

Light Emission PDF for G4 Simulation

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Scintillation Light Emission in Pure CsI

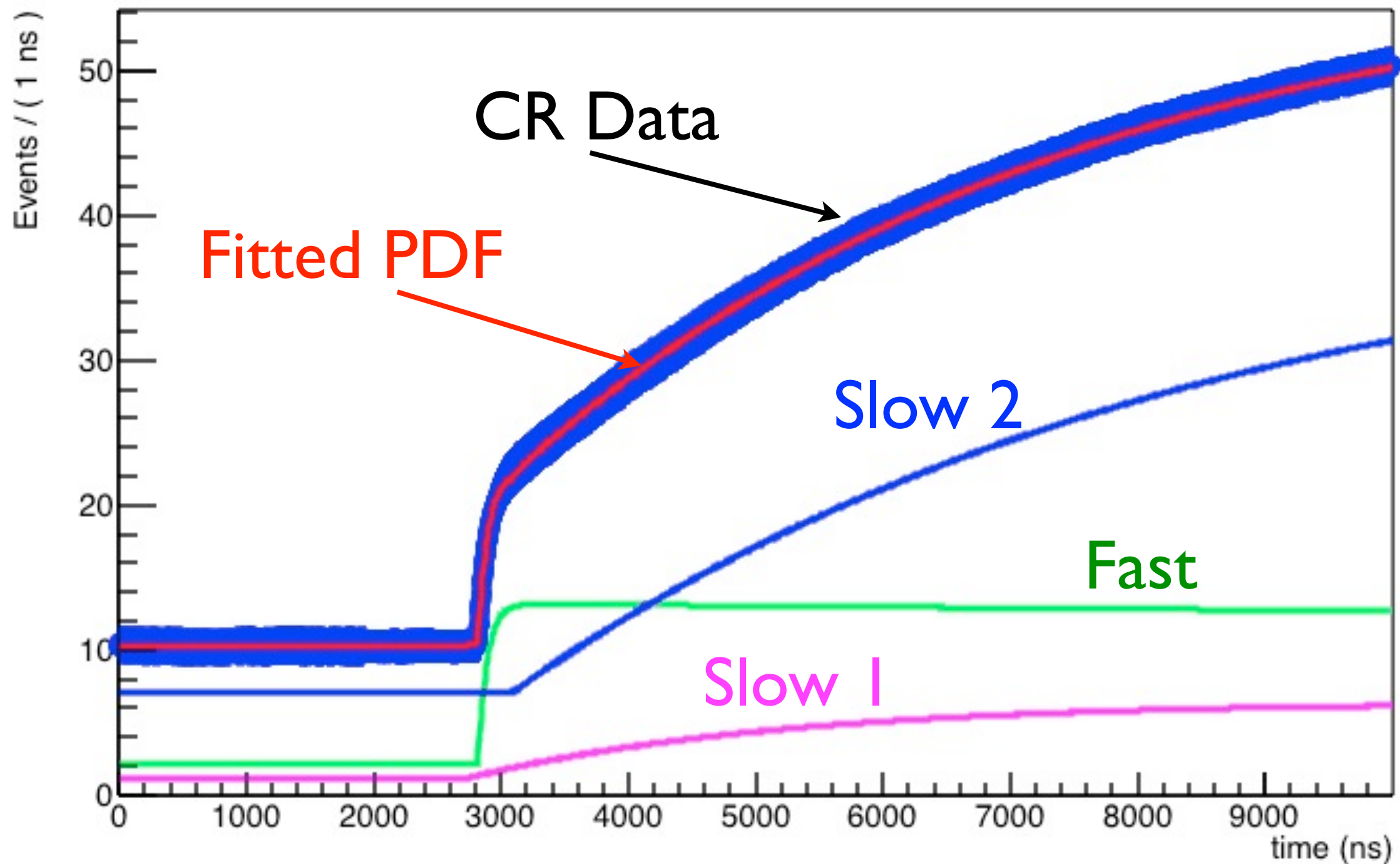
- In pure CsI the scintillation light has three components, which can be described by three different exponential distributions
- These are measured on cosmic ray data collected with Hamamatsu LAAPD read out with a CREMAT CR-110 amplifier
- The CR-110 is a charge integrating amplifier with a characteristic rise time given by

$$t_r = 0.4 C_d + 7 \text{ ns}$$

- For LAAPD $C_d \sim 200 \text{ pF} \Rightarrow t_r \sim 80\text{-}90 \text{ ns}$
- The output signal is then discharged with a $\tau = 150 \text{ } \mu\text{s}$

