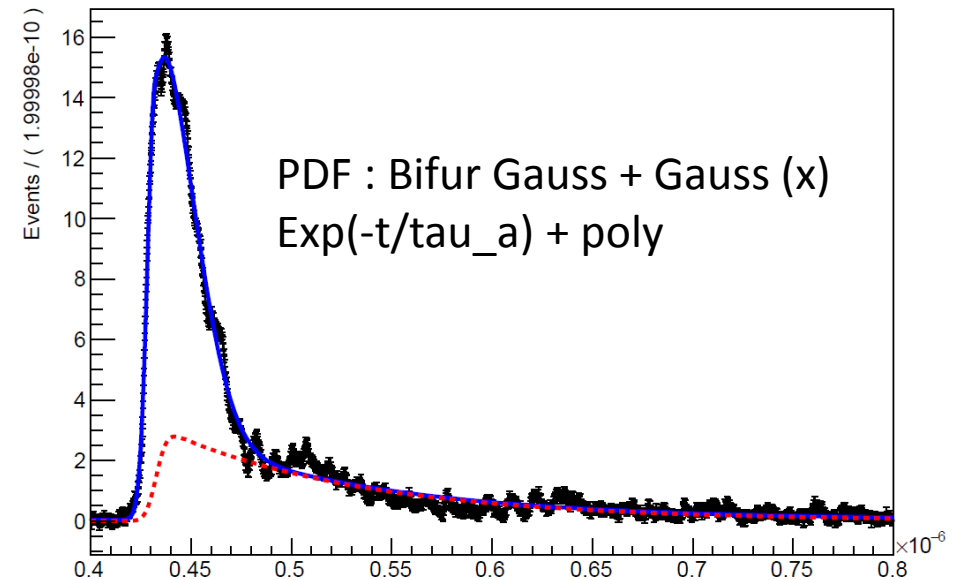
Raw signal

- Right histogram is just accumulated raw signal samples.
- Each bin error is estimated as below
 - $\sigma_{\text{tot}} = \sqrt{\sigma_{\text{fedest}}^2 (\text{baseline fluctuation}) + \sigma_{\text{bin}}^2 (\text{quantization}) + \sigma_{\text{gain}}^2 (\text{gain error: 1.5\% for gain})}$
 - Statistical fluctuation is not concerned.
- Upper panel: fr(main)= 62%, tau_a = 123+-2ns
Chisquare : 4877 (because of wrong error?)
- Lower panel : fr(main) = 60%, tau_a = 69+-1ns
Chisquare : 6893

A RooPlot of ""



A RooPlot of ""

