



Spallation neutron study at JUNO-TAO

Guang Luo

Sun Yat-sen University

The 12th Annual Meeting of the HEP Branch of CPS
July 17, 2026 @ Guangzhou, China

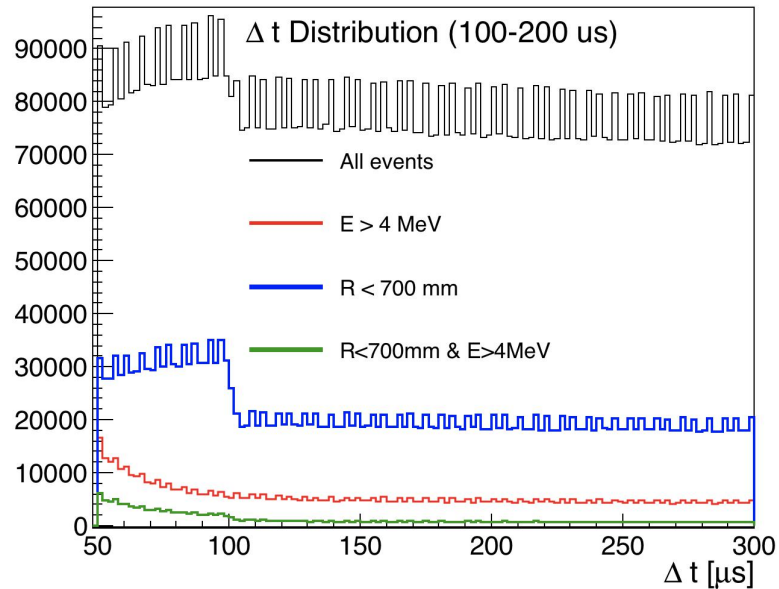
Event selection criteria

CDmuon events
>20MeV

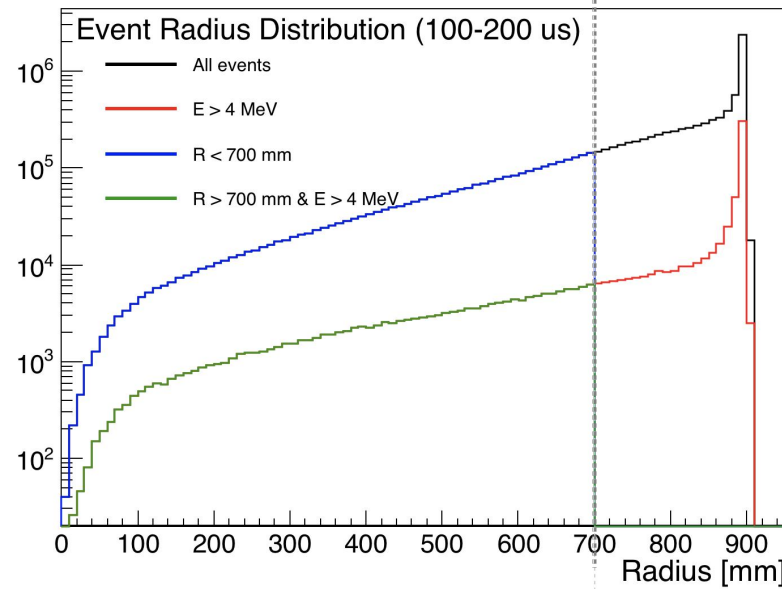
Muon After events

TimeLine

First, determine all muon events, and then analyze the subsequent events.



