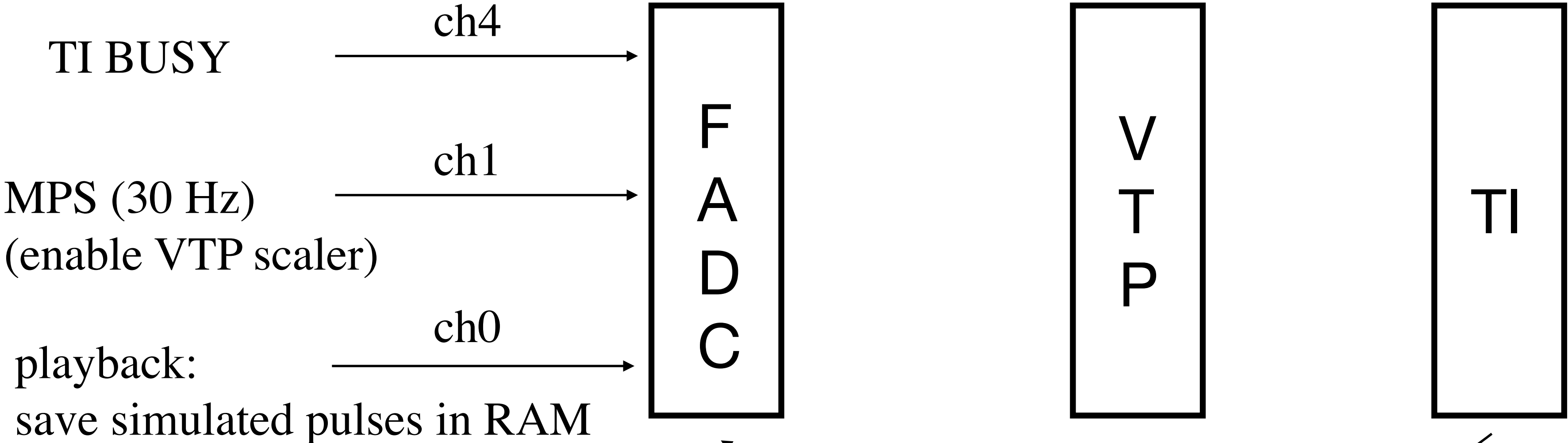


# **SOLID FADC test dead time measurement**

compton firmware: generate trigger when there is a signal in FADC channel 0

Trigger\_1: send a trigger to TI to read out FADC data



Trigger\_2: TI internal pulser generates a Trigger\_2 type trigger which injects the simulated data in the FADC

