

Summary of activity

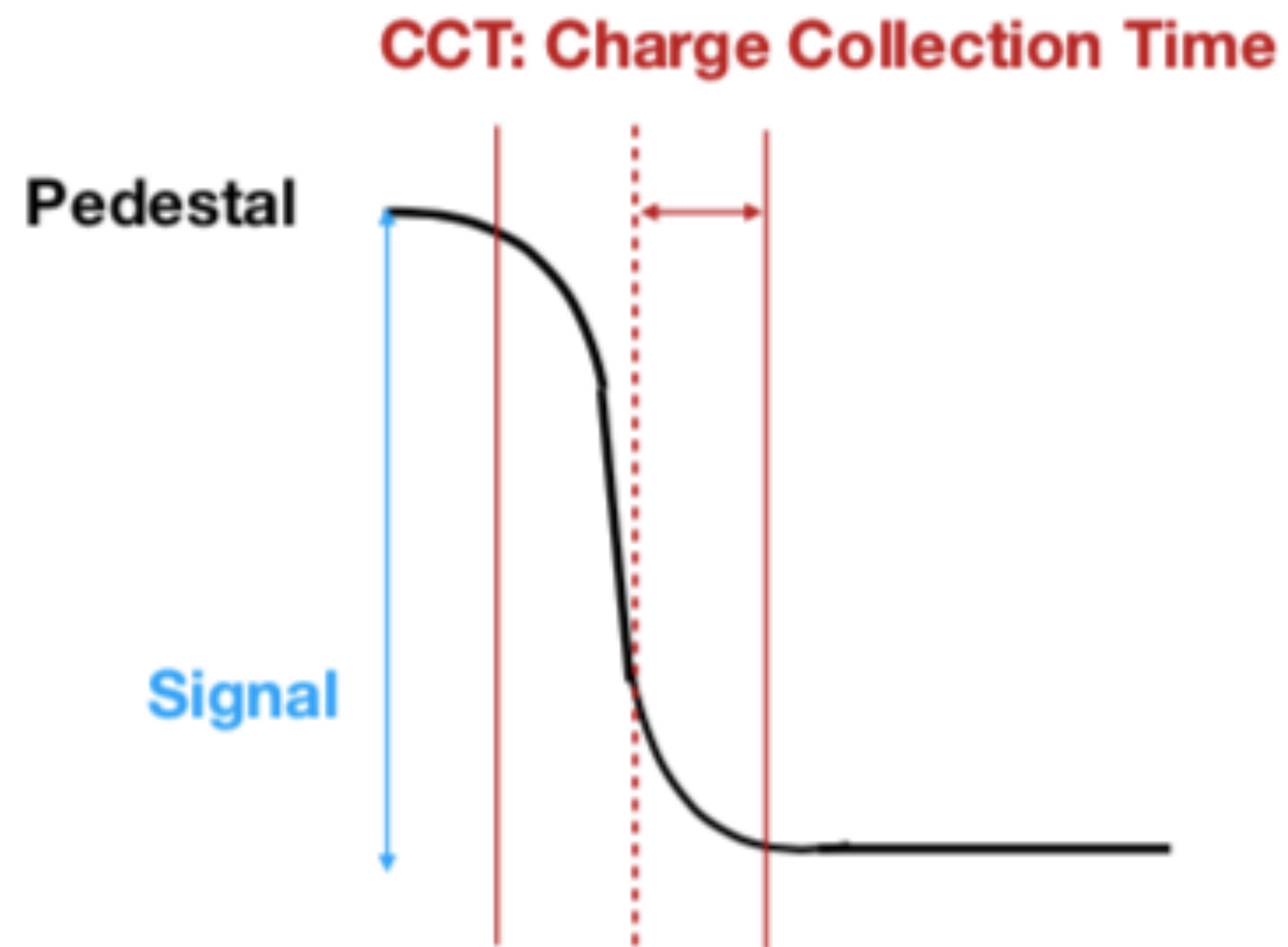
Jihye Jeong

05/01/2020

Service job

- Reception test
 - Almost everyday from end of the June to August
- Shift
 - Did the 6 sets of shift from July to December
 - Planning to do one more shift

Investigator



- CCT: The time how fast the electrons are collected.
- Reproducing the experimental result of the Investigator test chip by the simulation.
- Garfieldpp is the simulation tool based by C++ and root. We run the Garfieldpp after making the .C script.

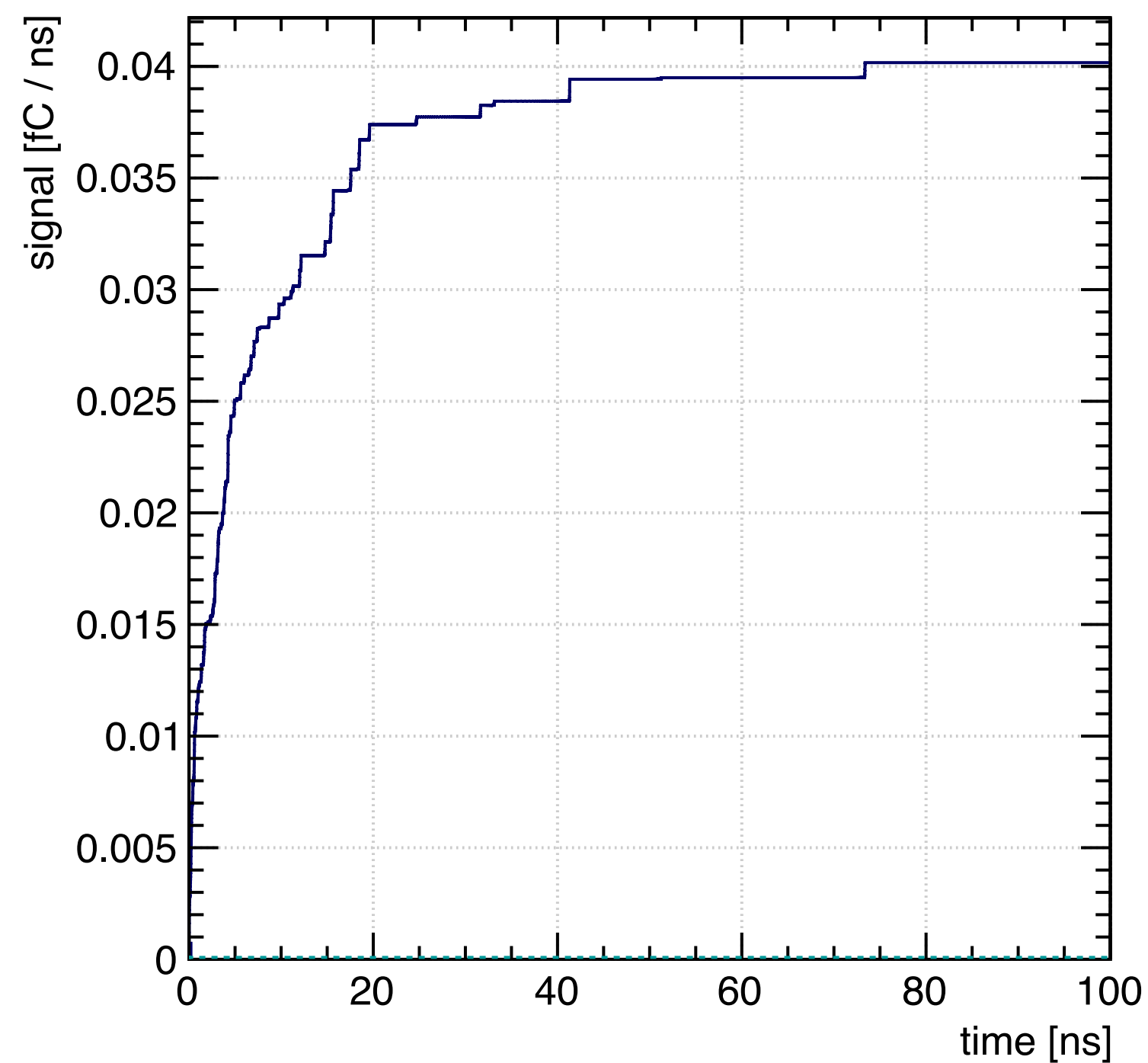
Process of simulation

- Simulate specific pixel in Investigator with TCAD
- Get E-field, Weighting potential of each pixel geometry from TCAD (Until now, Jan helped TCAD process)
- Modify the C code for Garfield++ simulation
 - With specification of the pixel to simulate
- Simulate by Garfield++ with result of TCAD in KIAF
- Get the output by txt file
- Draw the histogram by root with output.txt file