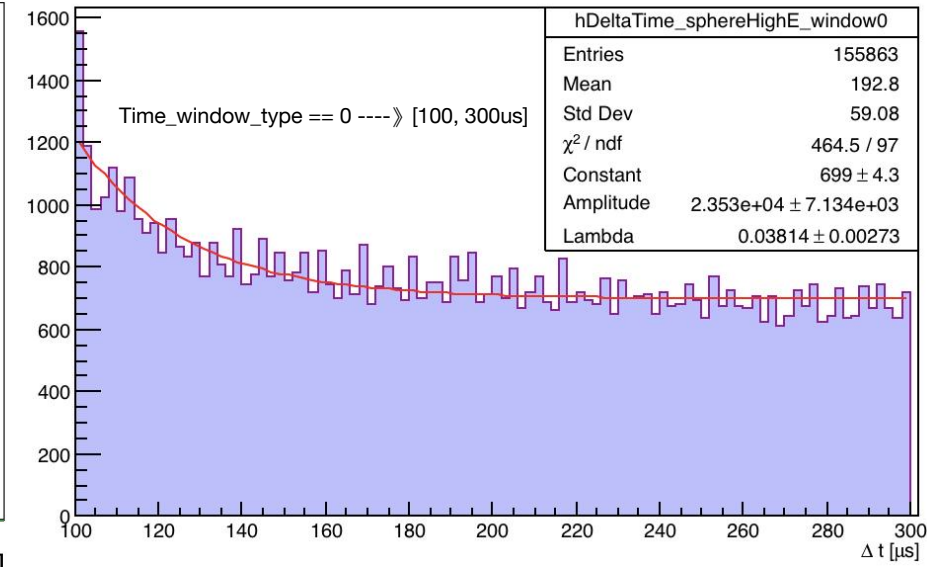
delta T distributions under radius and energy cuts.



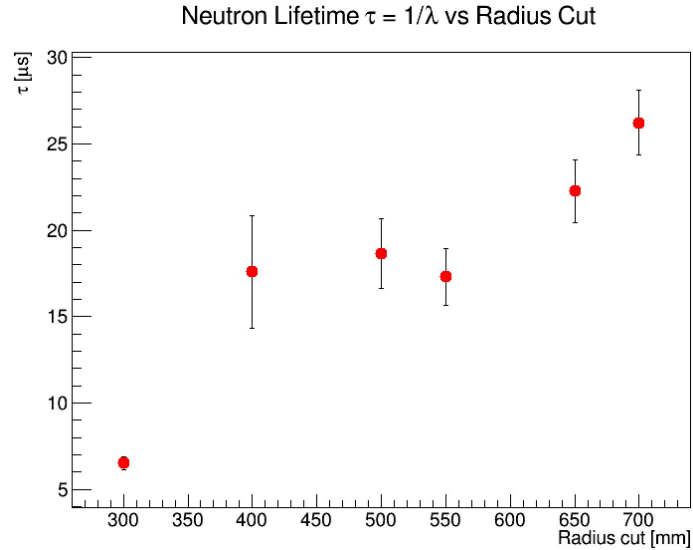
Radius distribution of reconstructed event vertices under radius cuts and energy cuts.

$$f(t) = \text{Constant} + \text{Amplitude} * \text{Lambda} \exp(-\text{Lambda} * t)$$

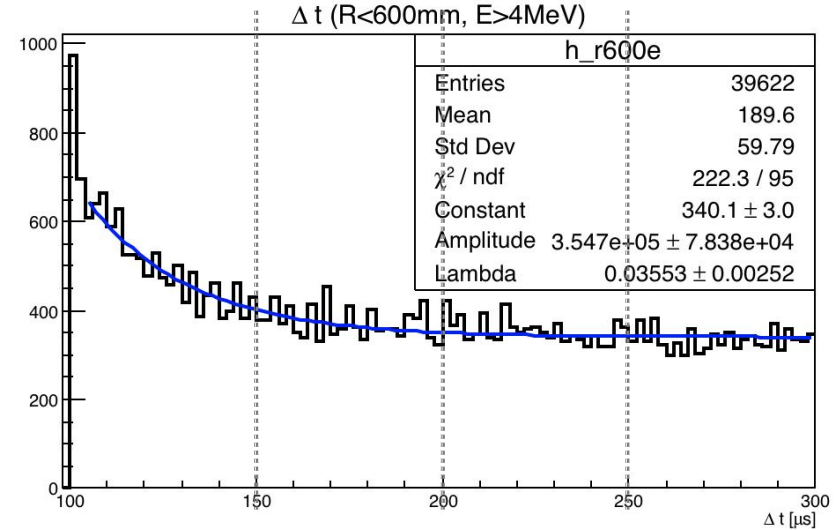
Δt Distribution (R<700mm & E>4MeV, time_window_type==0)