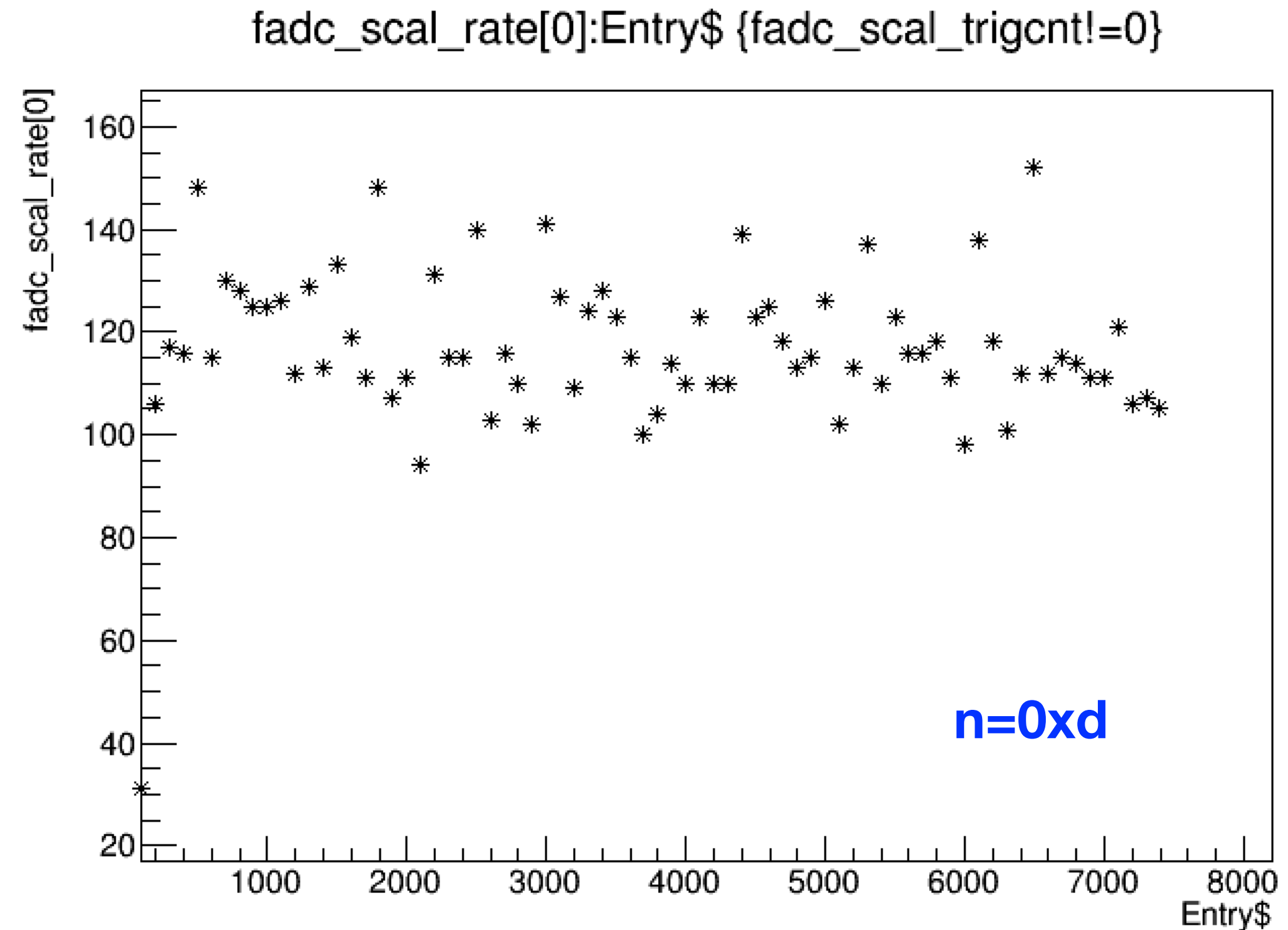
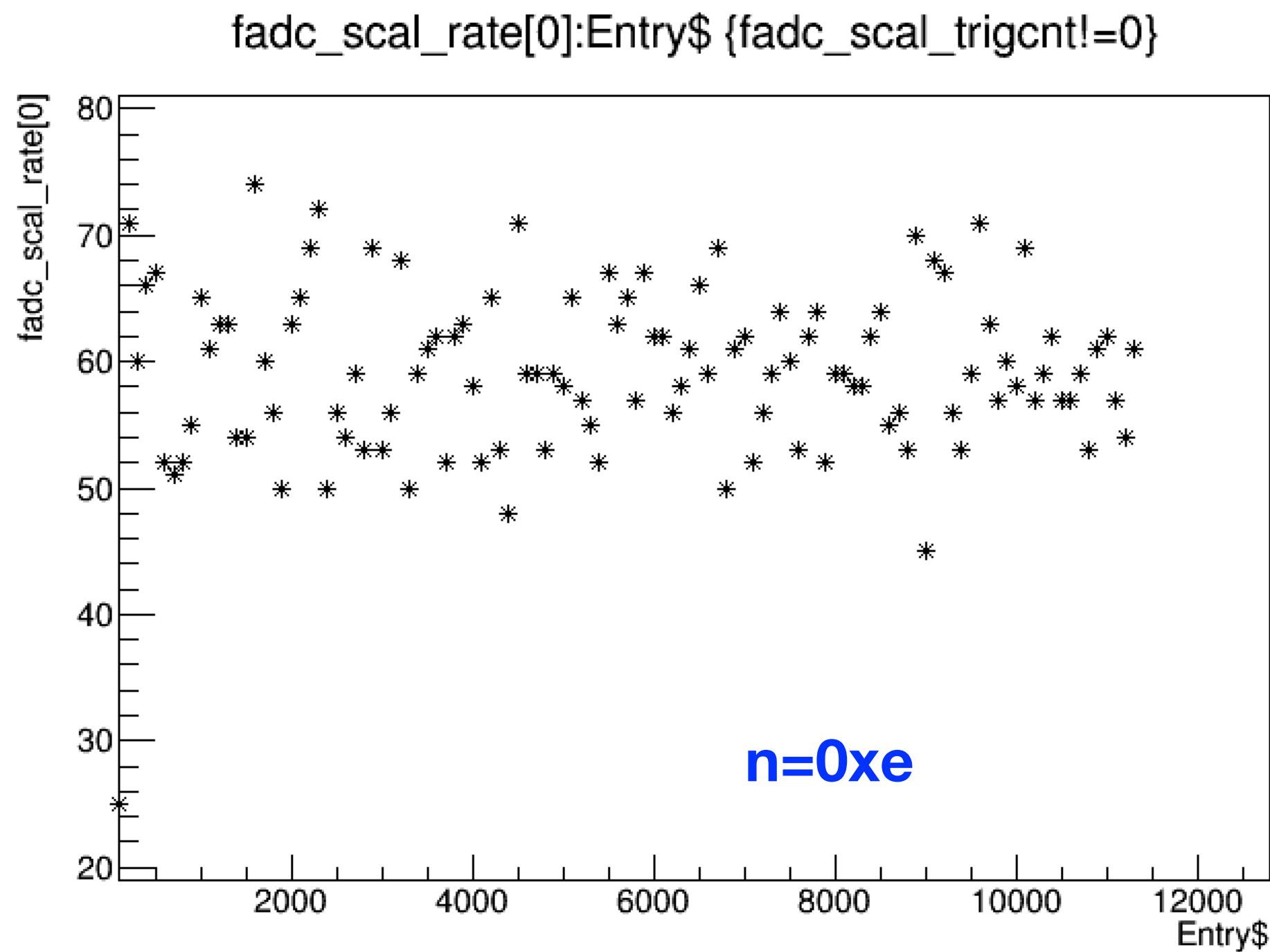
(Event rate can be controlled here)