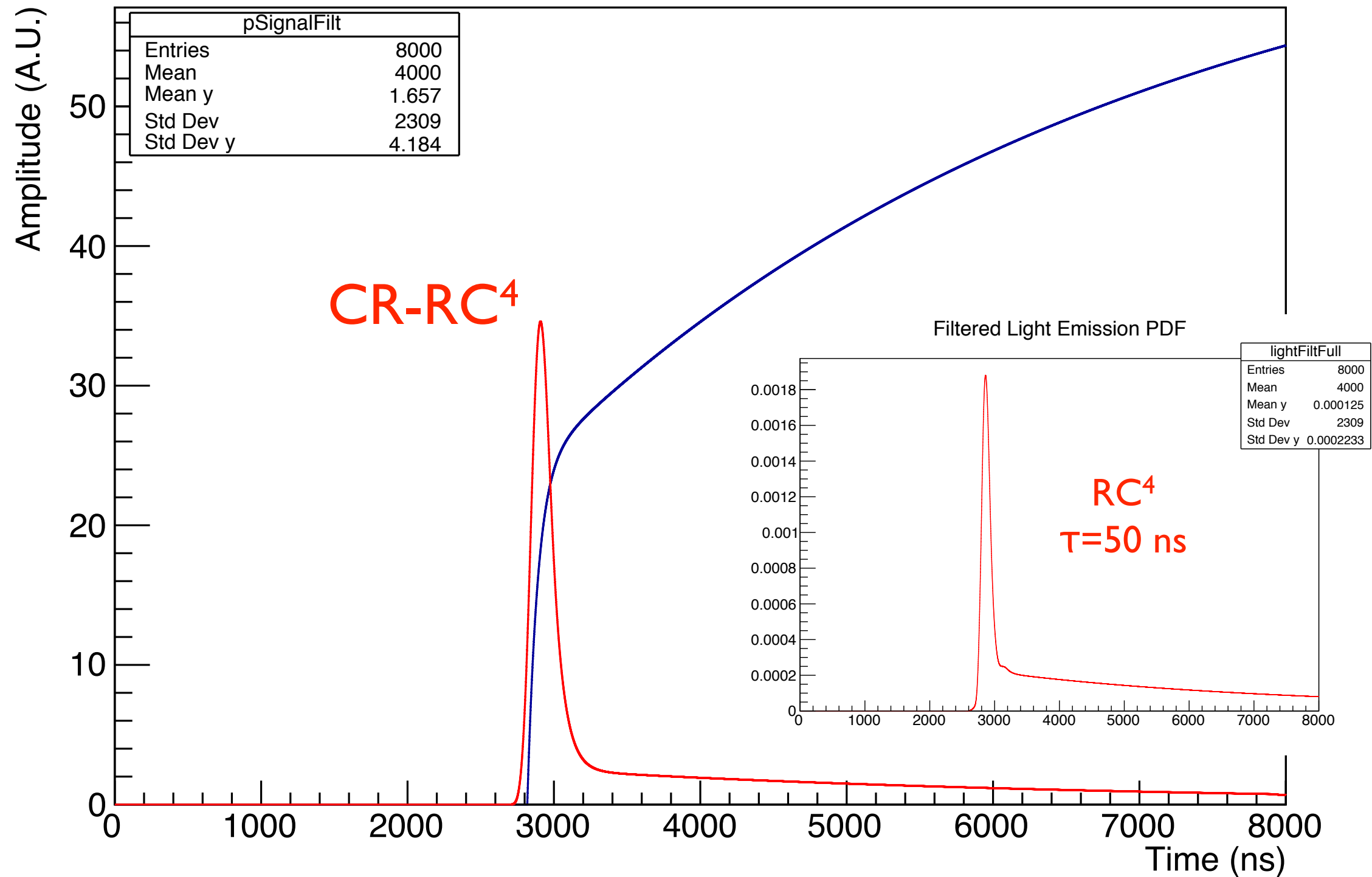
Output Signal from CREMAT

Plot of PDF



CREMAT + CR-RC⁴