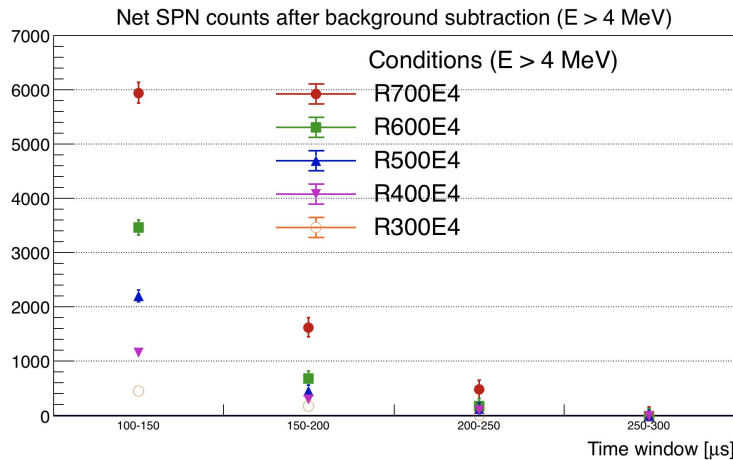
Δt distributions under radius<700mm&&energy>4MeV cut



The neutron lifetime vs radius cut;
Finding: Neutron lifetime decreases with smaller radius cut

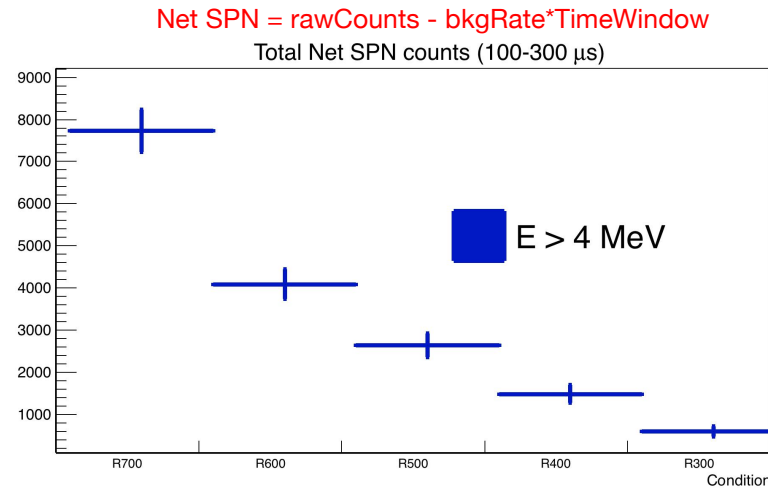


bkgRate = Constant (counts/us)



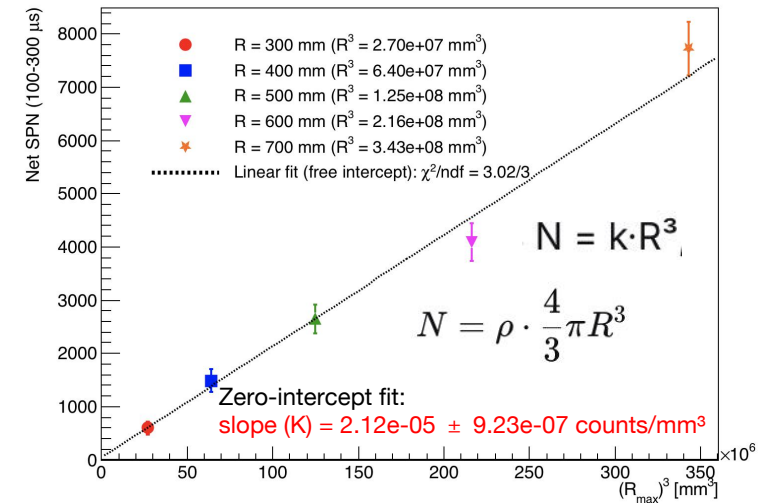
Net neutron counts in four Δt bins for different radius cuts, derived from the formula.

luog7@mail2.sysu.edu.cn



Scatter plot of net neutron counts in the full interval (100–300 μs) versus radius cuts.

Guang Luo (SYSU)



Slope $\rightarrow$ measures uniform net neutron yield per unit volume. Small uncertainty $\rightarrow$ confirms the uniformity assumption.