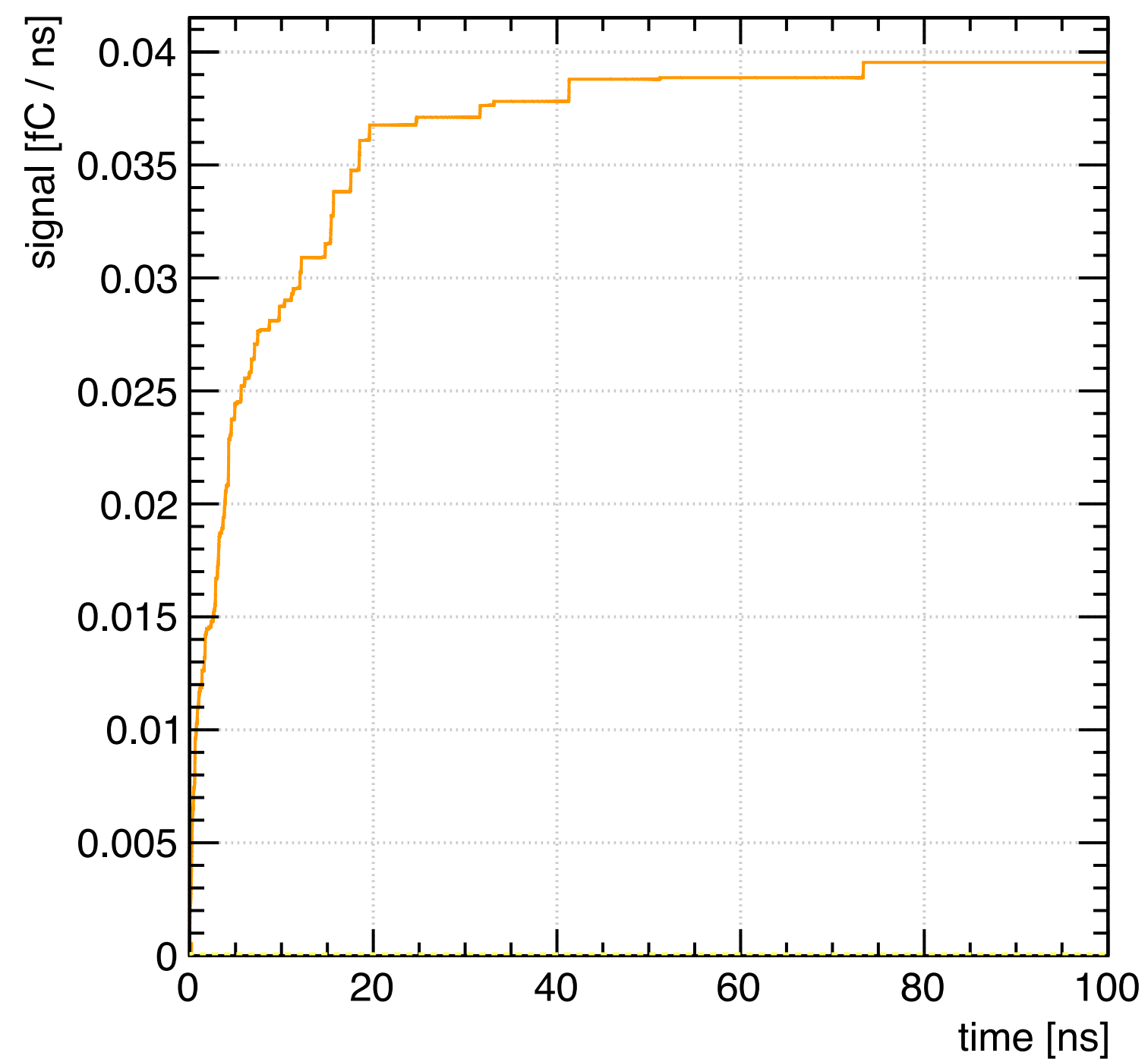
Simple Simulation by Garfieldpp

- Example of the simulation result: Signal Integrated
- Result of simulation is random
- After starting to draw the histogram, rarely see these signal graphs