Signal Waveform Toy

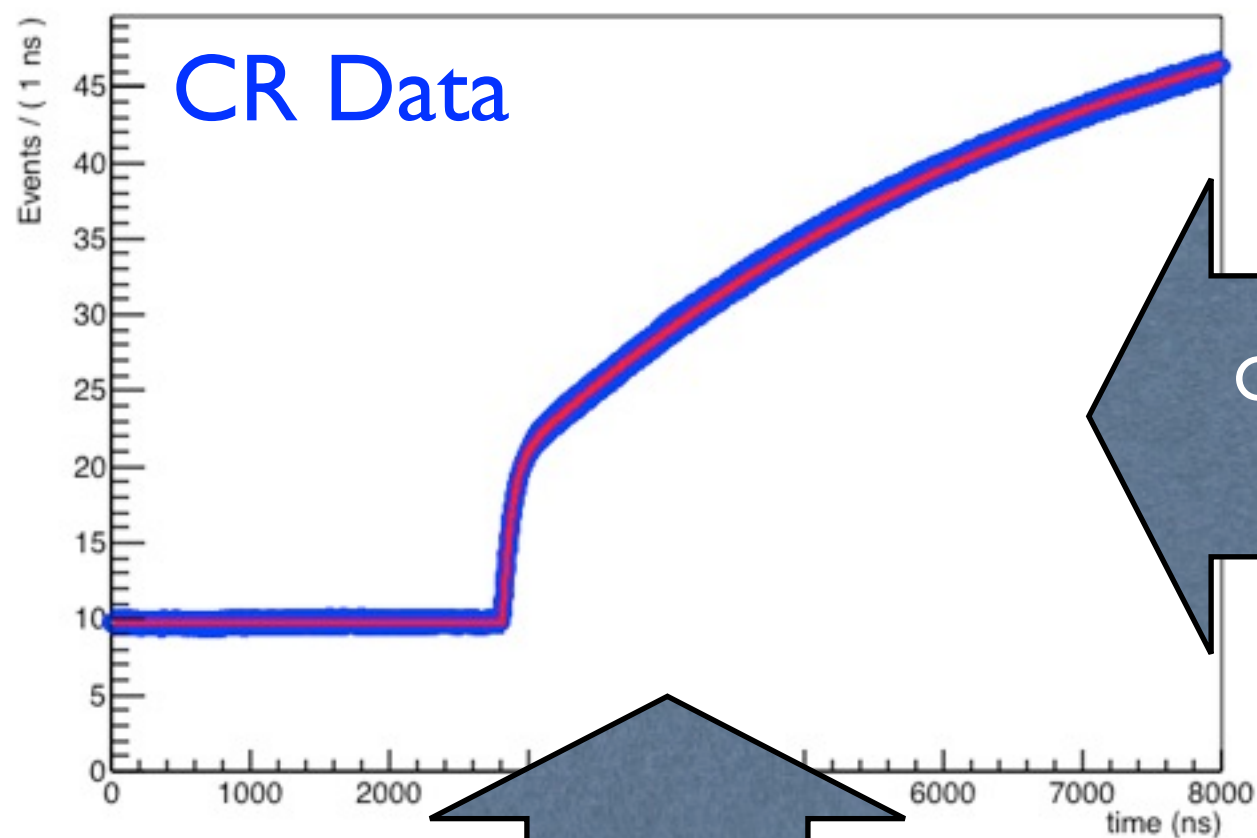


Derivative: Light Signal

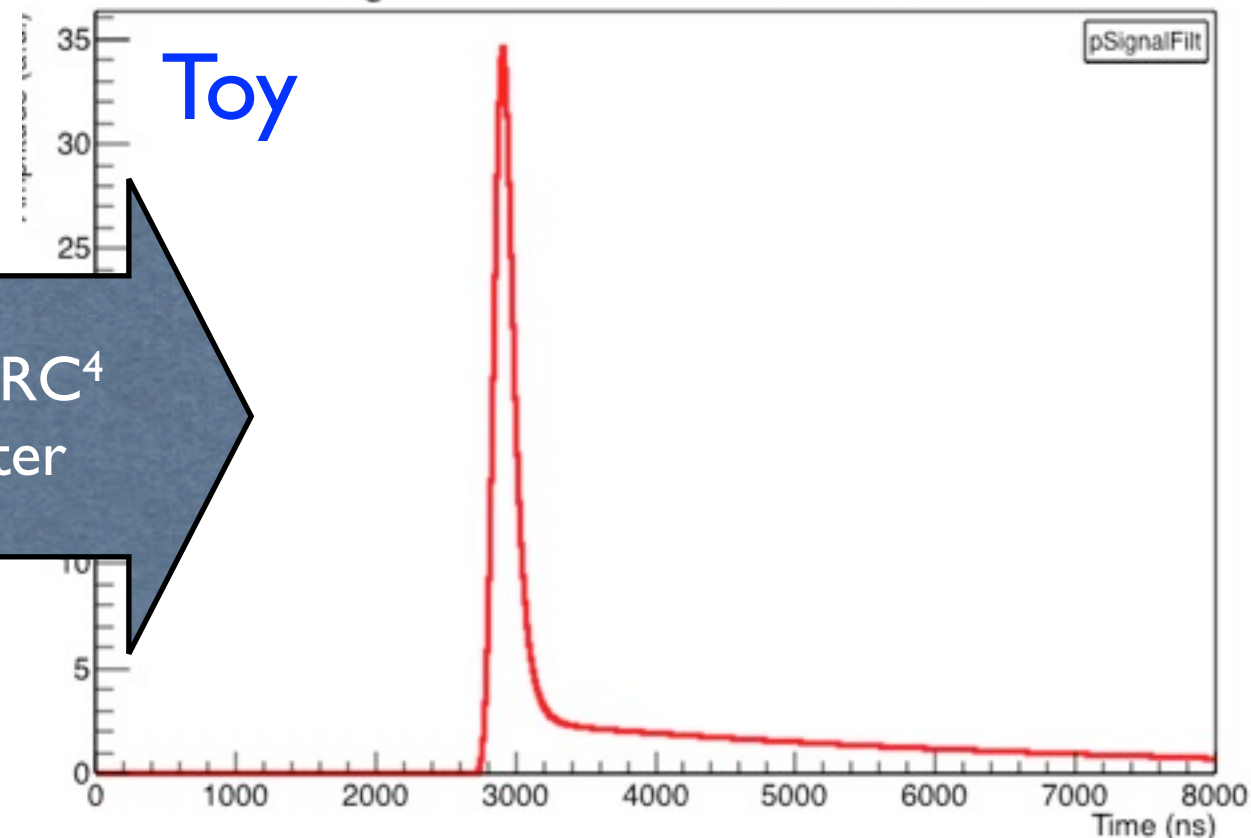
