Plot approval request for INTT chip saturation issue

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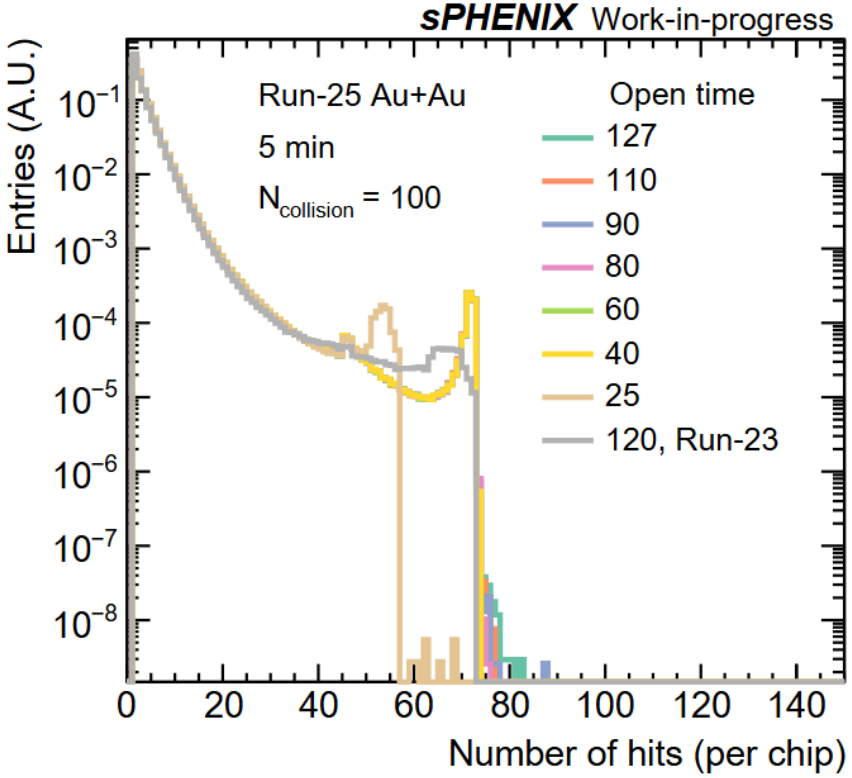
For RIKEN APR

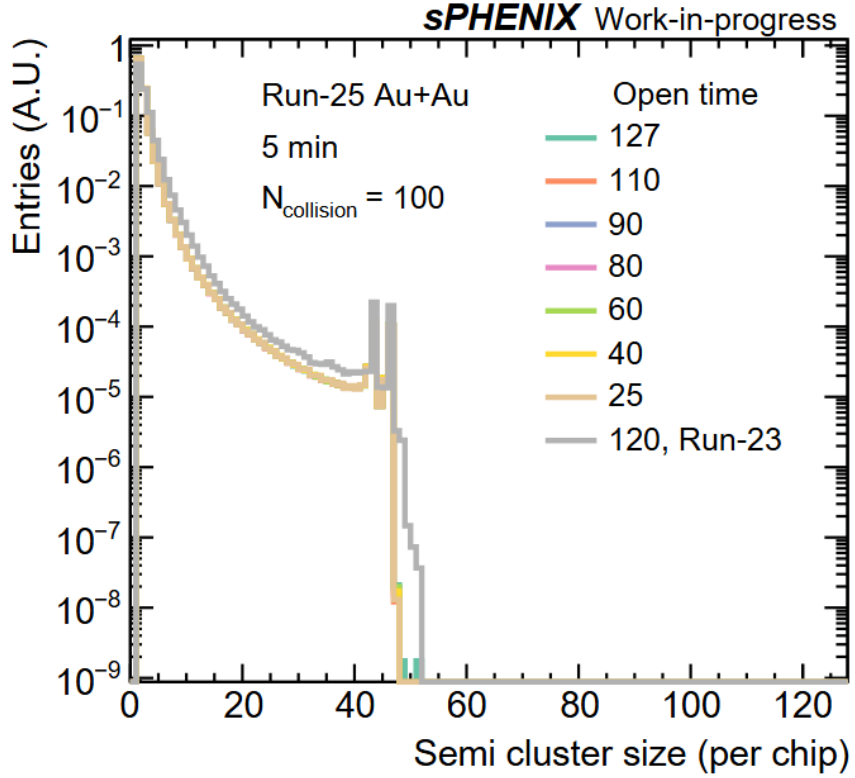
- Title: “Investigation of the Saturation Behavior of the Intermediate Tracker Chips in sPHENIX”
- Compare runs with different n_coll and open time values to see whether it is FELIX server parameters that cause the issue
  1. There are 128 channels for a FPHX chip. However, there is a peak around 71 in the #Hits distribution, and it is like a saturation behavior
  2. Also, there is similar saturation in cluster phi size distribution
  3. The hit multiplicity (total hit per event) has nothing to do with this saturation issue
  4. The ADC (per hit) distribution of chips with #Hits $\geq$ 68 (saturation) is different from that with #Hits < 68 (normal)
  5. Down to ladder level, the mean value of #Hits distribution of each ladder shows similar tendency, except for a ladder (F2_Fch4) we masked in the online map afterward
  6. I compare several runs with different open time and n_coll value, but they seem to have nothing to do with saturation issue -> now saturation issue is down to chip level