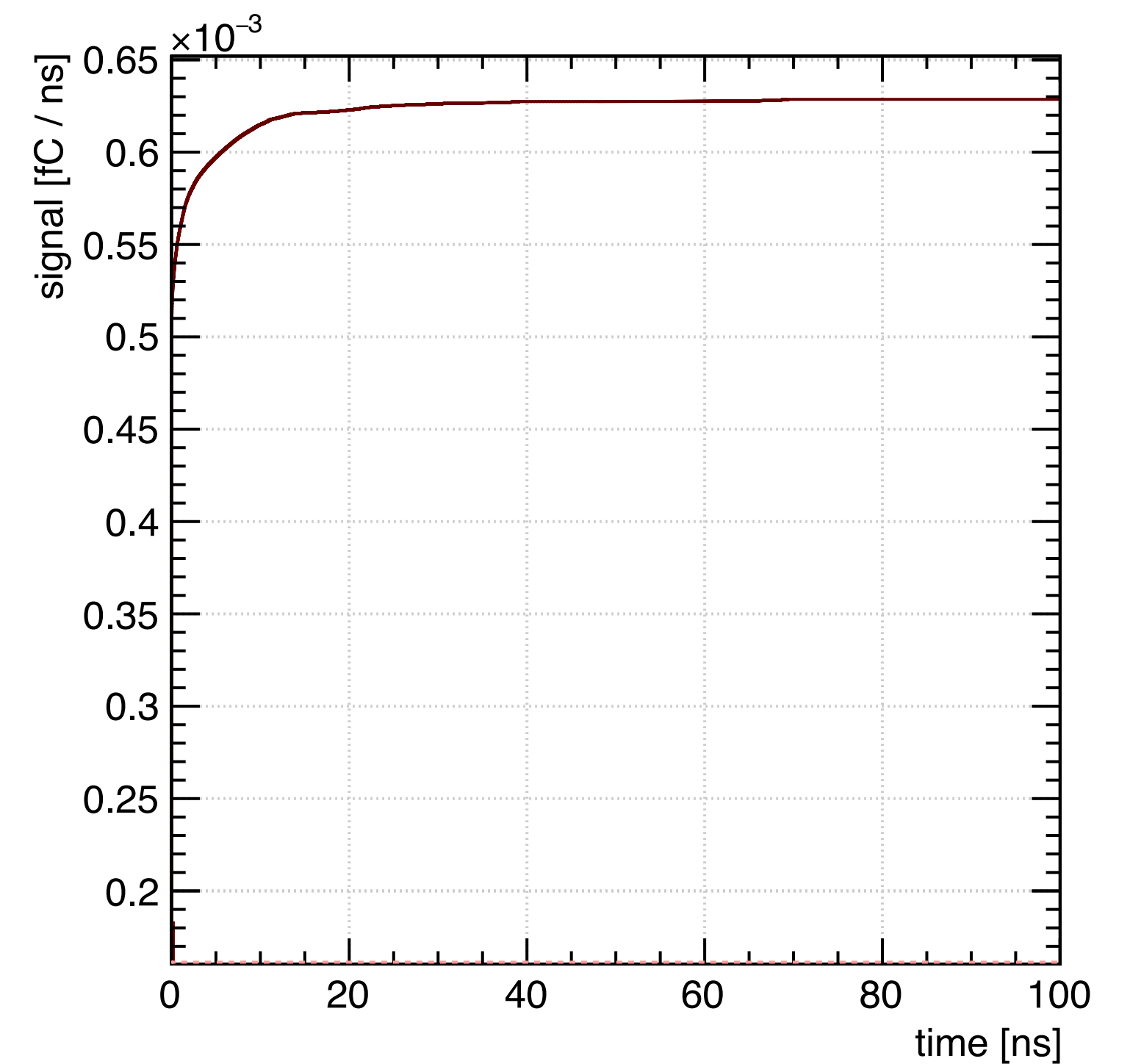
Total signal



Electron signal



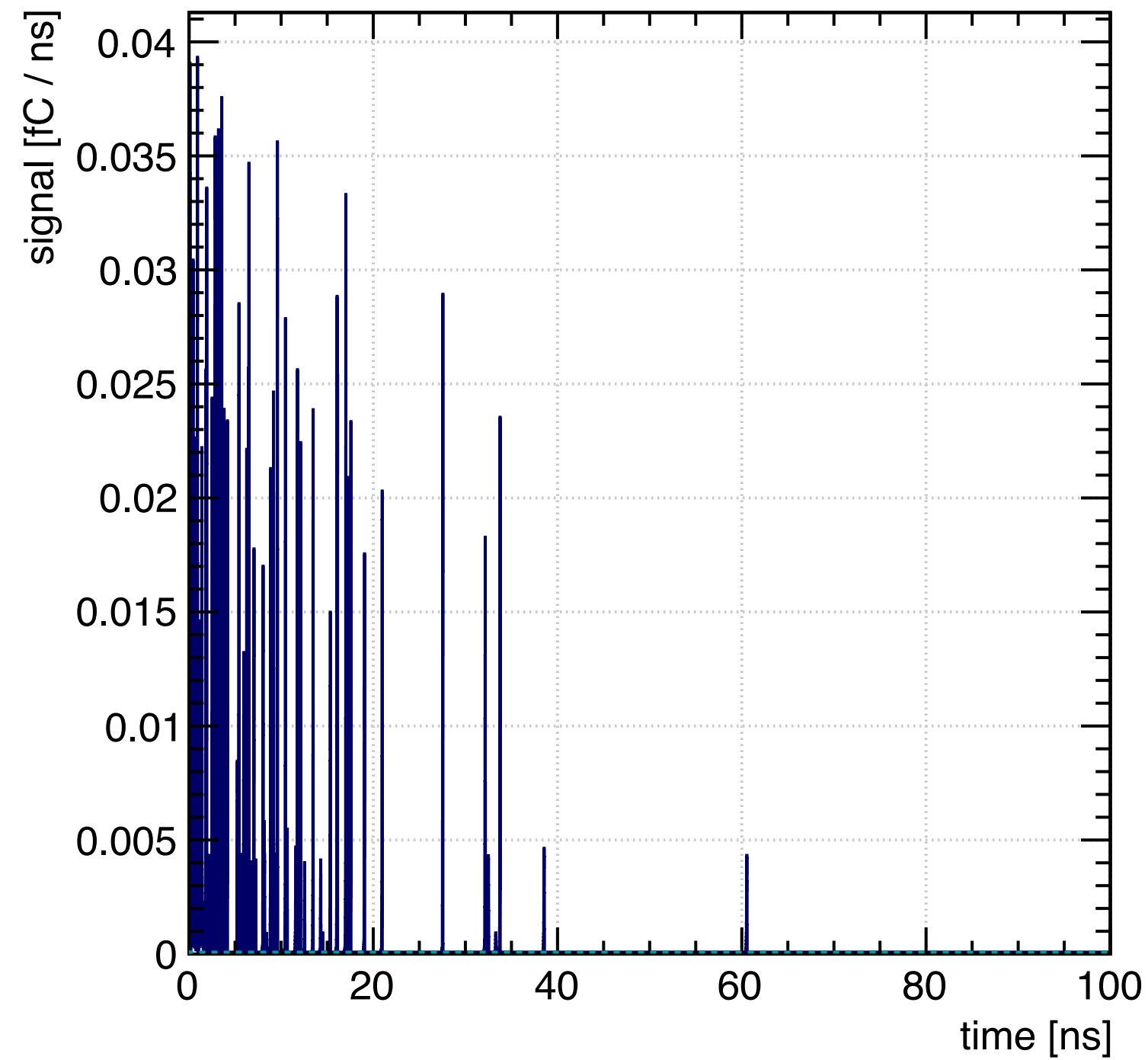
Hole signal



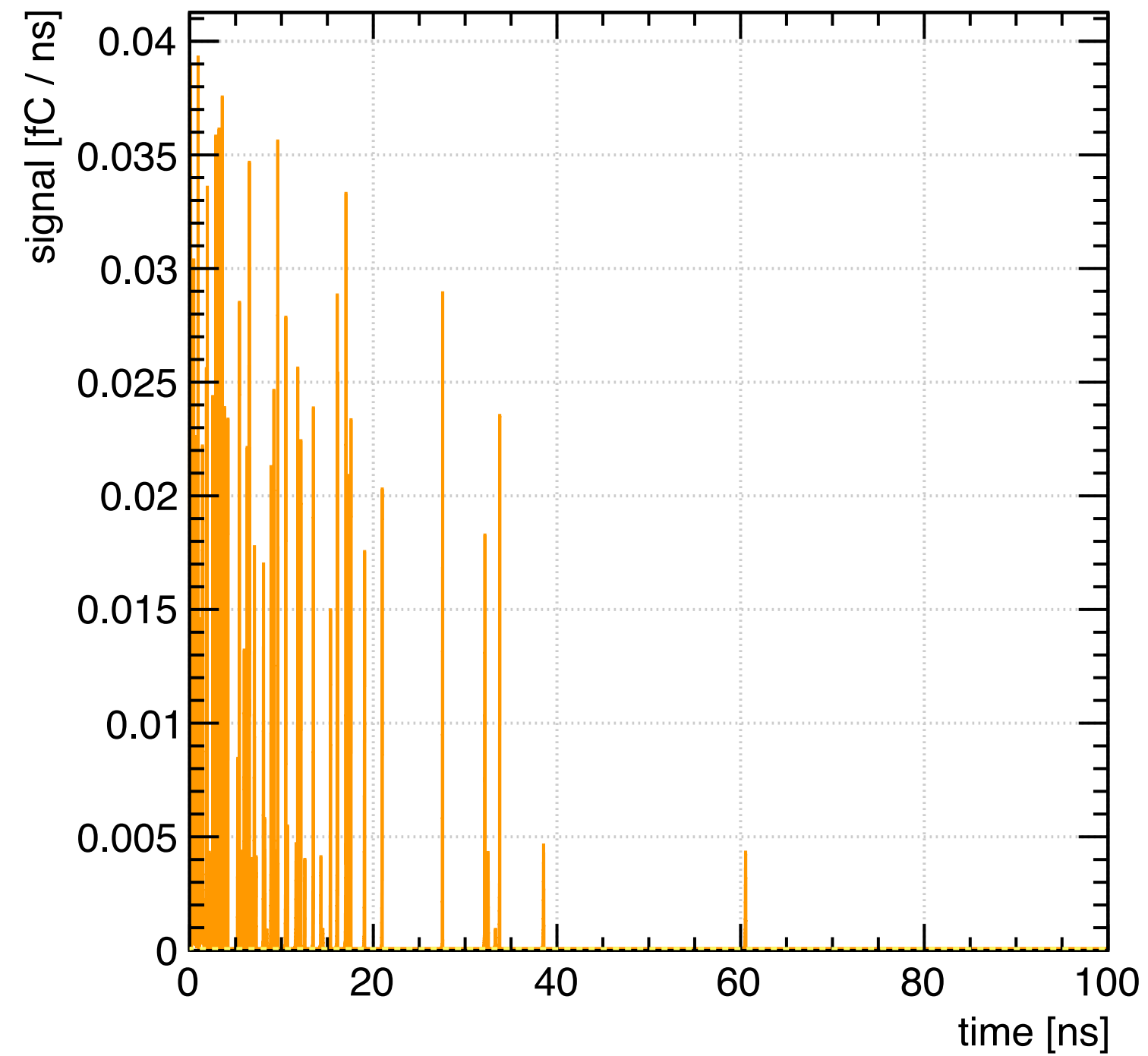
Simple Simulation by Garfieldpp

- Example of the simulation result: Not integrated
- Result of simulation is random
- Usually don't see these graphs

