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# TPC R&D progress for CEE

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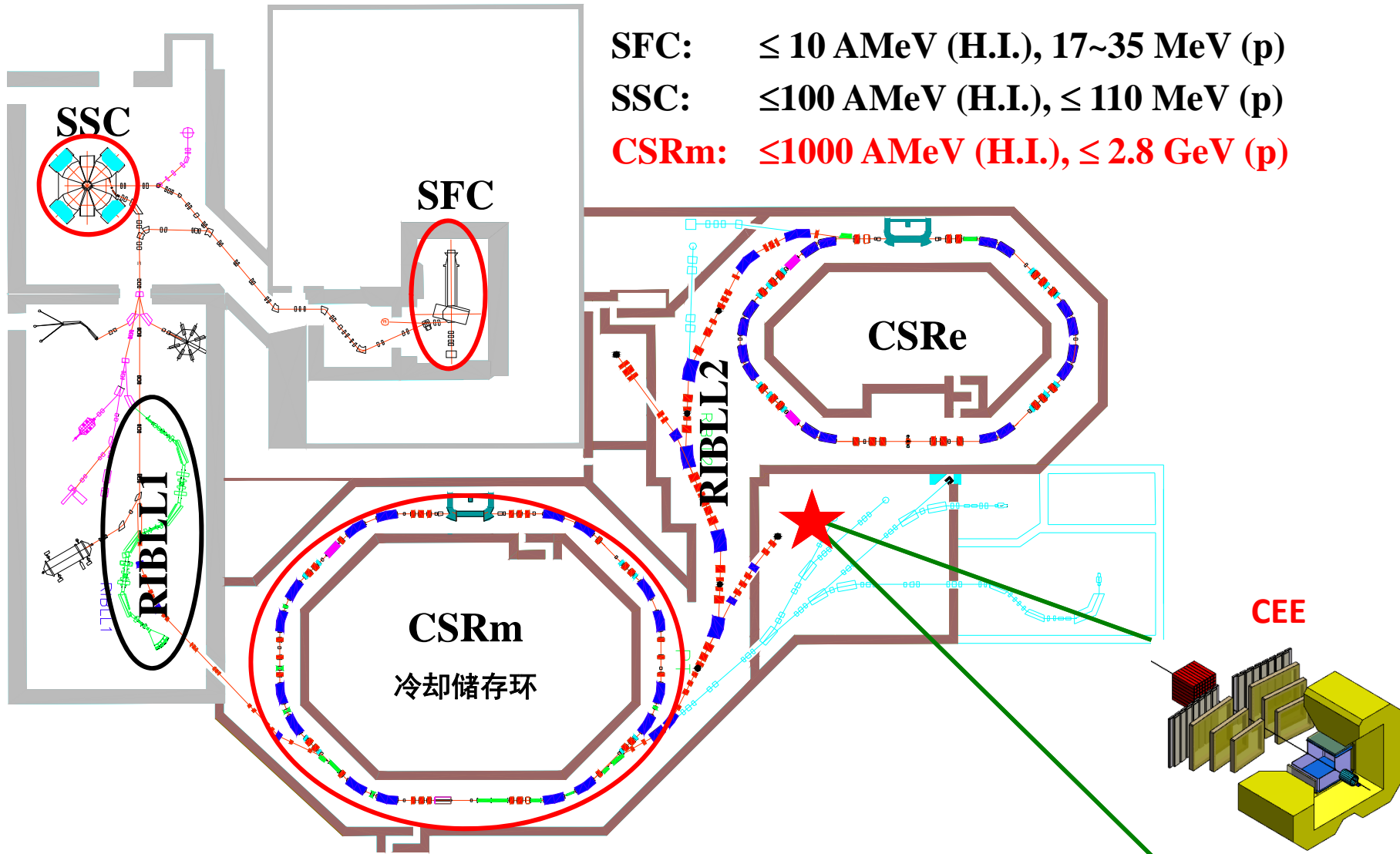
# Outline