#Hits and cluster size

- Each run (67542, 67544, 67545, …, corresponding to n_coll = 100 and different open time value) has same distribution

Presented in Jul. 11

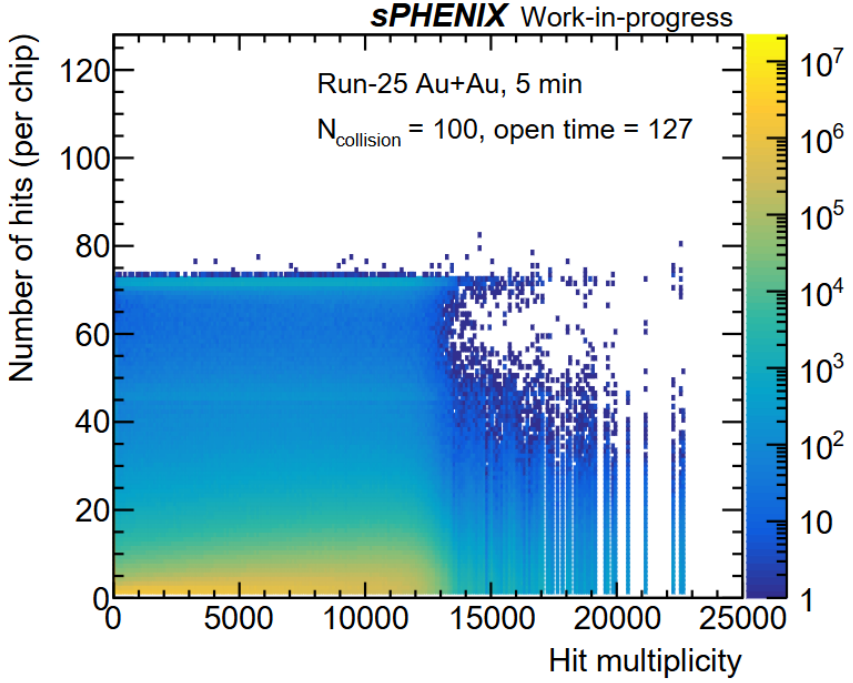


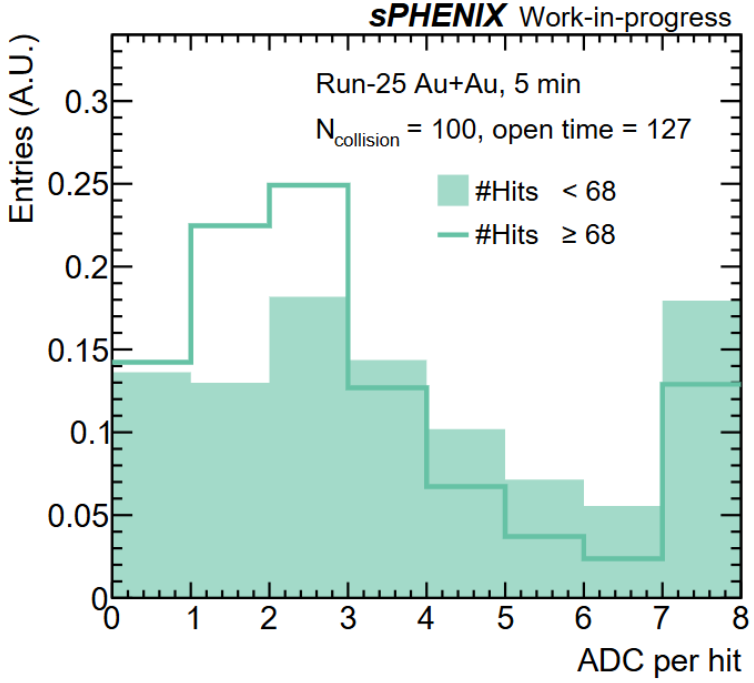


Hit multiplicity and ADC

- Take run 67542 (n_coll = 100, open time = 127) for example
- (left) Hit multiplicity (total hit per event) seems to have nothing to do with #Hits saturation
- (right) #Hits = 68 as a threshold, plot the ADC distribution per hit for #Hits < 68 (filled) and that for #Hits ≥ 68 (line)