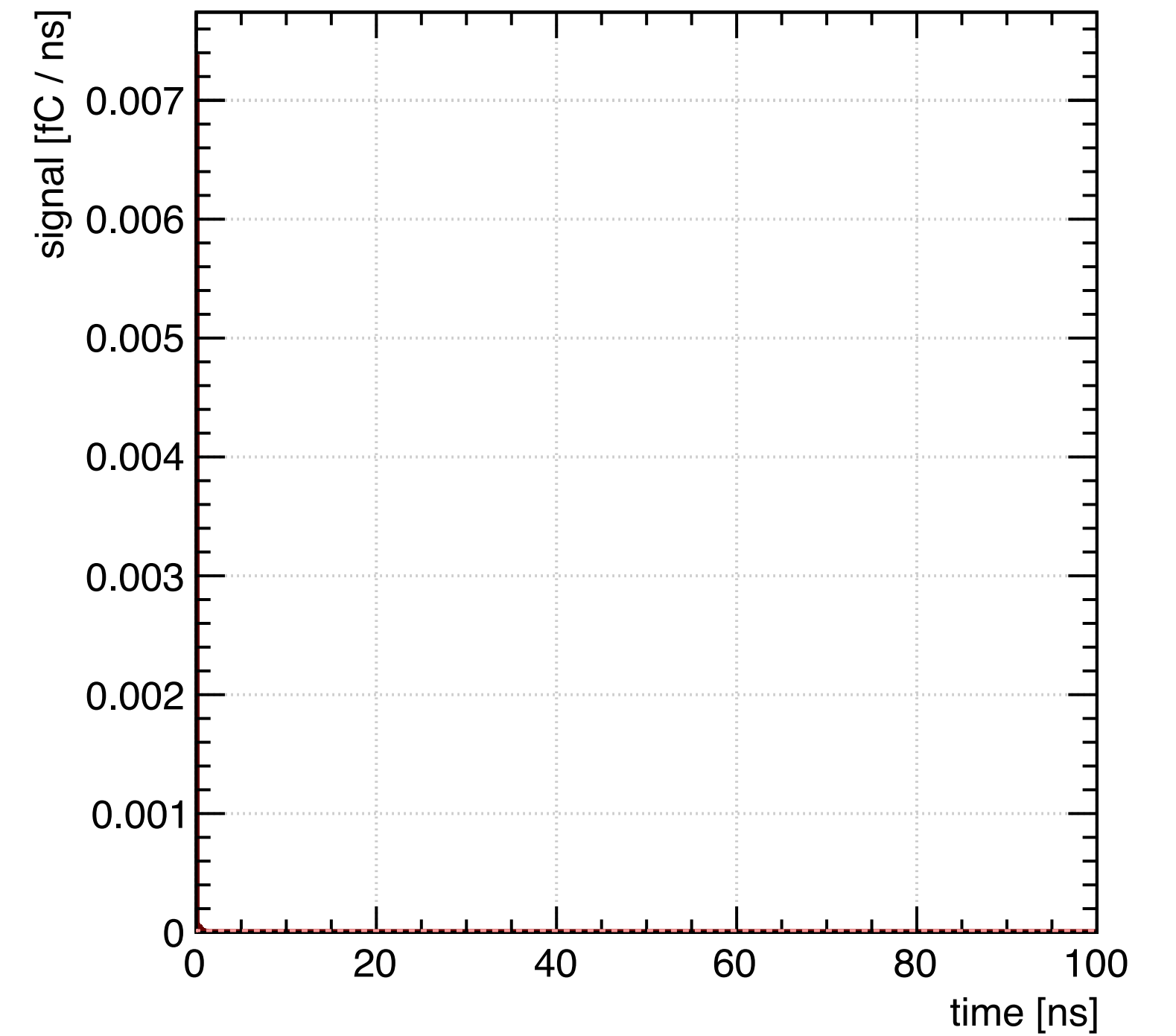
Total signal



Electron signal

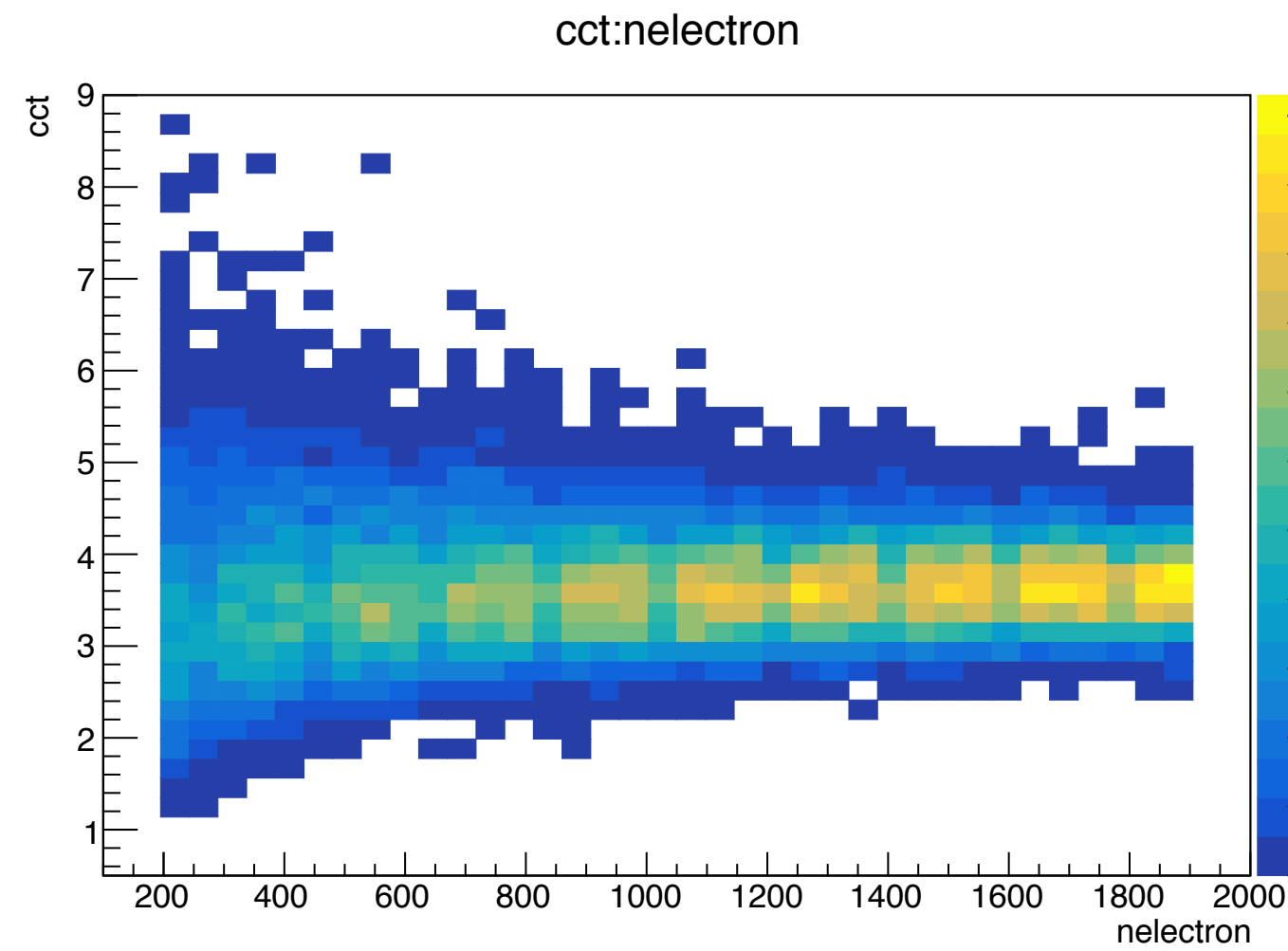


Hole signal

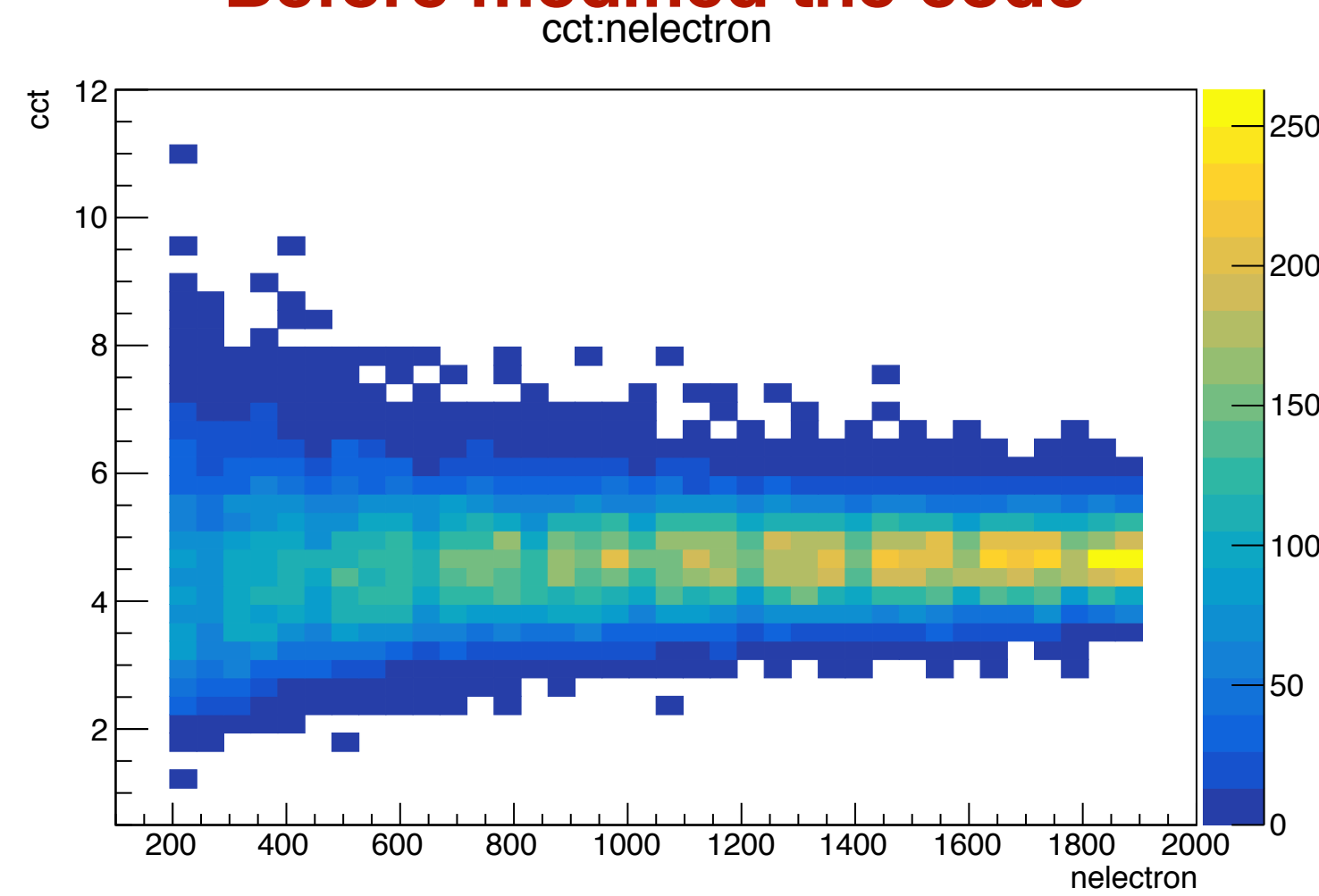


Comparing: pixel pitch(VBB -6V, nwell 3um, spacing 1um)