# What should the event rate be?

Blocklevel=1 , bufferlevel=1

```
tiSetRandomTrigger(2,n); // playback trigger
```

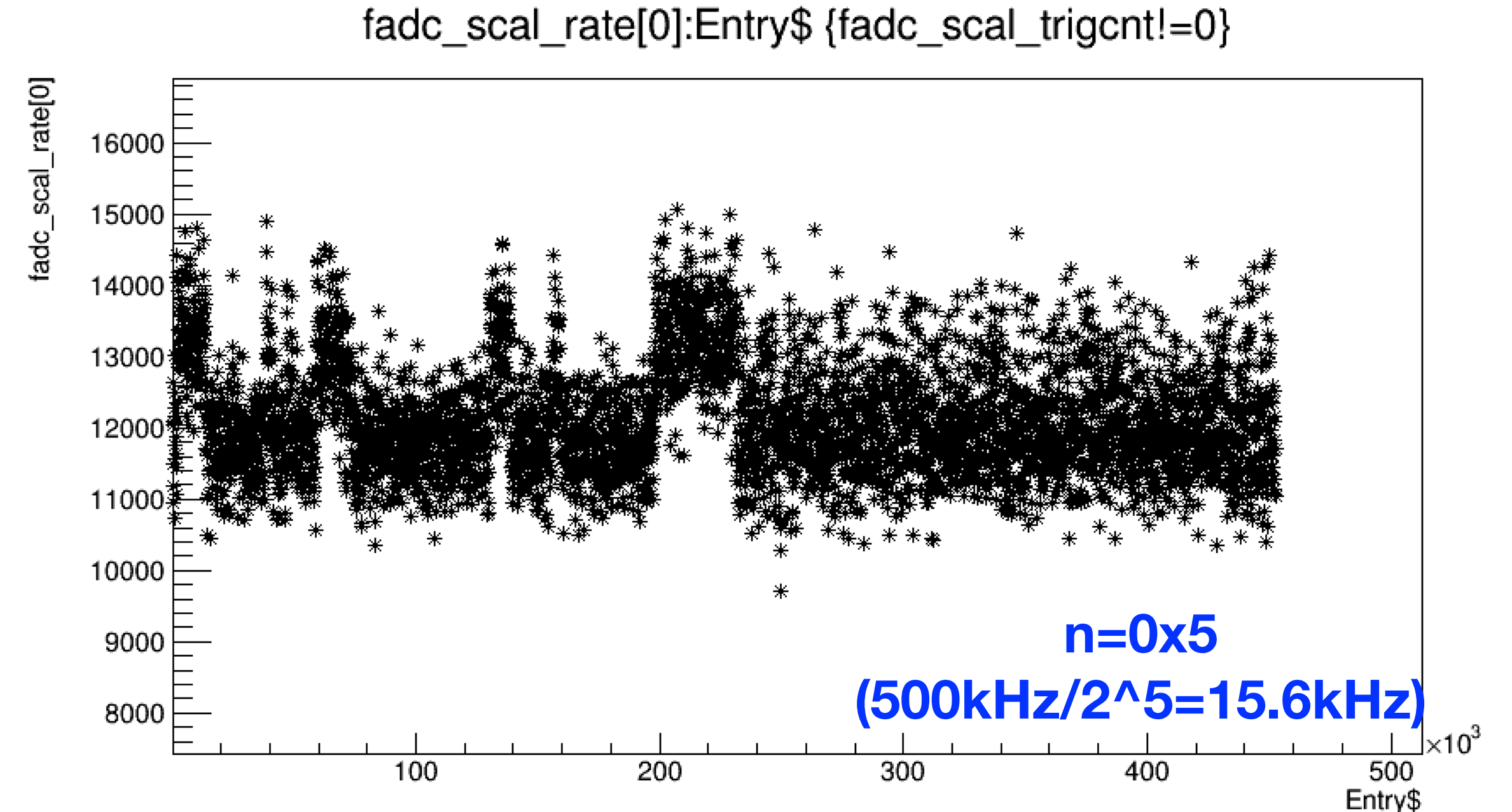
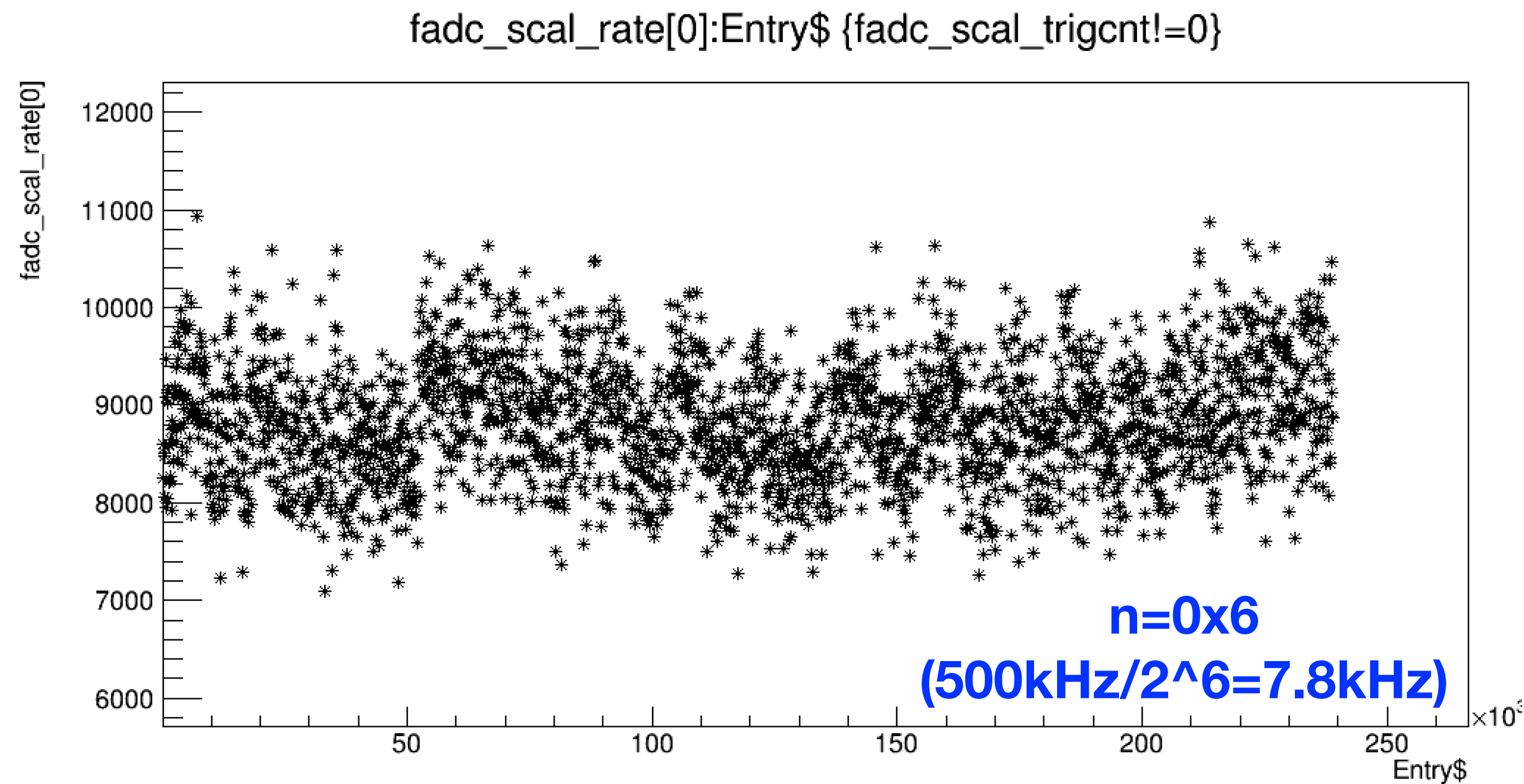
1. According to the TI manual, the rate should be  $500 \text{ kHz}/2^n$  (probably  $460 \text{ kHz}/2^n$ );
2. When  $n=0xe$  ( $500\text{kHz}/2^{14}=30.52 \text{ Hz}$ ), the rate observed in CODA and calculated from the fadc scaler is about 60 Hz. When  $n=0xd$  ( $500\text{kHz}/2^{13}=61\text{Hz}$ ), the rate observed is about 120 Hz



