What we did in Japan

6.20 ~ 6.25

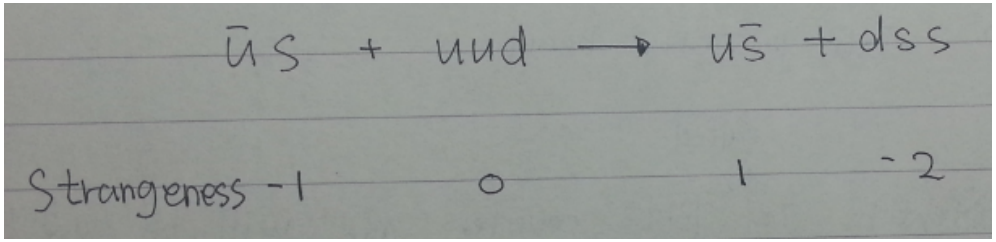
Tohoku University

E07 Experiment

The purpose of this experiment is the study of double strangeness nuclei.

Let K^- beam go to the diamond target.

$$K^- + {}'p' \rightarrow K^+ + \Xi^-$$



There is a called emulsion counter in front of diamond target and strangeness −2 Xi interacts with materials of emulsion counter with long and short distance.
From this, can study strong force interaction with relatively long and short distance.

I need more study to understand the physics and principle of this experiment and BH2 counter will be used for Trigger at this experiment.

BH2 Counter

Trigger has to give us accurate time information.

So we learned and studied how to calculate the intrinsic time resolution of BH2.

There was two BH2 candidates for trigger and we calculated which one has better time resolution.

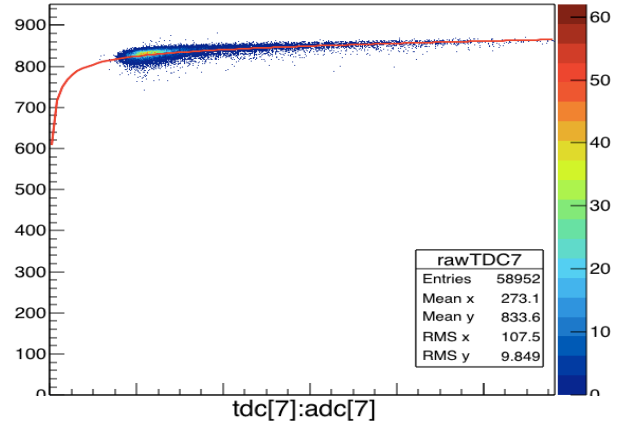
Intrinsic Time Resolution

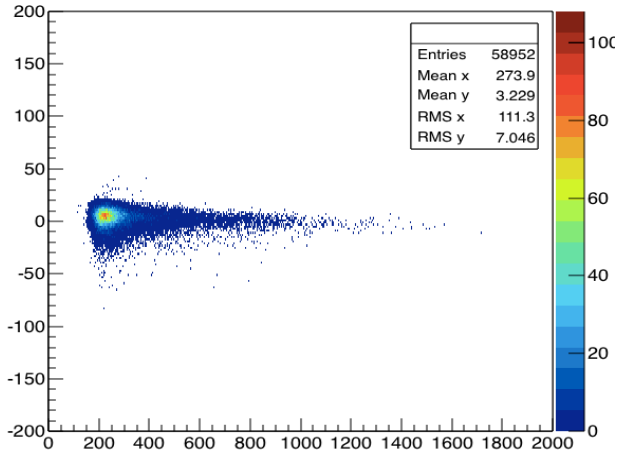
I. Choose good event sets.
(Can be considered as signals by beam, without pedestal, etc.)

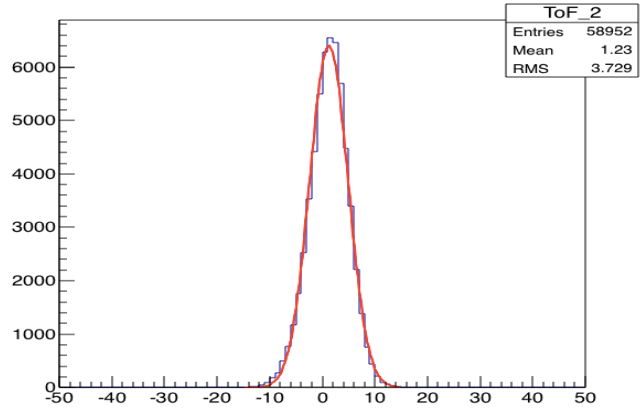
II. Slewing correction(time walk correction).

III. Calculate intrinsic time resolution through the time resolution of difference of TDC distribution with two triggers (not BH2 in this test) and BH2 counter each other.

But we got a little high time resolution than we expected. So we are studying continuously what is the cause.
Shinhyung will show detailed results.







Besides

And we met many good people, Japanese and Koreans.

Impression

One month and five days in Japan became good motivation to me. I realized consciously my knowledge about physics, computer program, English and etc is insufficient.

So I will continue my effort diligently to make good foundation for a great physicist.

Since we didn't get enough data yet for ToF detector system at our second visit, also didn't get complete result. So after I got complete results, I will also report what we studied in our second visit.

Shinhyung will also report about ToF detector system setup and data analysis of current status.

BACK – UP

Trigger has to give us accurate time information.
Trigger가 Gate를 만들어 TDC값의 기준을 주기 때문에.

I. Choose good event sets.
빔에 의한 event인가를 보기 위해 빔 영역 바깥으로 들어온 signal을 제외시키기 위한 buffer counter를 놔둠.
ADC값에 기본적으로 깔려있는 signal로 빔 없이 random Gate를 만들어 측정.

II. Slewing correction.
신호의 크기가 작으면 threshold에 의해 TDC가 실제 타이밍보다 늦게 값이 기록되게 되는데 이것을 보정하는 correction. ADC가 작은 값일수록 큰 TDC를 빼주는 피팅을 이용하여 보정한다.

III. Calculate intrinsic time resolution
BH2 distribution으로 바로 구하지 않는 것은 이 TDC가 어디를 기준으로의 값인지 모르기 때문이다. ToF distribution으로 하면 정확한 reference time을 잡아서 빼주는 효과가 이 reference time이 결국은 상쇄되지만 들어가기 때문에 더 정확하게 계산할 수 있다.

E07 Experiment

Emulsion Counter의 C, N, O 등 가벼운 원소에는 nucleon들 사이의 거리의 order로 포획됨. 그래서 가까운 strong force interaction을 보고, Ag, Br 등 무거운 원소에는 핵과 전자 사이의 거리 order로 포획됨. 그래서 비교적 먼 거리에서의 strong force interaction을 본다. 데이터와 이론들을 비교함.