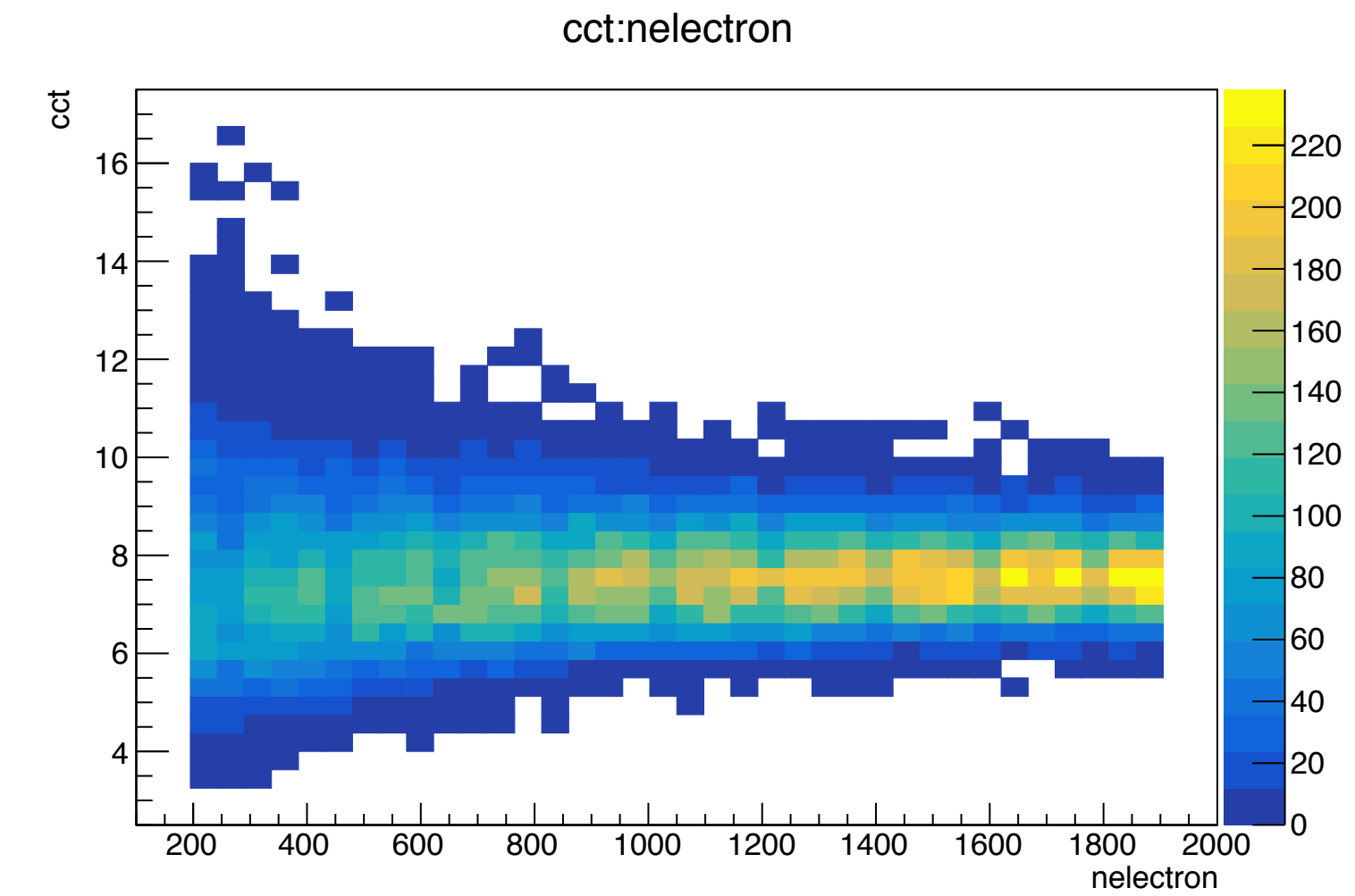
Before modified the code



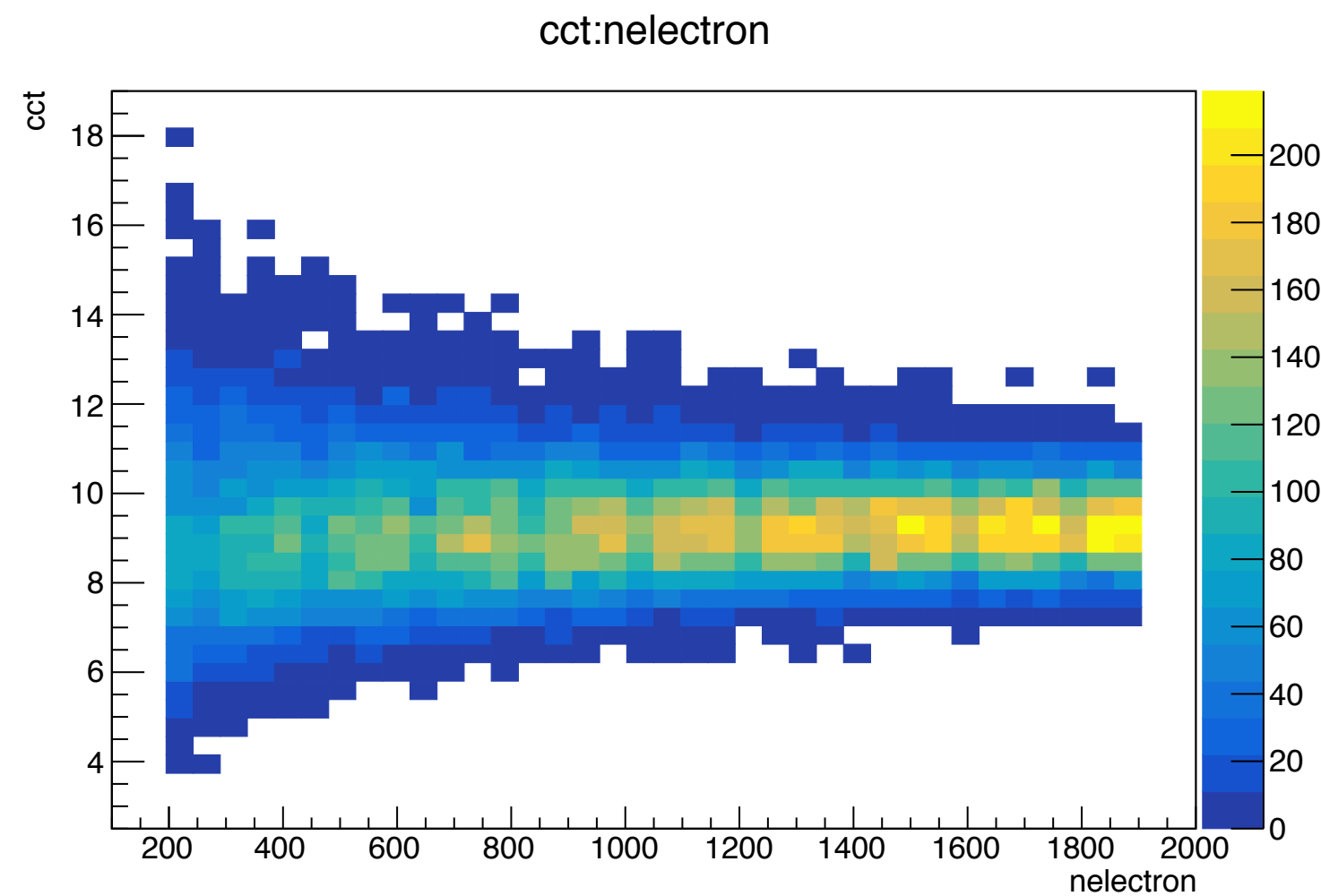
Pixel pitch: 20um



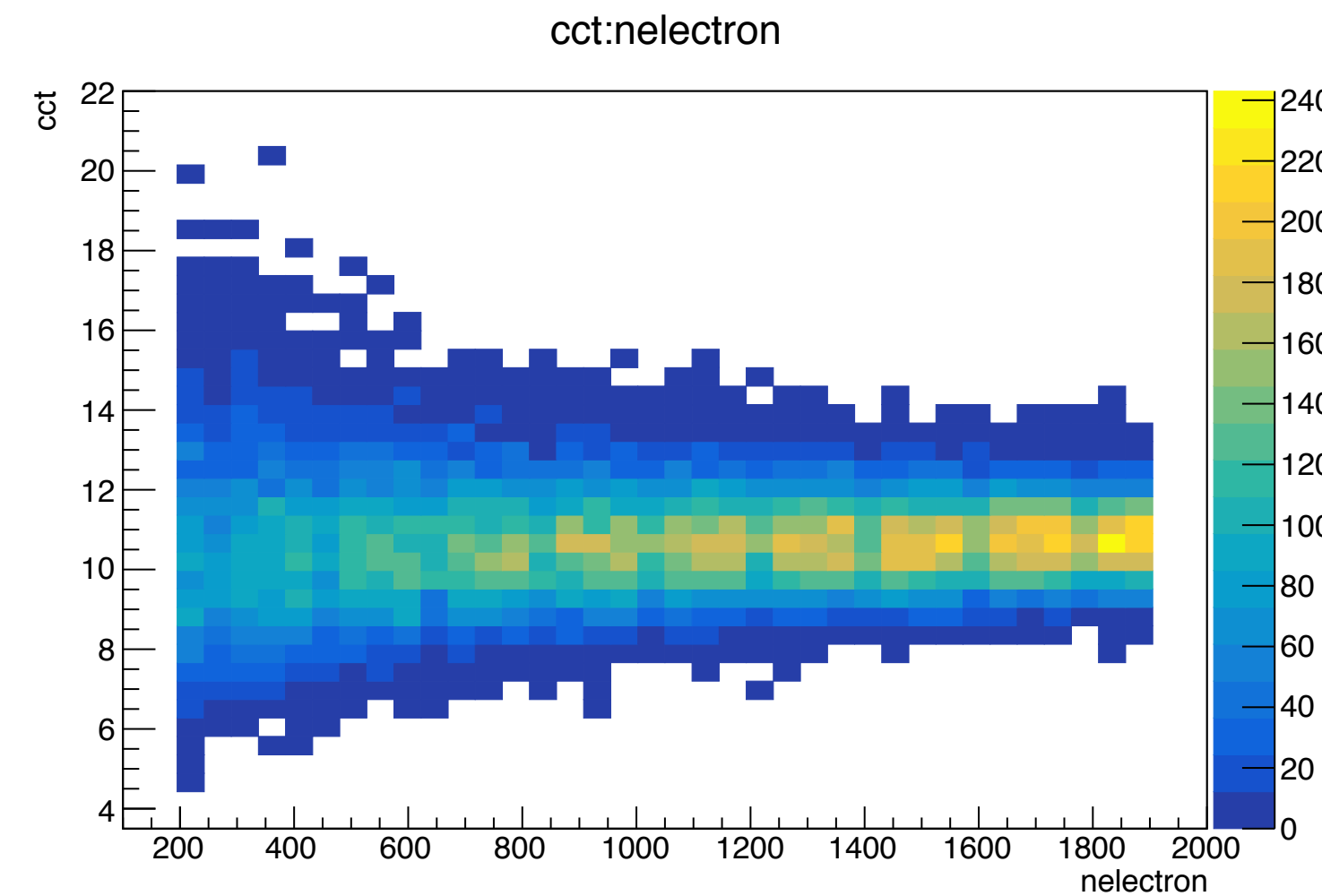
Pixel pitch: 22um



Pixel pitch: 25um