# What should the event rate be?

```
tiSetRandomTrigger(2,n); // playback trigger
```

1. According to the TI manual, the rate should be  $500 \text{ kHz}/2^n$  (probably  $460 \text{ kHz}/2^n$ );
2. When  $n=0xe$  ( $500\text{kHz}/2^{14}=30.52 \text{ Hz}$ ), the rate observed in CODA and calculated from the fadc scaler is about 60 Hz. When  $n=0xd$  ( $500\text{kHz}/2^{13}=61\text{Hz}$ ), the rate observed is about 120 Hz  
—————> Maybe the rate should be  $500 \text{ kHz}/2^{(n-1)}$  ?
3. When the rate is higher, the fadc scaler measured rate is even different from  $500 \text{ kHz}/2^{(n-1)}$  (probably due to dead time?)



# What should the event rate be?

```
tiSetRandomTrigger(2,n); // playback trigger
```

1. According to the TI manual, the rate should be  $500 \text{ kHz}/2^n$  (probably  $460 \text{ kHz}/2^n$ );
2. When  $n=0xe$  ( $500\text{kHz}/2^{14}=30.52 \text{ Hz}$ ), the rate observed in CODA and calculated from the fadc scaler is about 60 Hz. When  $n=0xd$  ( $500\text{kHz}/2^{13}=61\text{Hz}$ ), the rate observed is about 120 Hz  
—————> Maybe the rate should be  $500 \text{ kHz}/2^{(n-1)}$  ?
3. When the rate is higher, the fadc scaler measured rate is even different from  $500 \text{ kHz}/2^{(n-1)}$  (probably due to dead time?)