green = fast
red = slow 1
blue = slow 2



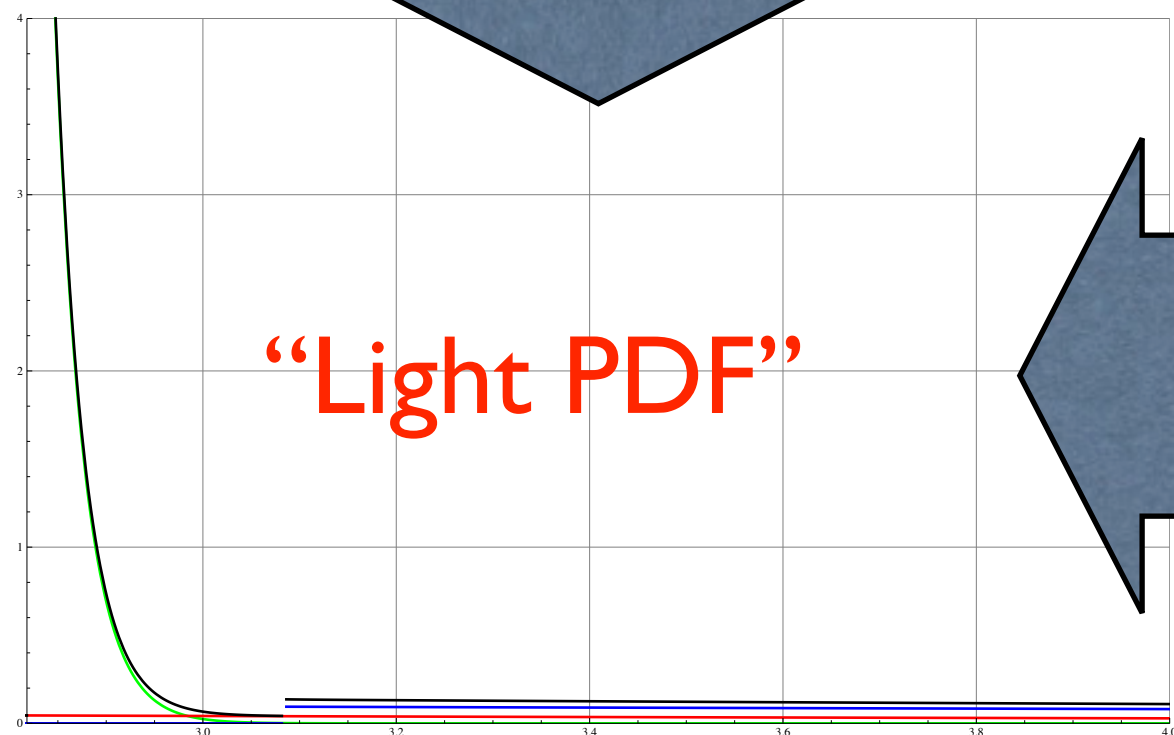
Plot of PDF