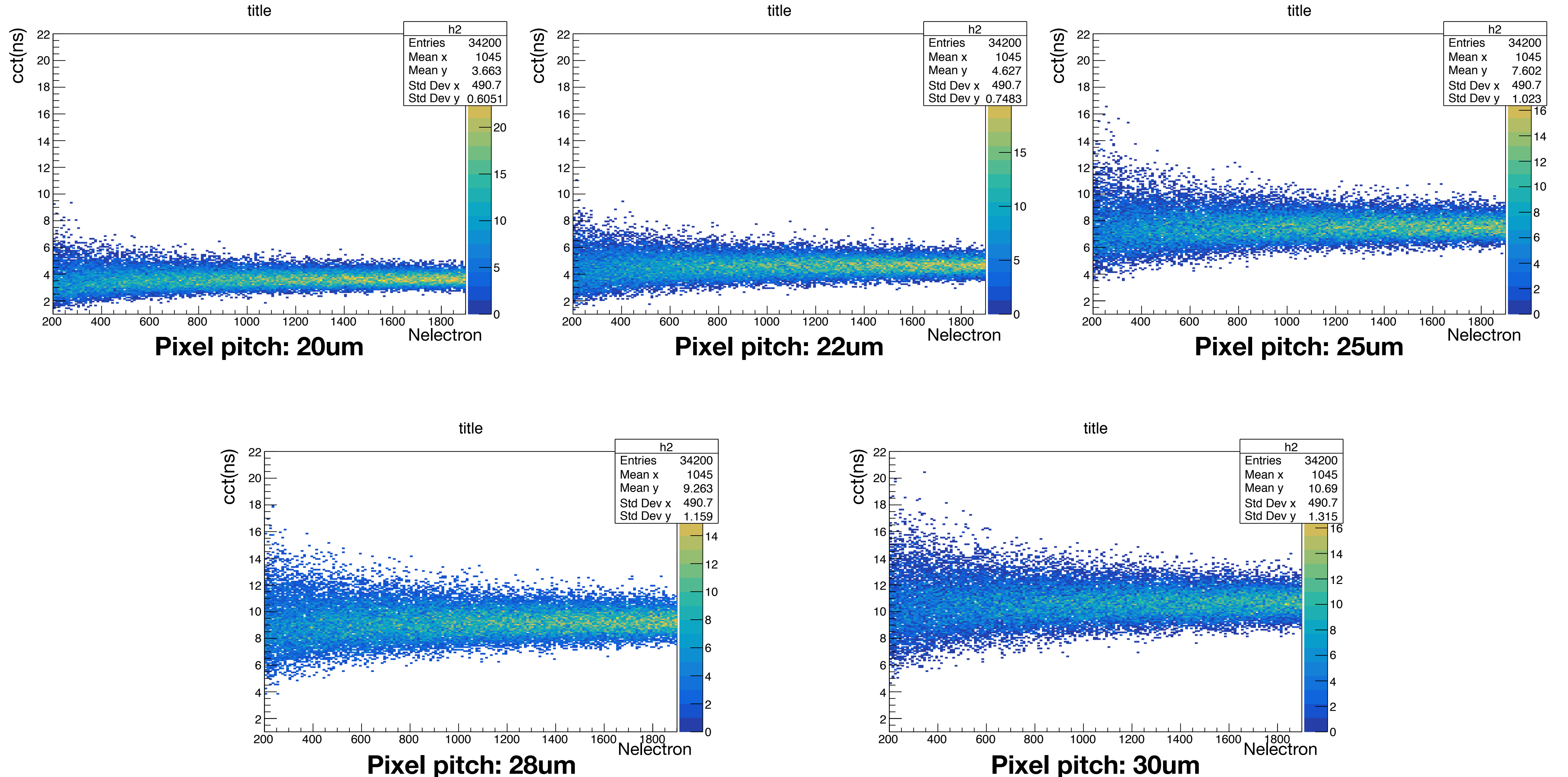
Pixel pitch: 28um



Pixel pitch: 30um

Pixel pitch increased-> pwell get wider(The region except depletion region get larger) -> Charge collection time increased