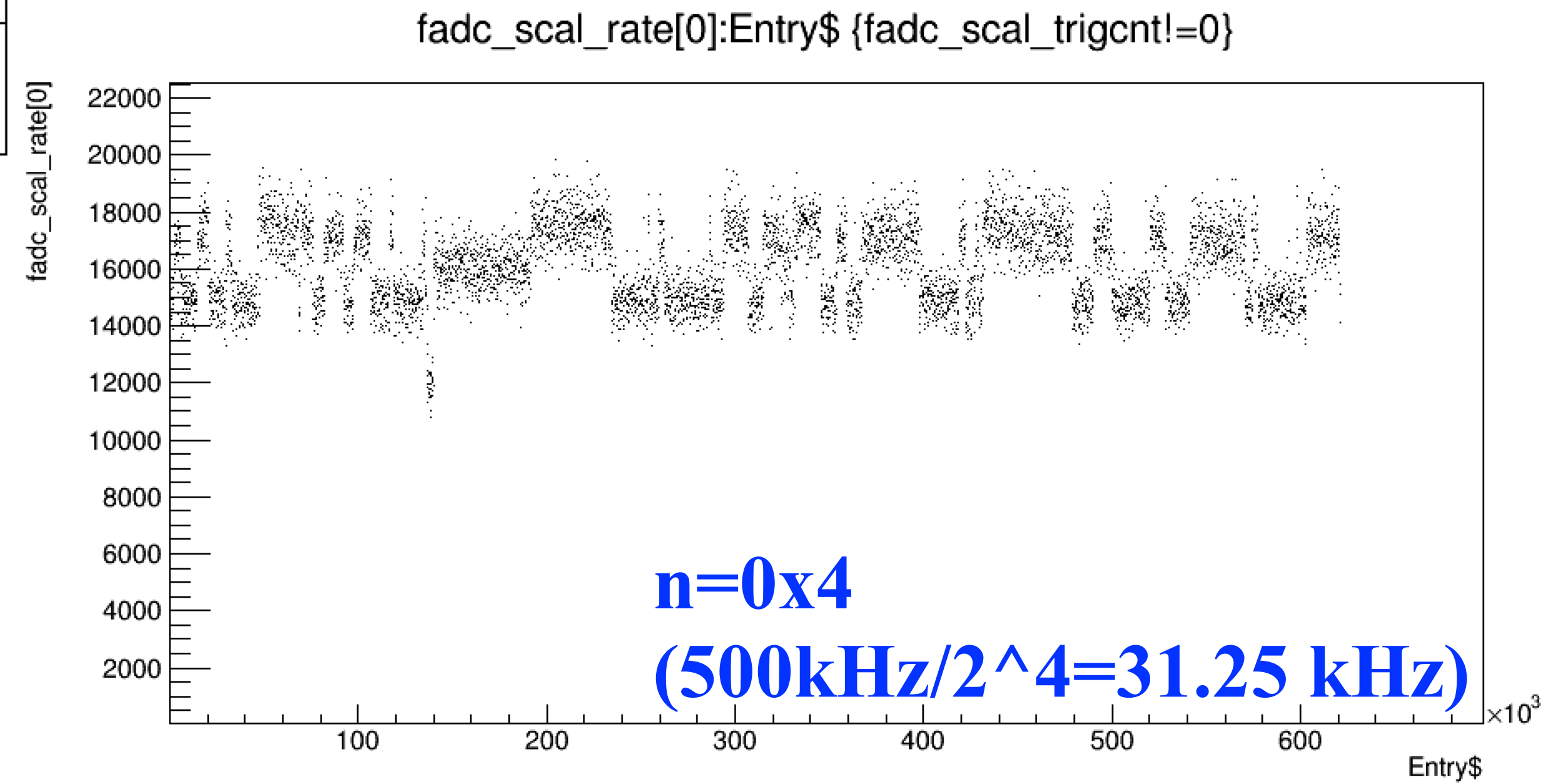
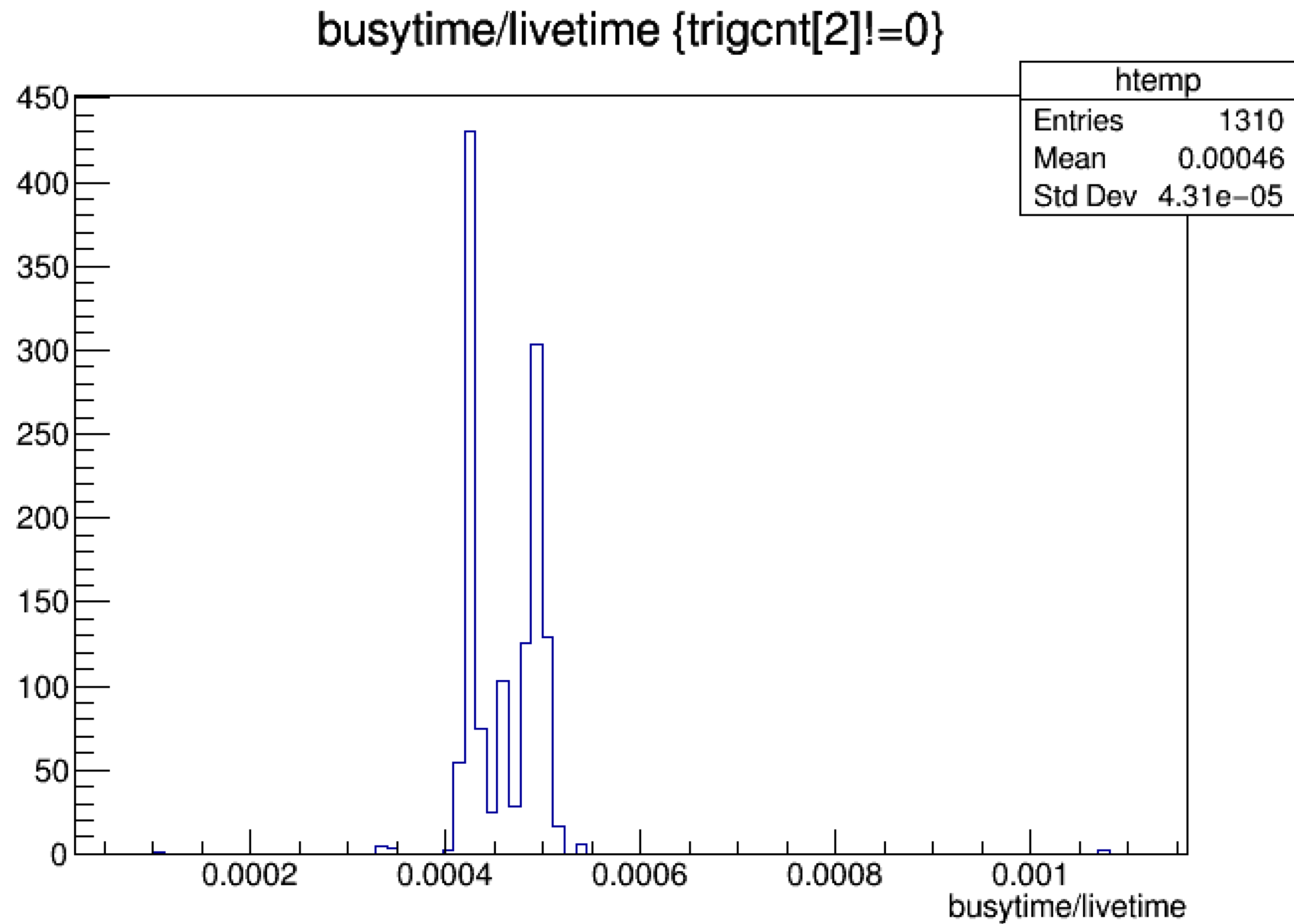
Question:

shall I use  $500 \text{ kHz}/2^{(n-1)}$  as the rate or the rate calculated from the fadc scaler?

# What should the FADC dead time be?

Blocklevel=1 , bufferlevel=1

1. VTP records busy time, live time per helicity window  
dead time = busytime/livetime?



# What should the FADC dead time be?

Blocklevel=1 , bufferlevel=1

1. VTP records busy time, live time per helicity window  
dead time = busytime/livetime?
2. fadc\_real\_counts/fadc\_scaler\_counts: **method1**  
fadc\_real\_counts: the total number of events with fadc\_a[0]>0
3. trigger\_counts/fadc\_scaler\_counts **method2**