Presented in Jul. 11 and 31

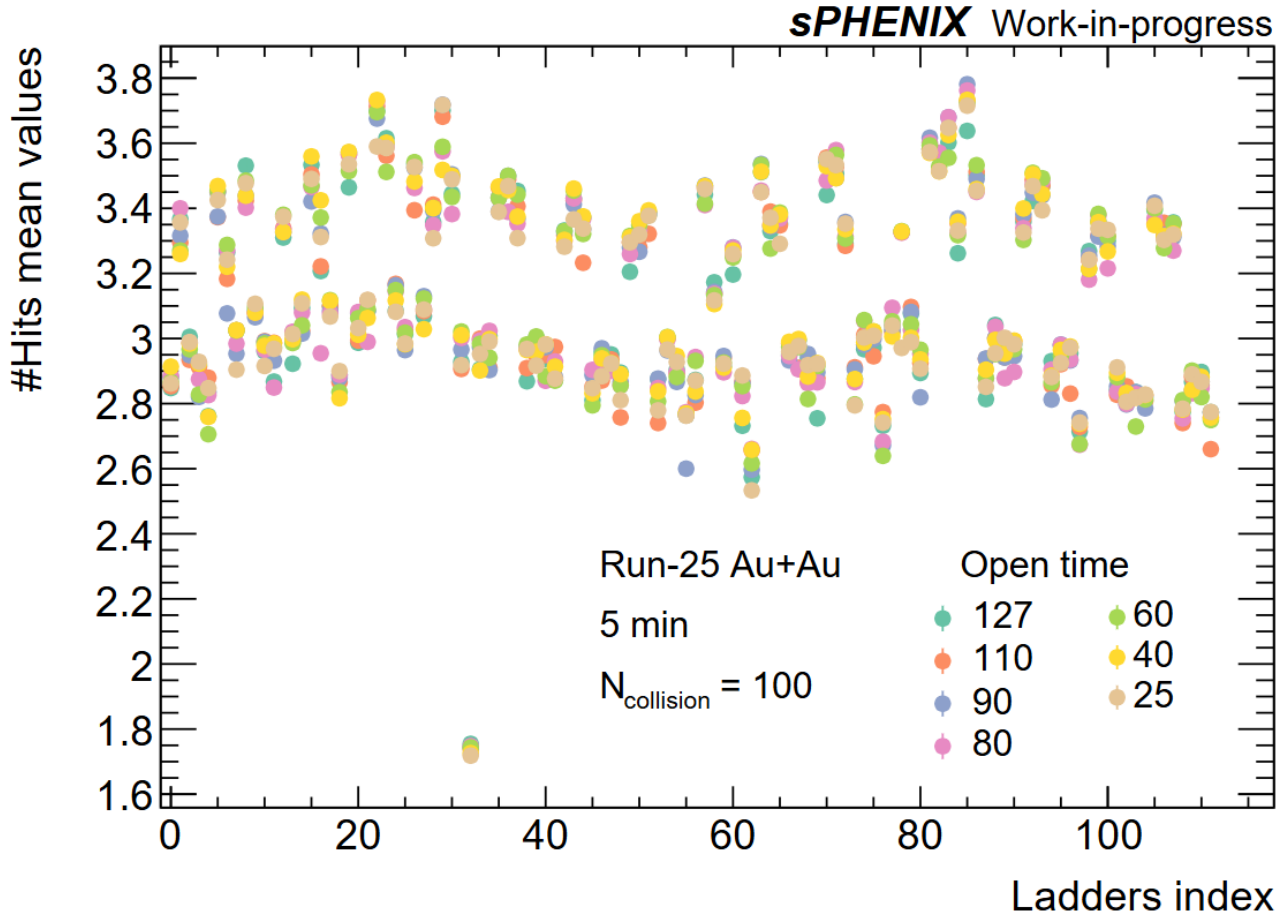




Mean value of #Hit

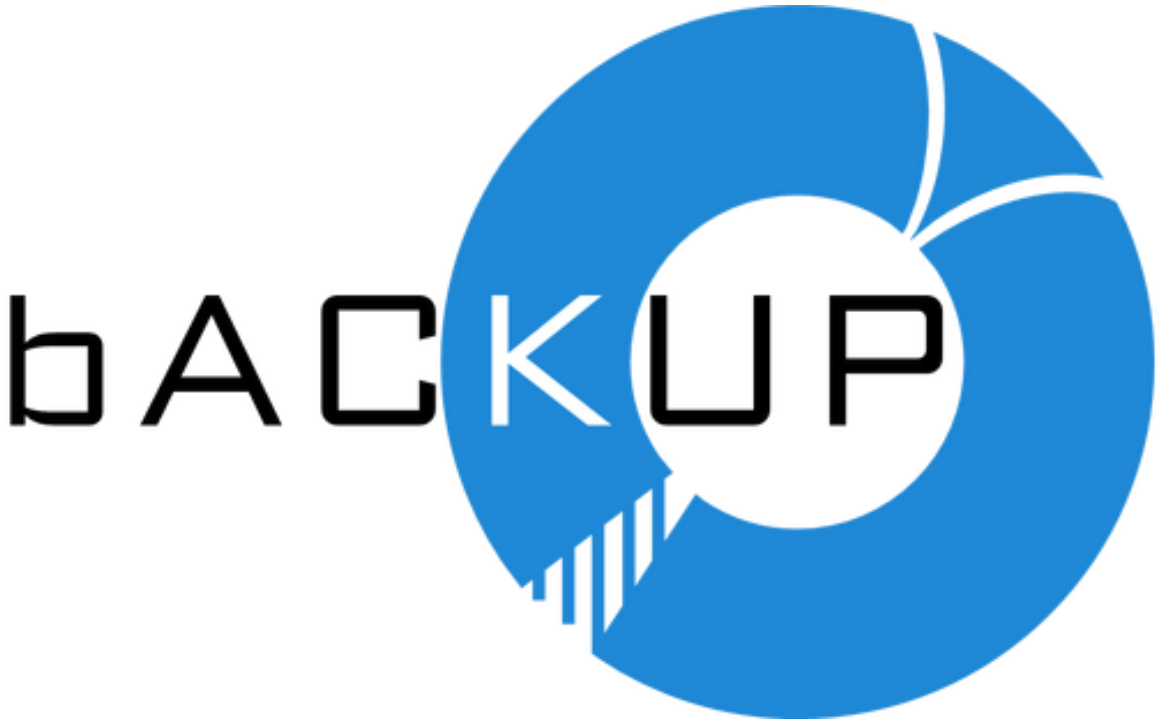
Presented in Jul. 31

- Stack the #Hits distribution of 26 chips, the distribution becomes ladder level
- Similar tendency for all of the ladders, except F2_Fch4 (ladder = 32)
  - We now mask this ladder in the online map



Summary

- I request work-in-progress for the plots shown in slide 3-5, and they will be used for APR
- The same plots might also be used in my TPS2026 (Taiwan Physics Society, Jan. 13-15) poster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