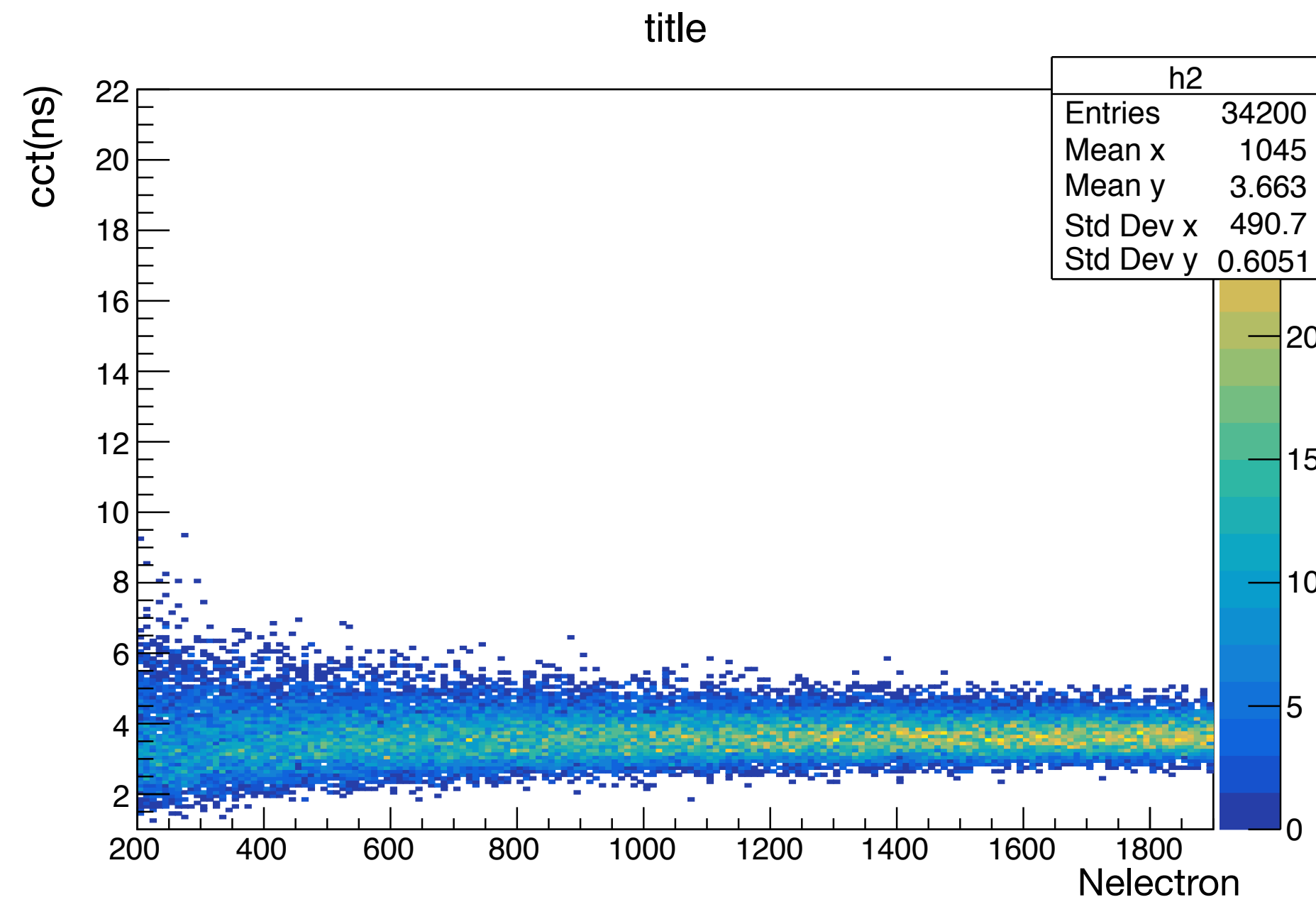
Comparing: pixel pitch(VBB -6V, nwell 3um, spacing 1um)



Pixel pitch increased-> pwell get wider(The region except depletion region get larger) -> Charge collection time increased

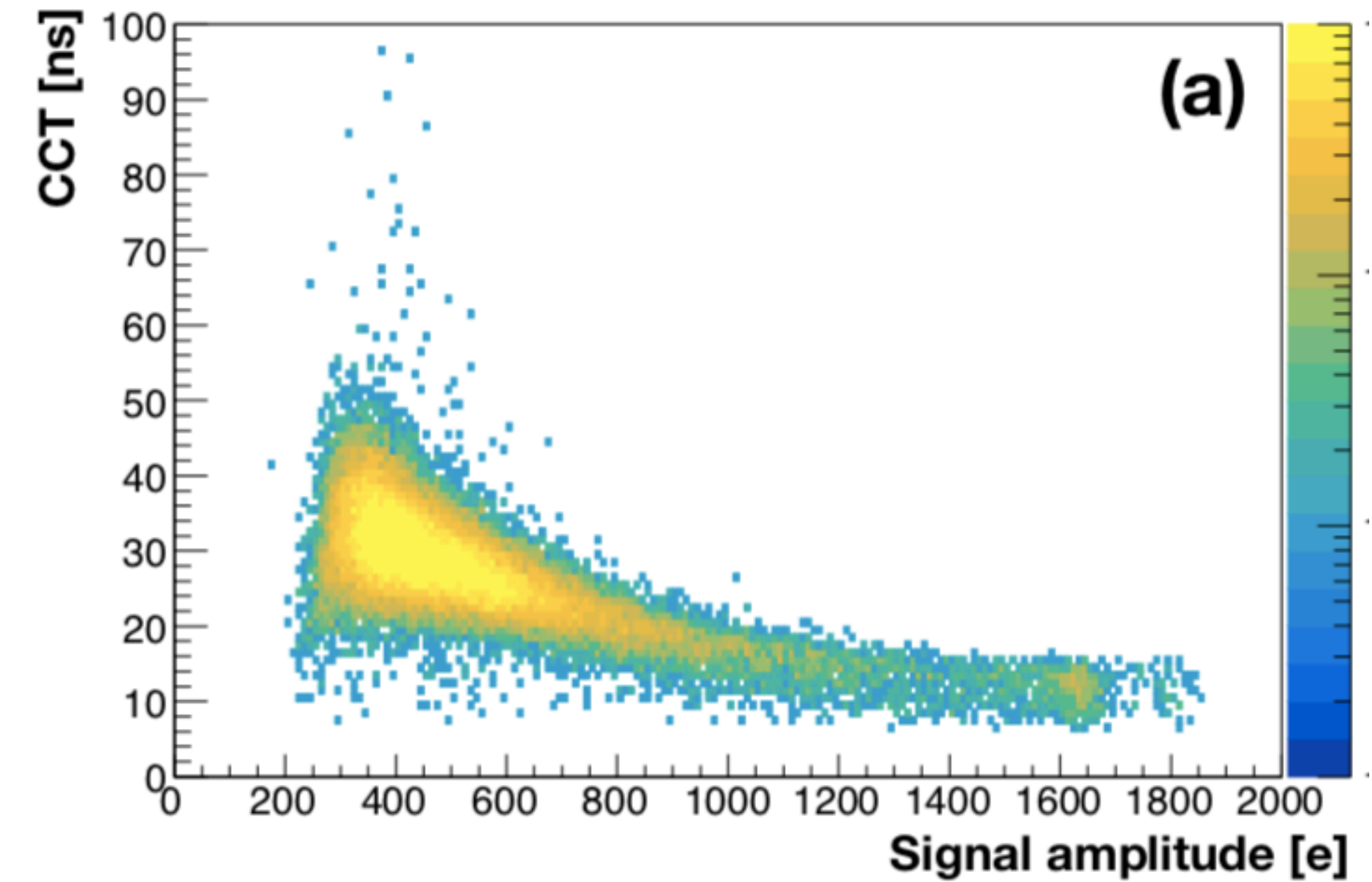
CCT simulation_comparing

Simulation



Pixel pitch: 20um
Nwell size: 3um
Spacing: 1um
Expitaxial layer: 18um
Substrate: 20um
VBB: -6V