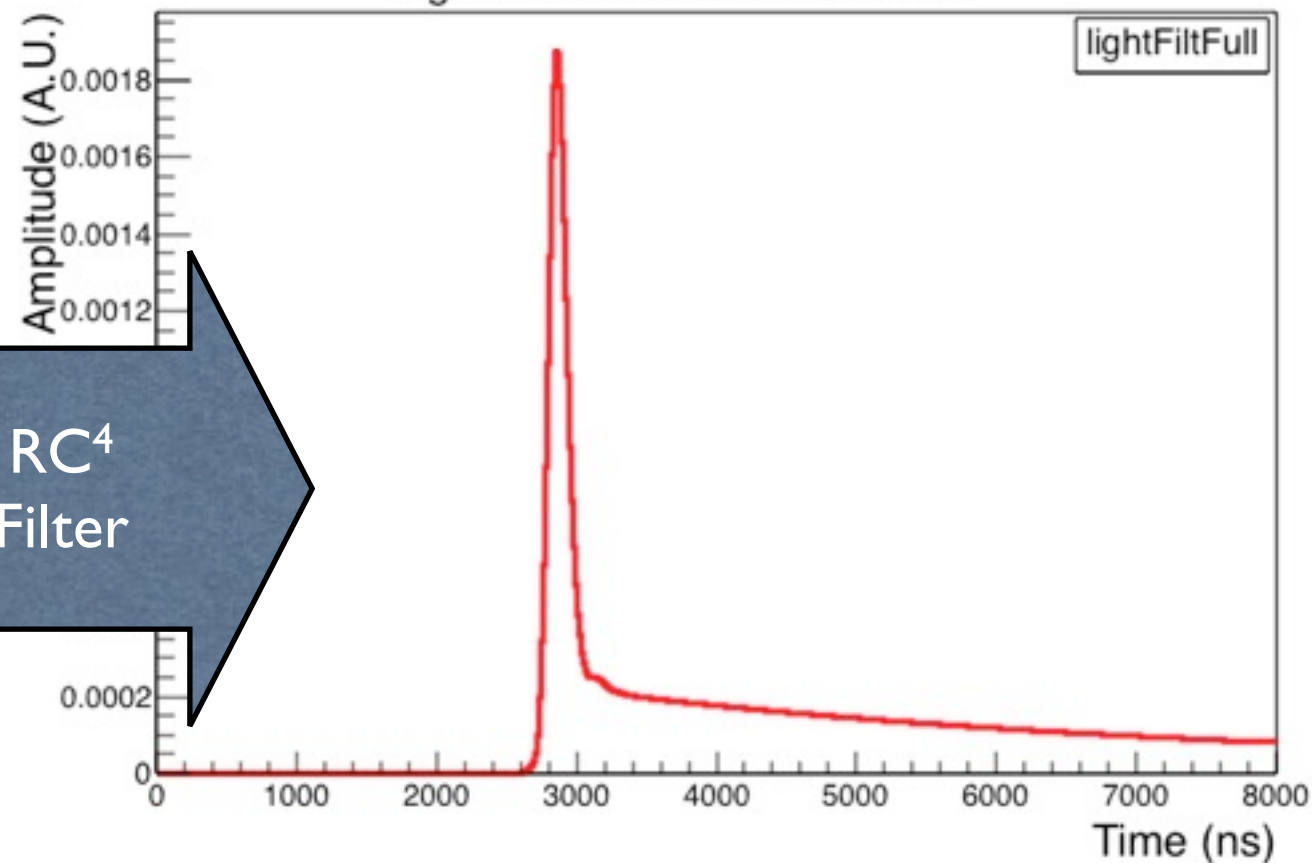
Signal Waveform - CR-RC⁴ Filter



Analitic
Derivative
(=CR)