1. Introduction of CEE
2. Simulations of CEE-TPC
3. TPC prototype
4. Summary and future plan

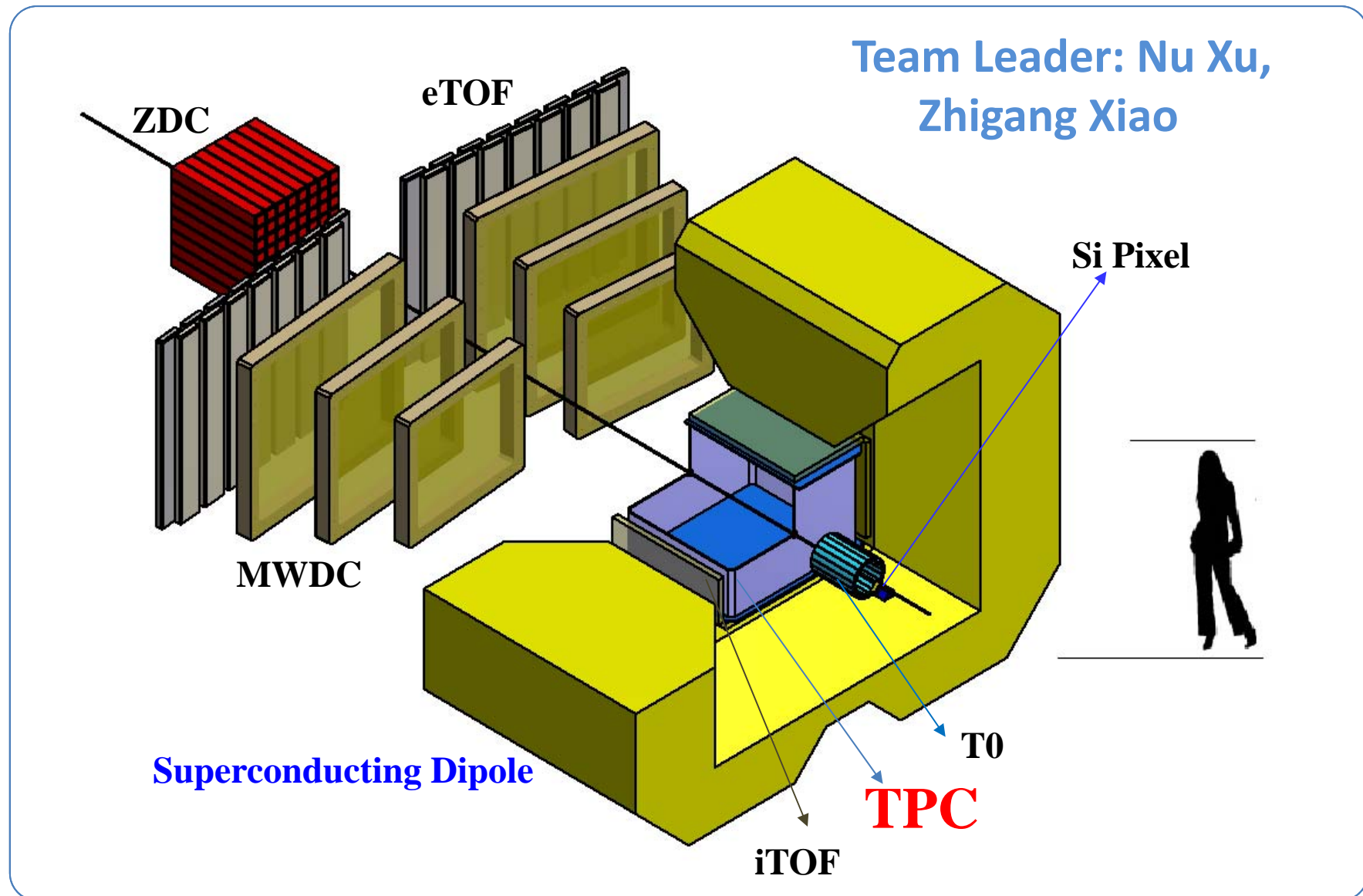
CEE

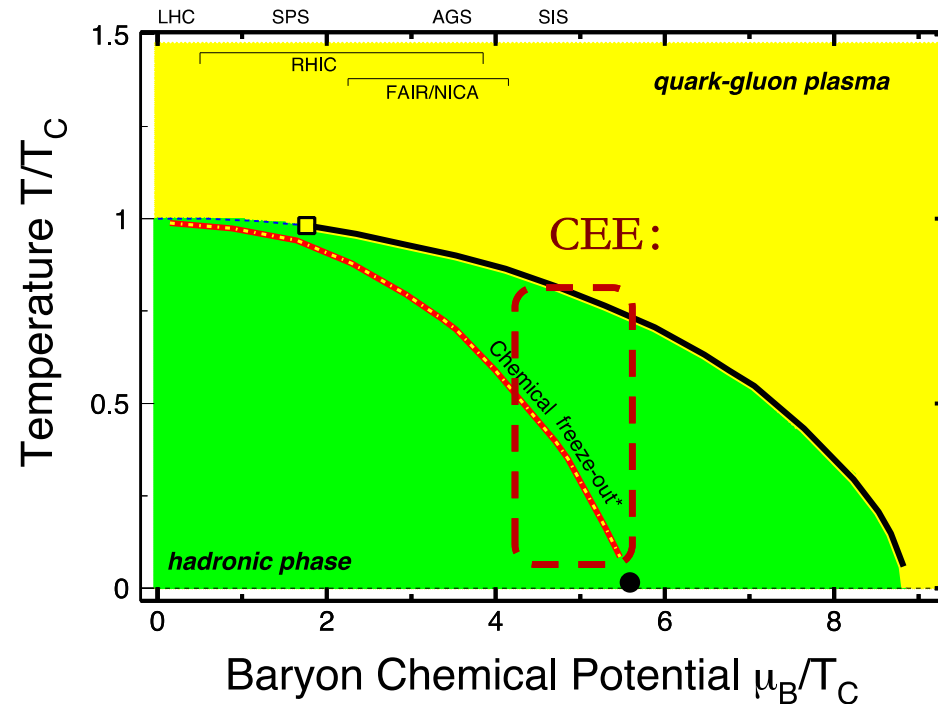
# CSR-External-Target-Facility Experiment