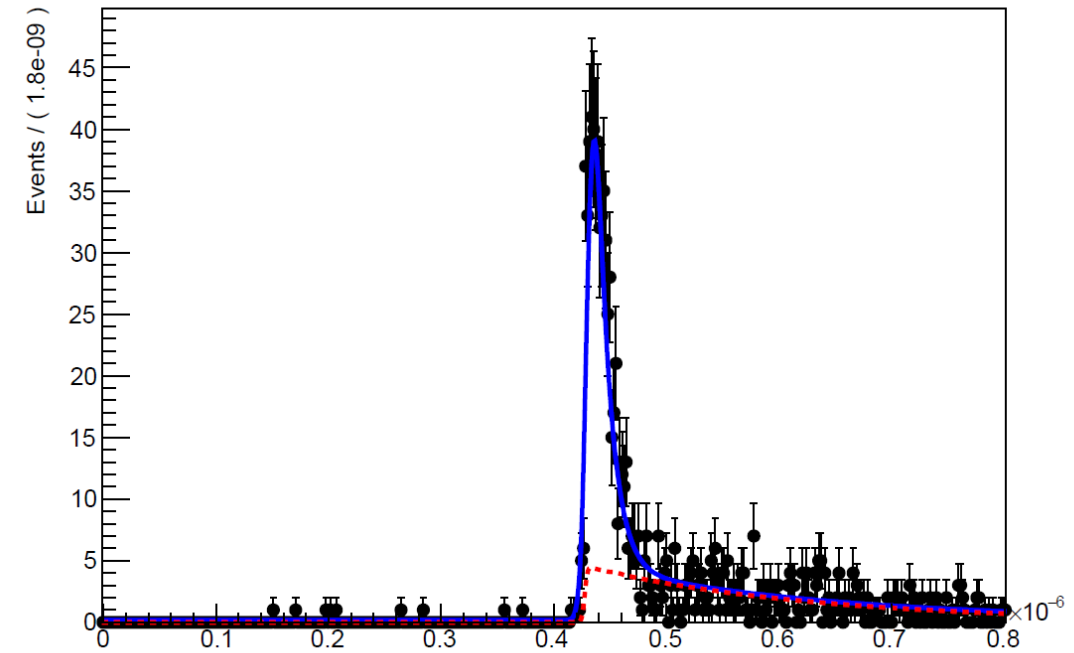


Analyzed data

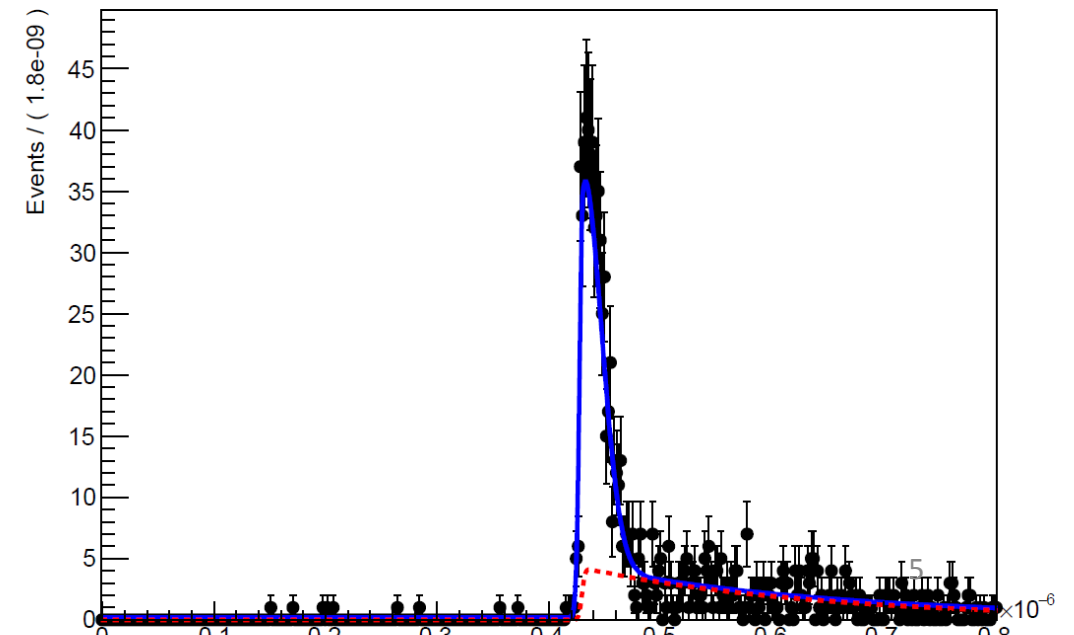
- PDF : Gauss (x) Exp(-t/tau) + Gauss (x) Exp(-t/tau_a) + poly
 - Tau : 1.2e-8s, Tau_a (O-Ps candidate) = 2.3e-7 (Too big)
 - Fr(main PDF) = 0.56, chisquare = 23.1
-
- PDF : Bifur Gauss + Gauss (x) Exp(-t/tau_a) + poly
 - Tau_a : 2.2e-7 (too big)
 - Fr(main PDF) = 0.56, chisquare = 23.0

➔ Almost no difference btw two PDF

A RooPlot of ""



A RooPlot of ""



Light guide



- Dirk ask me to measure annihilation signal with intensity information but if I attach PWO detector near to BG trap, signal is effected by B-field.
- Bertrand borrowed light guide as attached picture.
- We need to cut and grind surface.
- Light guide :D4cm x L50cm (D4cmxL35cm)
(other guide 5cmx5cmx 1.5m is too long for PWO detector which has few photo electron per 0.5MeV gamma)

To do list

- Light guide will be installed in PWO detector btw PWO crystal and PMT.
- High intense signal will be measure near BG trap area.
- Without positron beam time information, we can't sure o-Ps.

I will ask to Dirk to take a data without MCP to see raw annihilation signal without O-Ps.

Appendix

3/8/2017

Weekly meeting