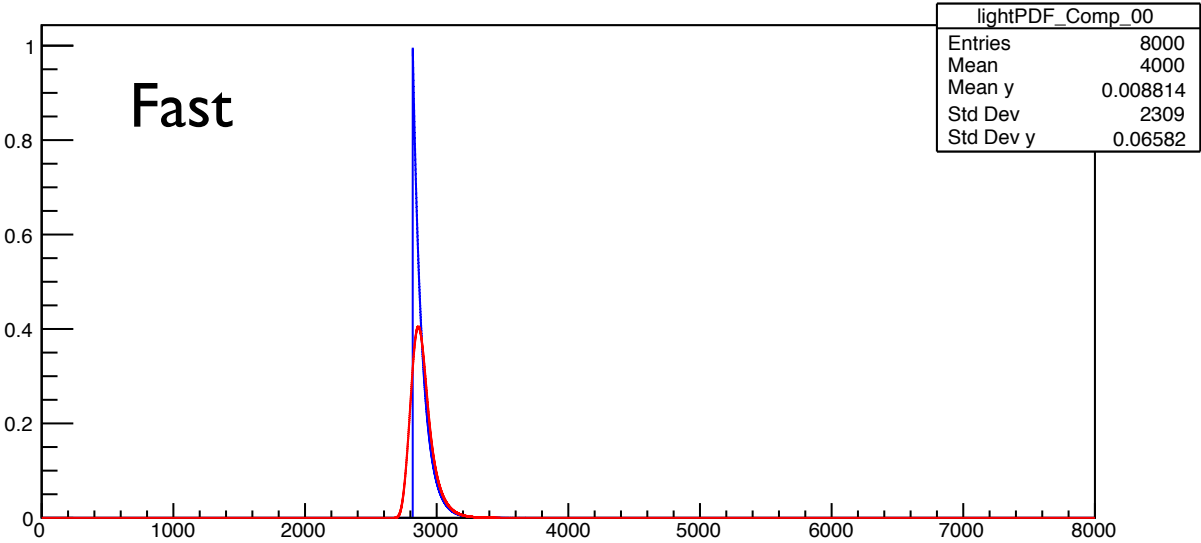
Light Emission PDF - RC⁴ Filter



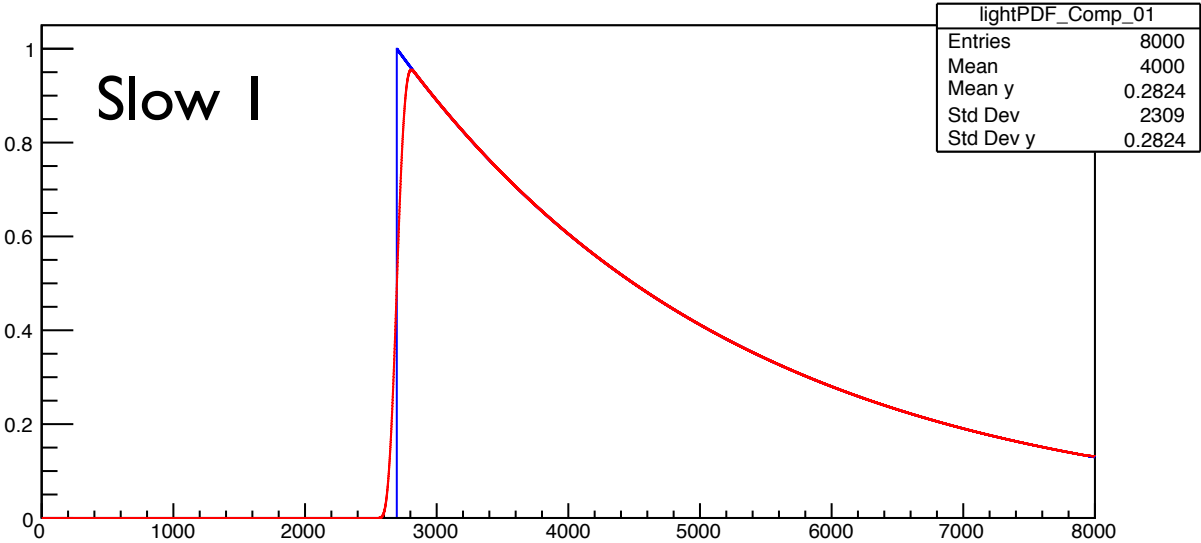
CR-RC⁴
Filter

RC⁴
Filter