## Lanzhou HIRFL-CSR:

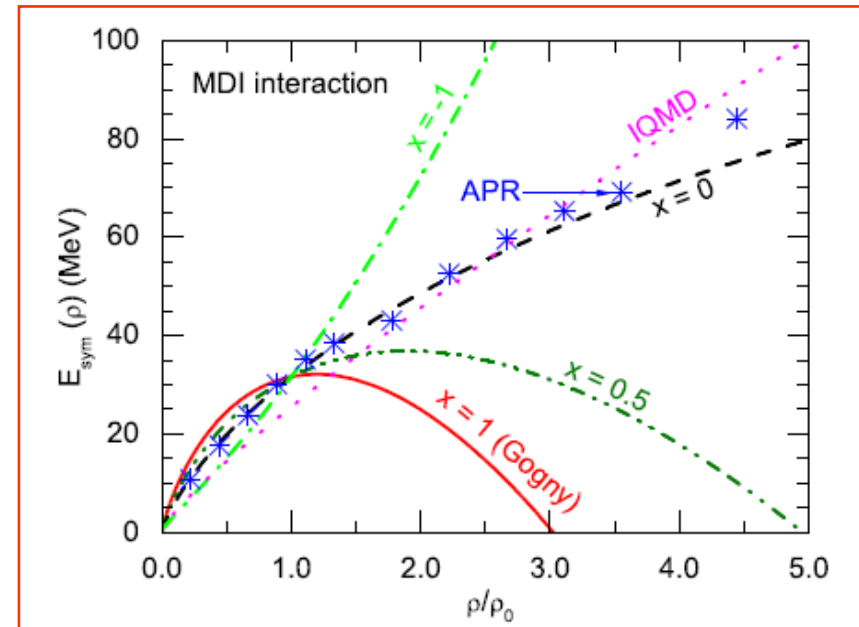


# CEE Conceptual Design



Phase Diagram of  $QCD$  :

## Symmetric Energy:



Study the cold and dense nuclear matter:

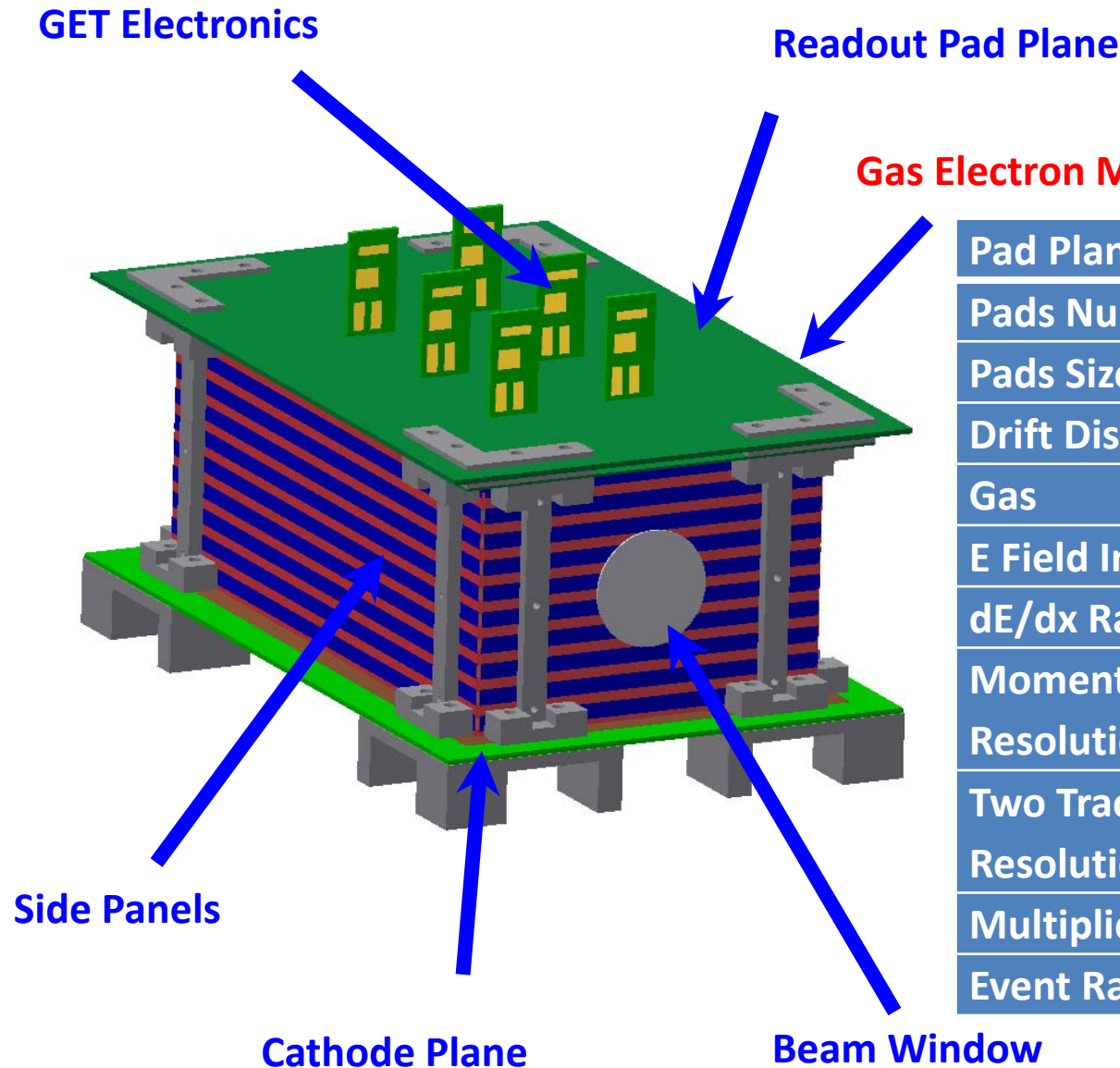
Study the quarkyonic matter

Help to look for the Critical Point

Study the symmetric energy at  $2\rho_0 \sim 3\rho_0$

CEE

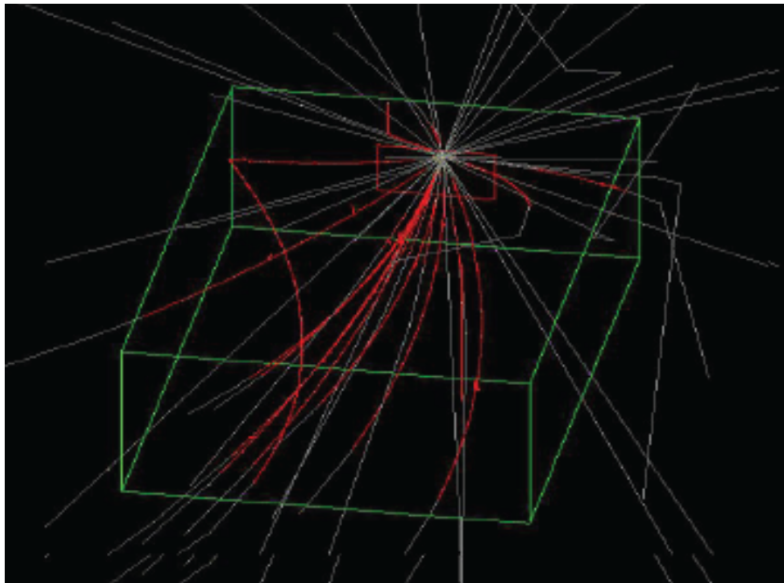
# Conceptual Design of CEE-TPC



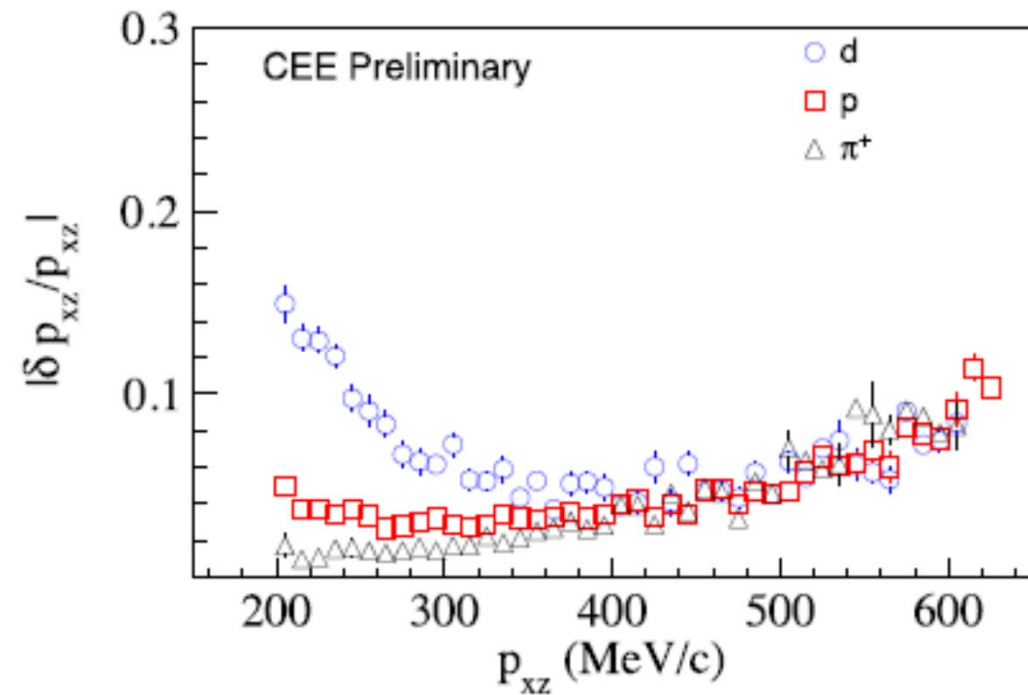
Pad Plane Area	80cm × 100cm
Pads Number	10000
Pads Size	10mm × 8 mm
Drift Distance	80 cm
Gas	90%Ar + 10%CH <sub>4</sub>
E Field Intensity	200V/cm
dE/dx Range	Z ≤ 2, π, p, d, t, He
Momentum Resolution	5%
Two Track Resolution	3 cm
Multiplicity	200
Event Rate	1000Hz

by Dr. Song Zhang

Tracks:



Momentum Resolution:



CEE-TPC can meet the requirements in the heavy ion collisions experiment at CSR

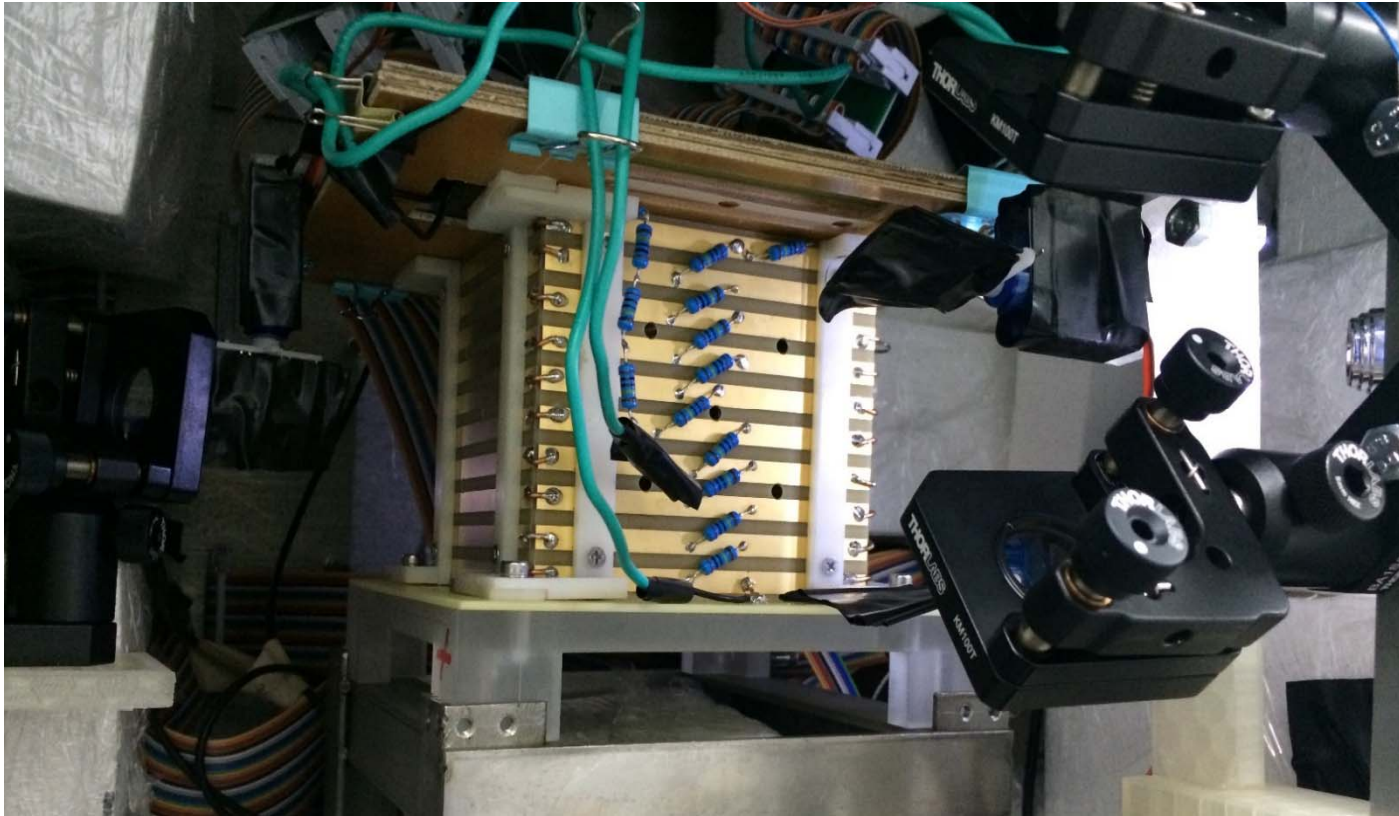


TPC Prototype

## Prototype of CEE-TPC

Field Cage: 10cm × 10cm × 10cm;

Pads: 64 ch

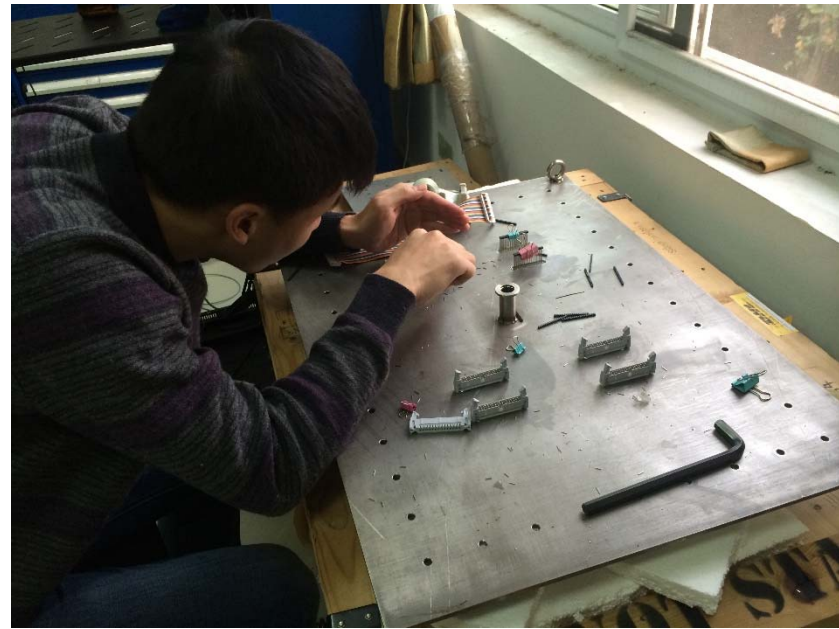


Electronics: Preamplifier, Shaper,  
500M Hz digitizer.