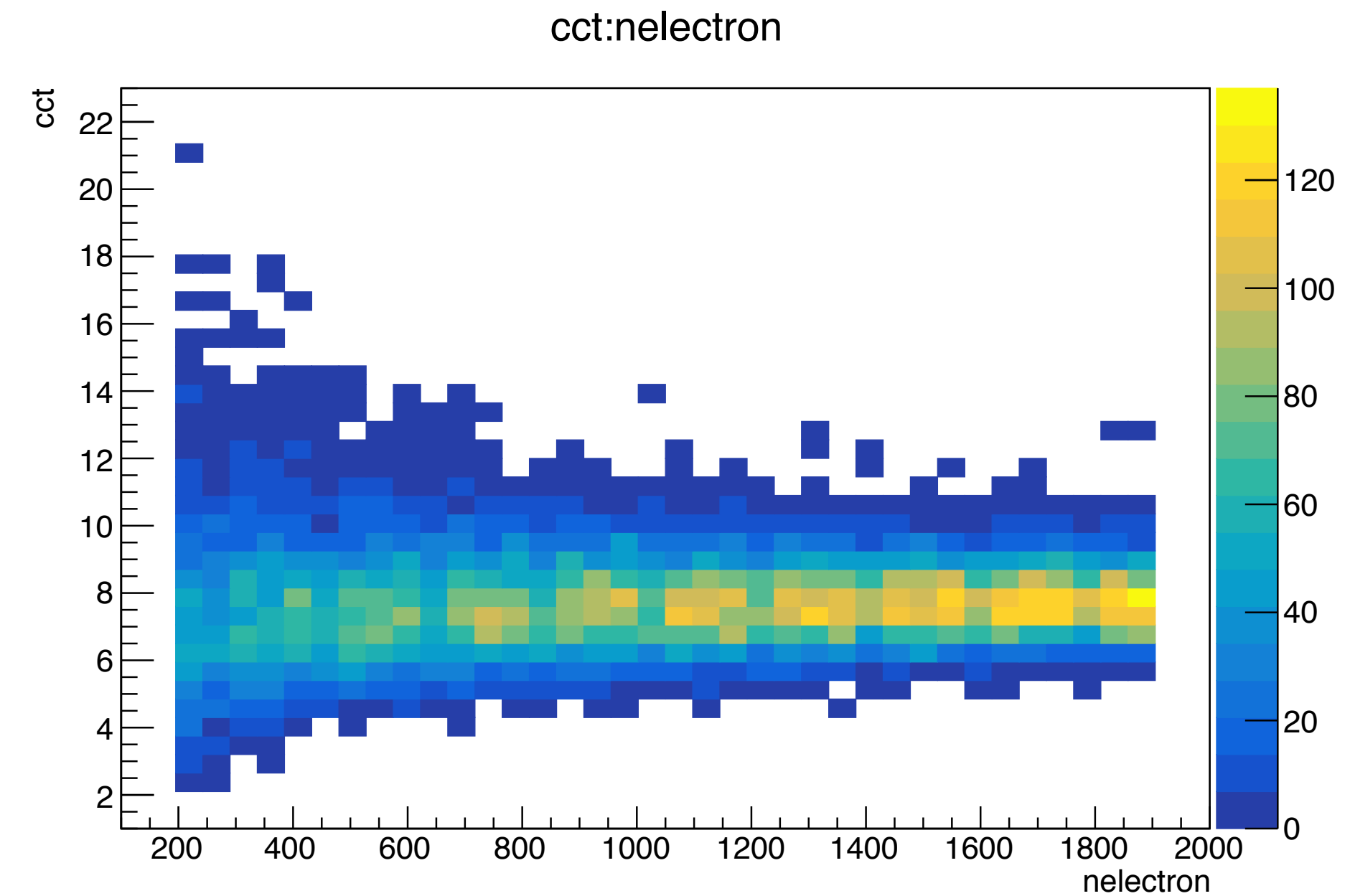
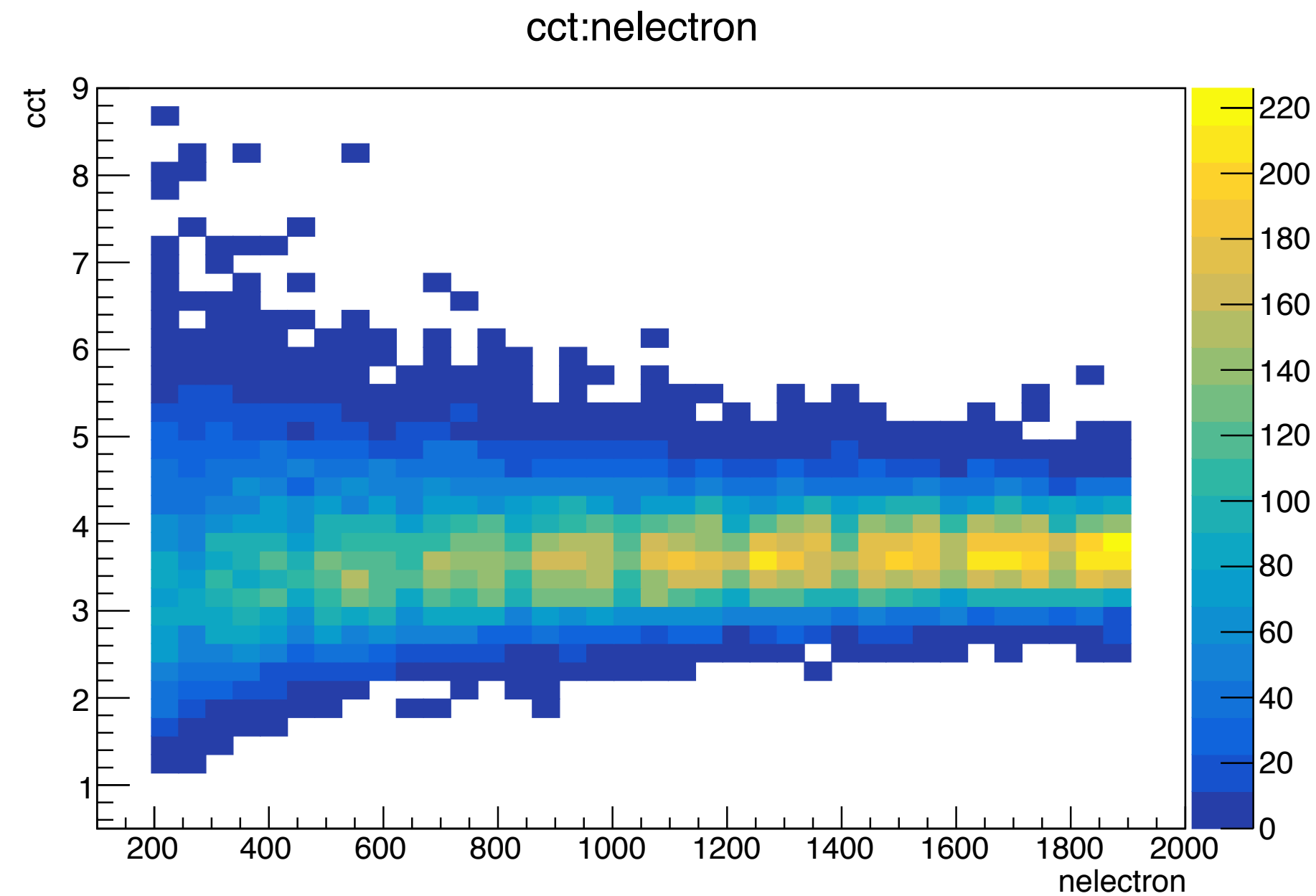
Experiment



Pixel pitch: 20um
Nwell size: 3um
Spacing: 1um
Expitaxial layer: 18um
Substrate: 20um
VBB: 0V

CCT simulation_Issue

Trying to figure out about low values



- Pixel pitch: 20um
- Bin size: 0.1
- Nruns: 200
- After modified the definition of CCT
 - $CCT=(1/2)dx$ between 0.1~0.9 of Maxsignal
 - Values are **too low**

- Pixel pitch: 20um
- Bin size: 0.0001
- Nruns: 100
- Before modified the definition of CCT
 - $CCT=dx$ between 0.2~0.95 Maxsignal의
 - Values are high

Status update

- Setting of Garfield simulation was almost done.
- Some additional simulation was done. Will be updated after finding internet.
- Planning to talk about difference between simulation and experiment with Miko in this week.
 - Low values
 - Shape of the histogram