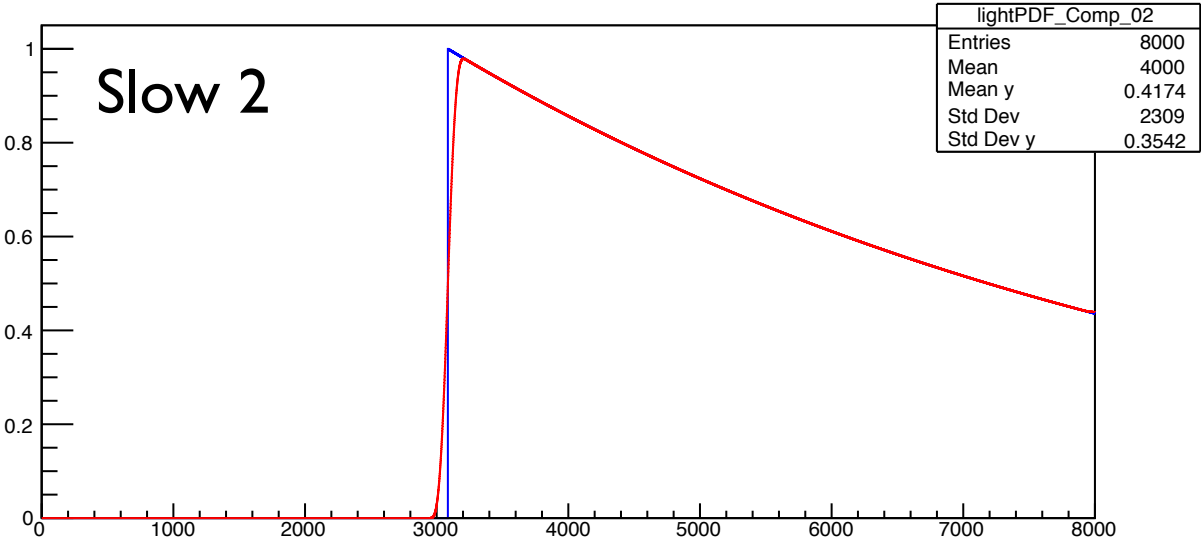
LE Component 00



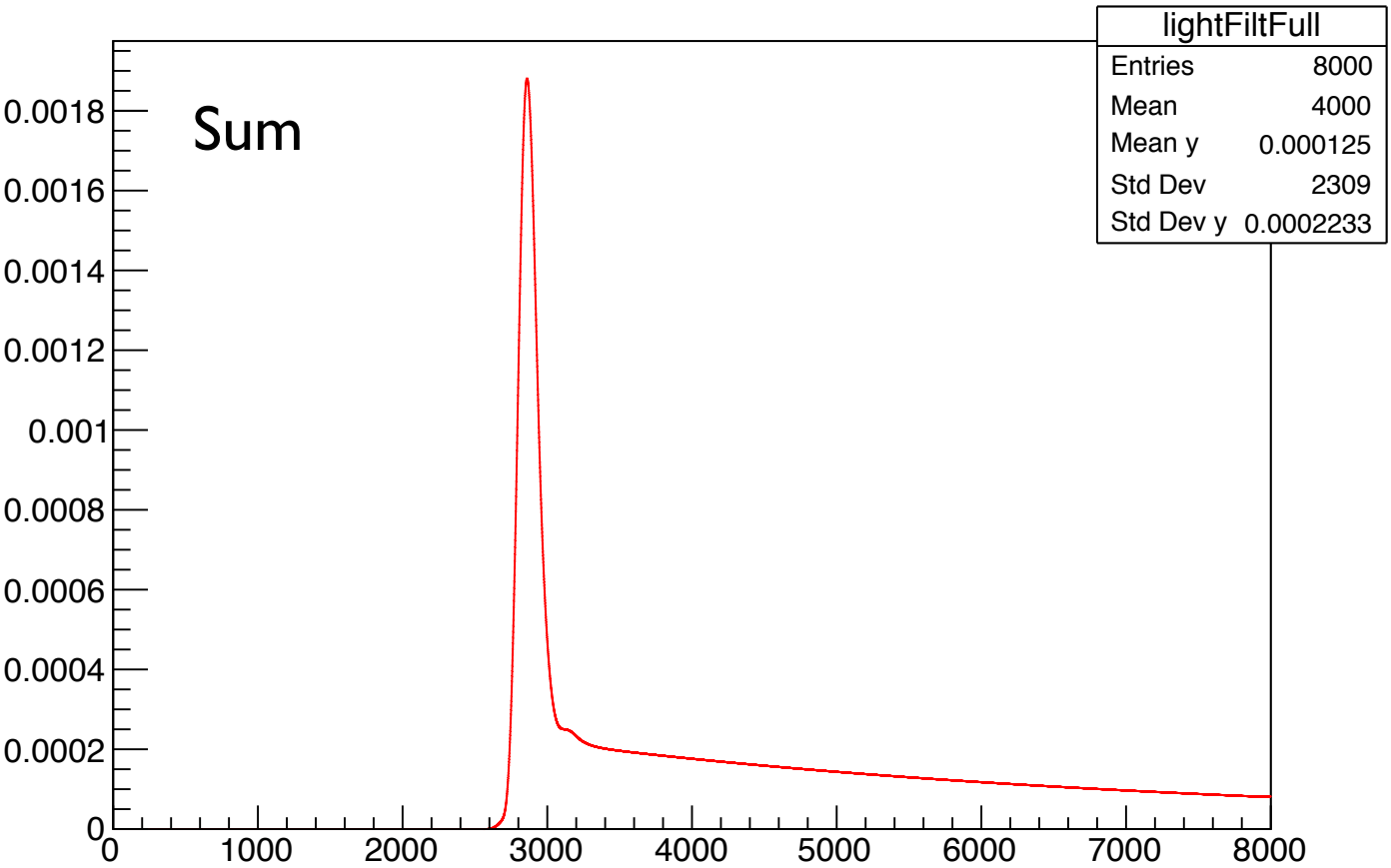
LE Component 01



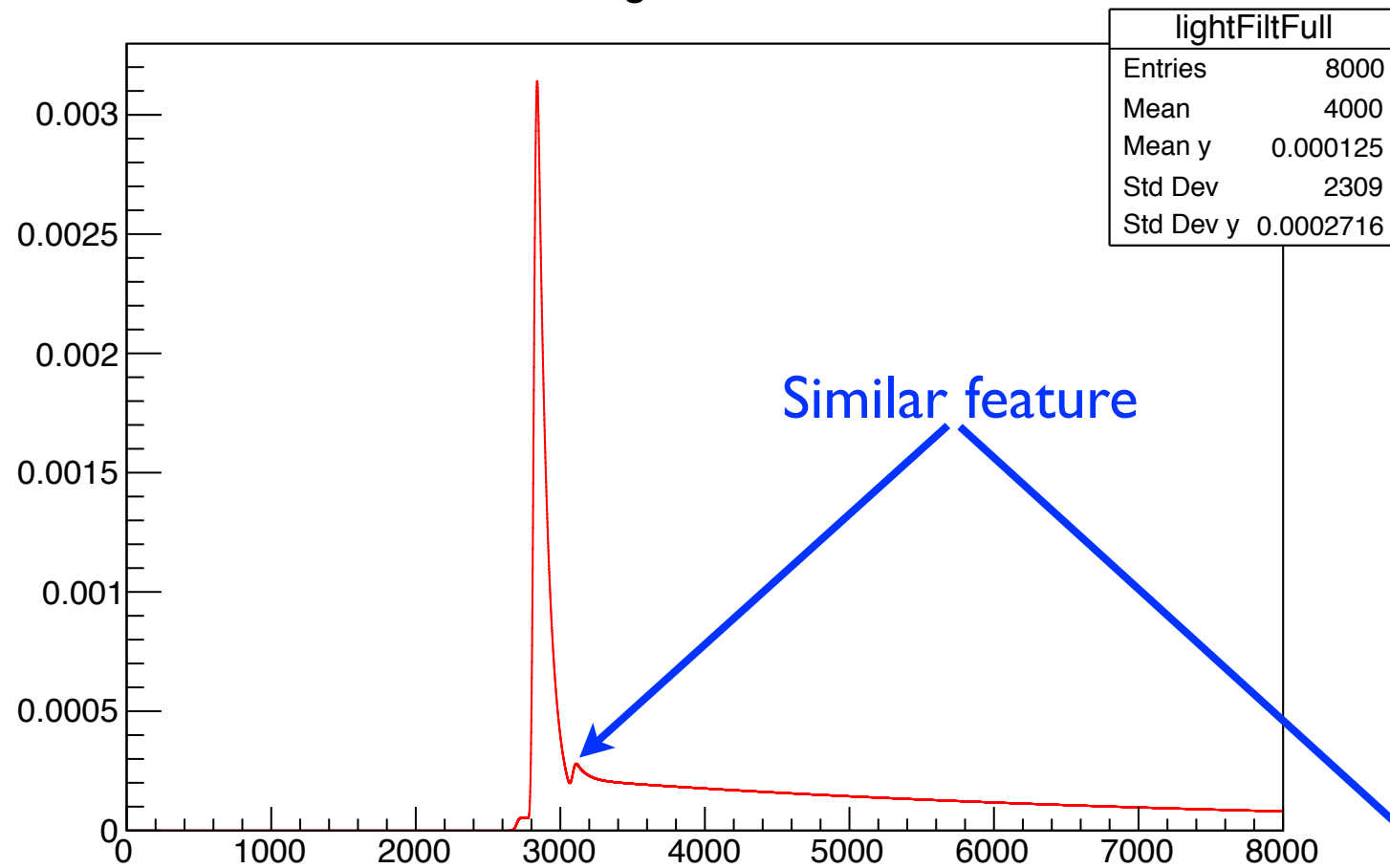
LE Component 02



Filtered Light Emission PDF



Filtered Light Emission PDF



CR Data from BEAST

16383-1*Waveform:Iteration\$ {Channel==6&&BoardId==2&&Qlong>150}