## TPC Prototype

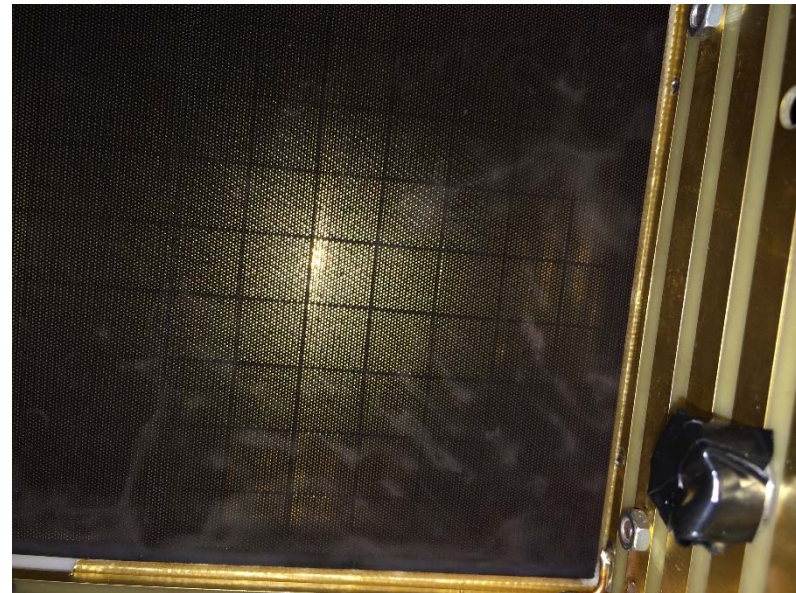
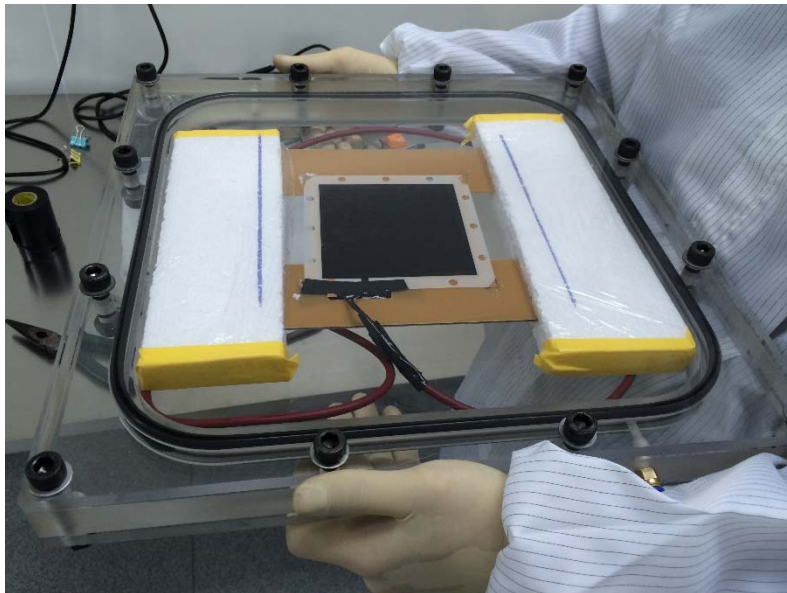
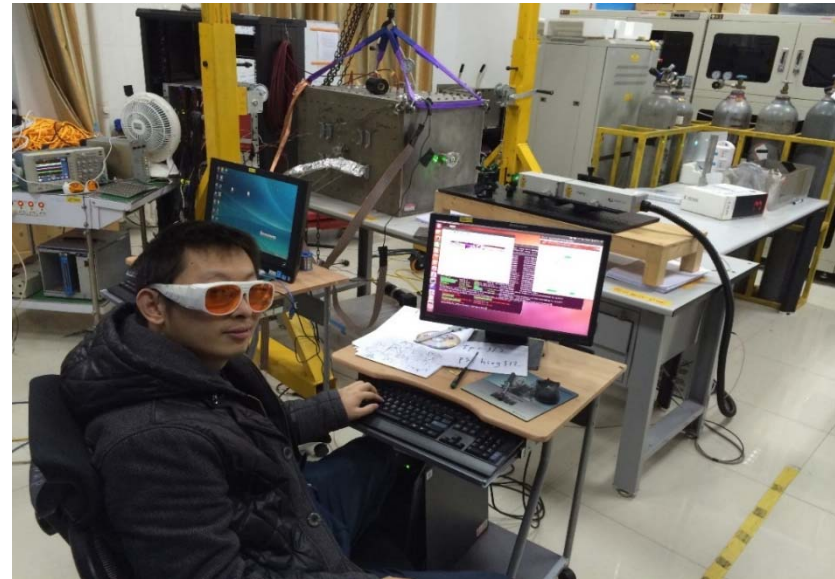
# Construction of TPC





## TPC Prototype

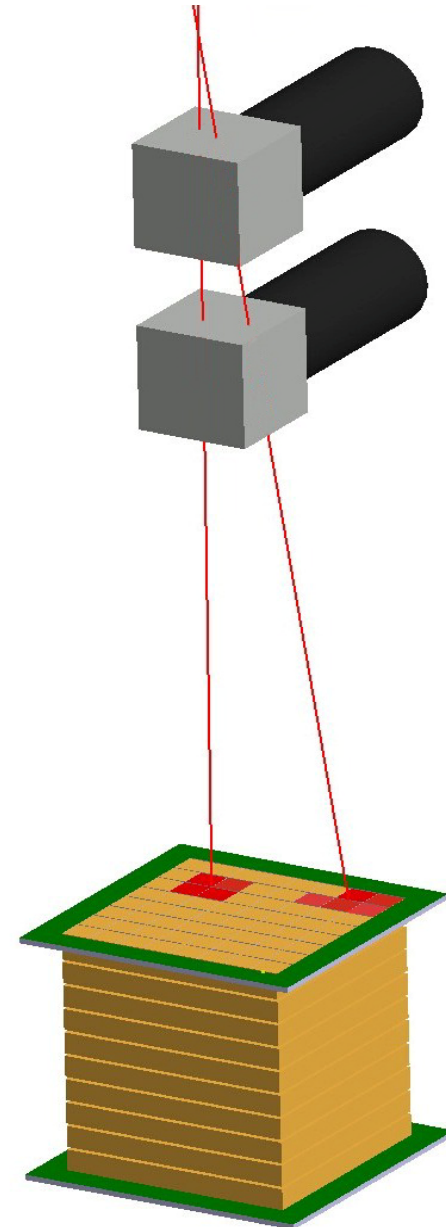
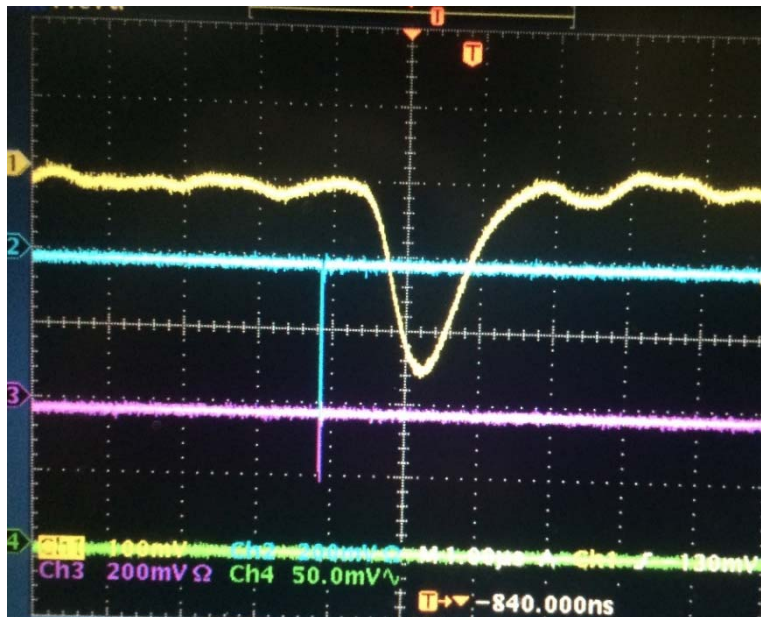
# Construction of TPC



# TPC Prototype

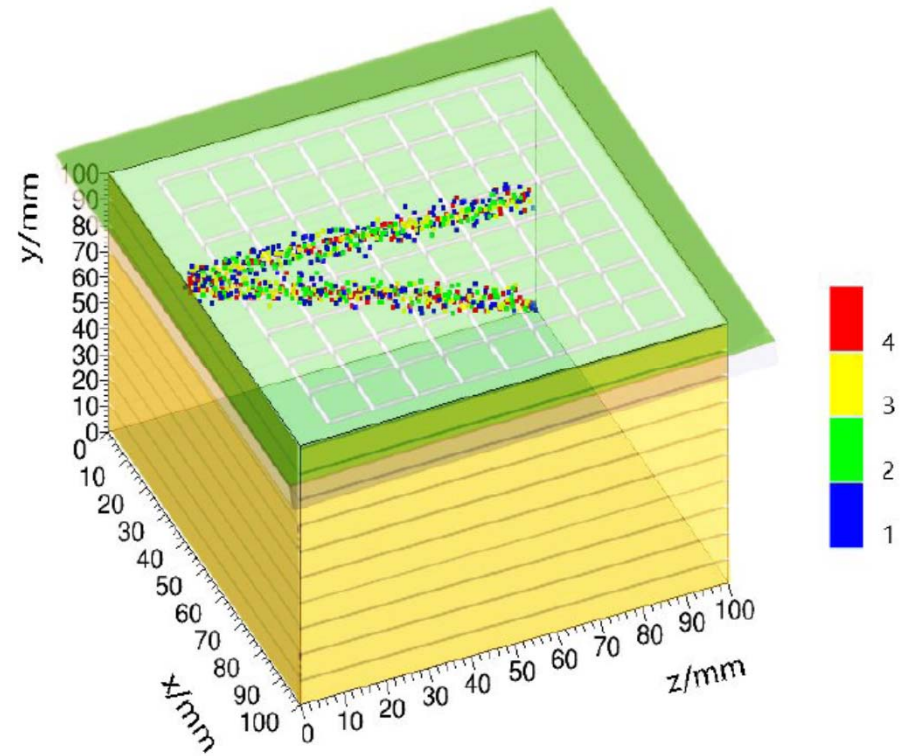
# Cosmic-ray test

Trigger: 2 scintillator



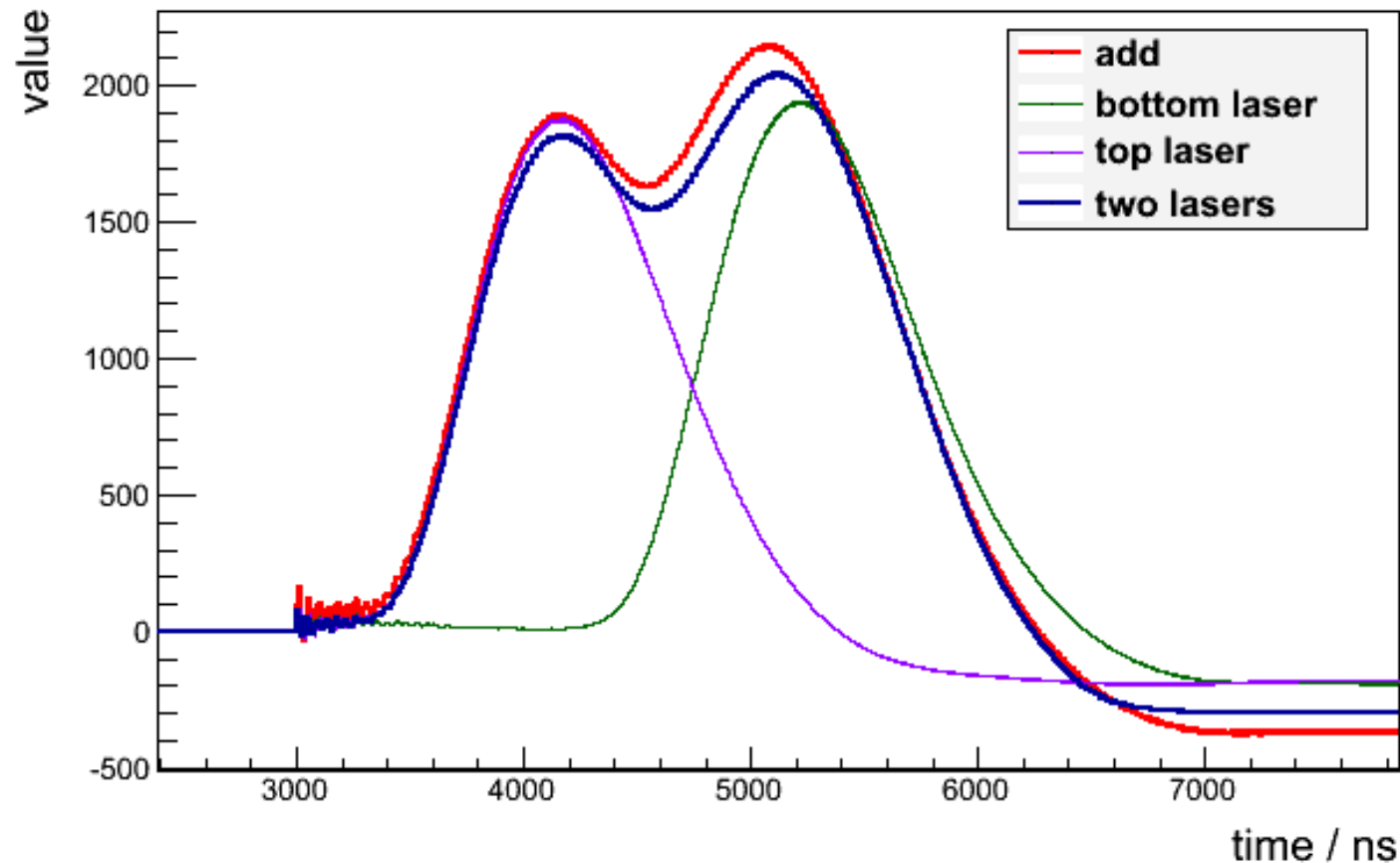


UV Laser : 266nm, 15mJ/pulse, 10Hz



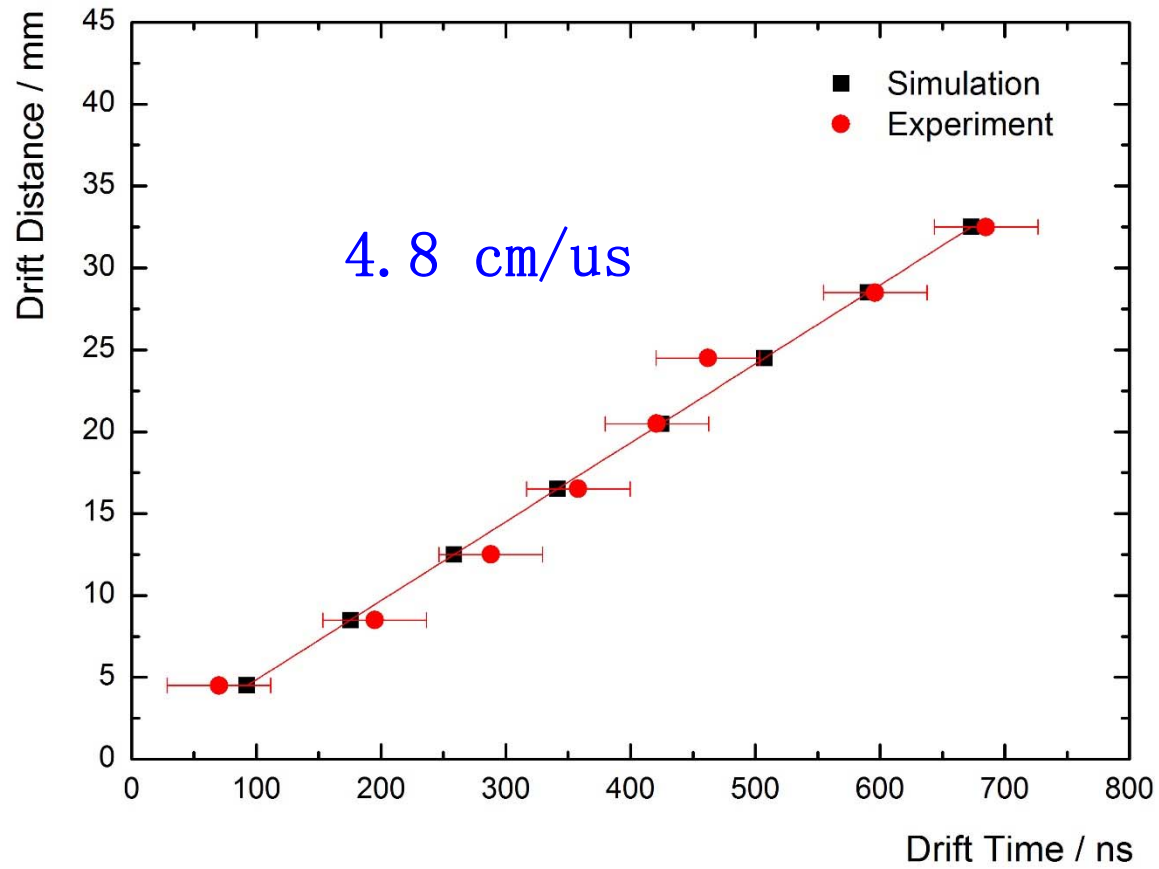
# Laser Test

Two simultaneous lasers or not simultaneous lasers



Amplitude: 
$$\frac{\text{Two simultaneous lasers}}{\text{Top Laser} + \text{Bottom Laser}} = 95\%$$

## Electrons Drift Velocity





# Summary and Future Plan

1. We have made a small prototype of TPC for CEE project. The test results meet the requirement in the heavy ion collisions experiment at CSR.
2. Another prototype of TPC was made. The beam test at Lanzhou will be done.
3. We will build large SLEGS-TPC in the future, to study the photonuclear reactions.
4. We are hoping MSU group can help us with the GET electronics and data analysis.