
Self-Introduction

Cai Yiming

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Radiation Physics and Detection Technology

Department of Engineering Physics

Personal Details

- First name :Yiming Family name :Cai
- Date of birth: March-3-1993
- Place of birth: Liaoning Province
- Ph.D. in Tsinghua University
- Ph.D. advisor: Prof. Li Yulan and Prof. Gao Yuanning



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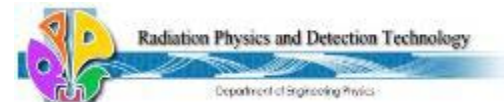


Education and skills

- 2011.08-2015.07 Tsinghua University
 - Department of Engineering Physics
 - Bachelor of Engineering, GPA: 87/100 Ranking: 31/90
 - Academic Scholarship & University Scholarship & Excellent graduate
- 2014.01-2014.06 KTH, Royal Institute of Technology
 - Department of Engineering Physics
 - Exchange student
 - Undergraduate- Merit Scholarship
- 2015.08 till now Tsinghua University
 - Lab of Radiation physics and detection technology
 - Ph.D.
 - Department Scholarship

• Software Skills

- Programming language: C++
- Algorithm development environment: Matlab, ROOT
- Simulation tools: Geant4, Garfield++, Maxwell, ANSYS and know a little about kalman filter & Marlin TPC (ongoing)



Research

- Ph.D. project: the study on spatial-resolution gas tracking detector and its calibration method based on laser system
- To develop a high-precision tracking detector(TPC) prototype to meet the requirement of high-precision detection and high-accuracy experiment such as measuring Higgs.
- Rely on Haiyun's laser calibration system.
- My tasks: simulation and experiment.

simulation

- The performance of field cage
- The reconstruction of the track
- The simulation of process of avalanche (ongoing)

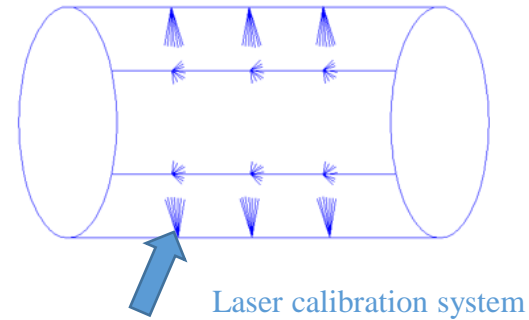
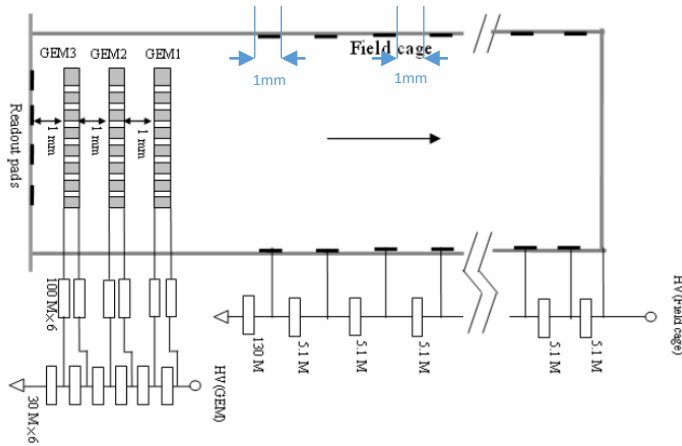
experiment

- Test GEM
- The assembly of TPC detector



Research-simulation

- The performance of Electric field of field cage equipped with laser system



- Covering the inner surface of field cage with a set of conducting strips with a constant potential difference to make the electrical field as uniform as possible

Dig holes



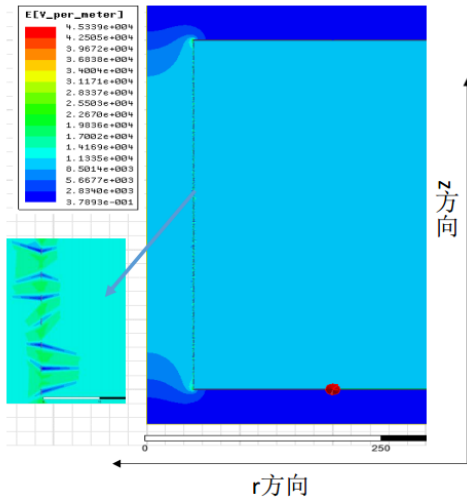
Enlarge the space



Research

• Evaluation index :

- The uniformity of the electrical field in the whole chamber
- The fluctuation of the electrical field along z axis
- The fluctuation of the electrical field along r axis

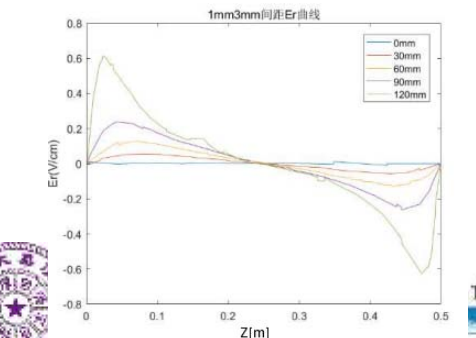
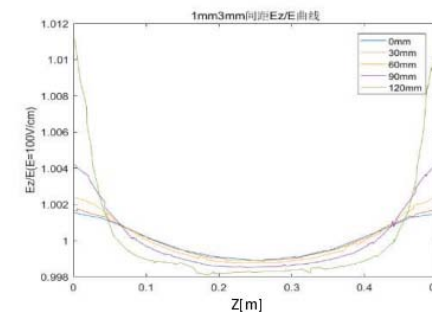
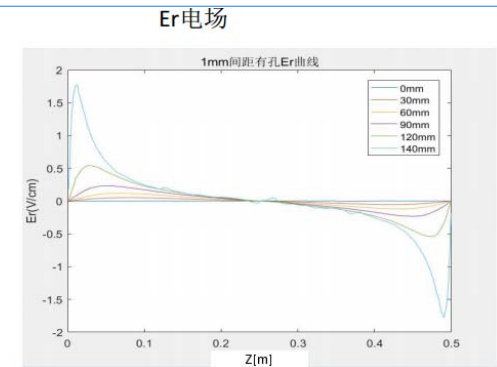
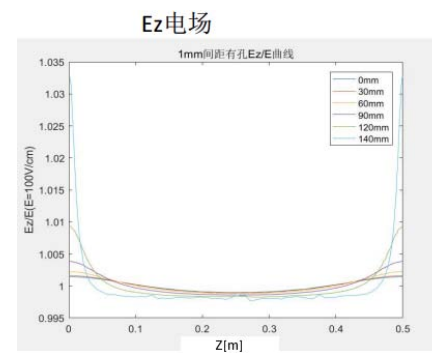
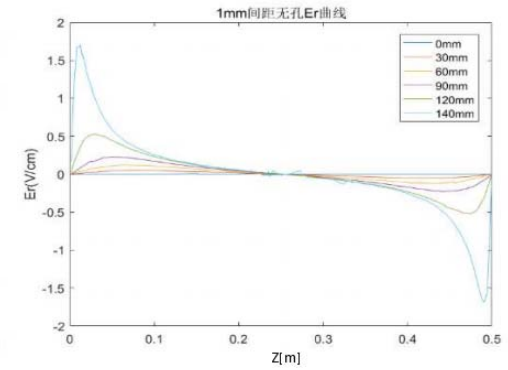
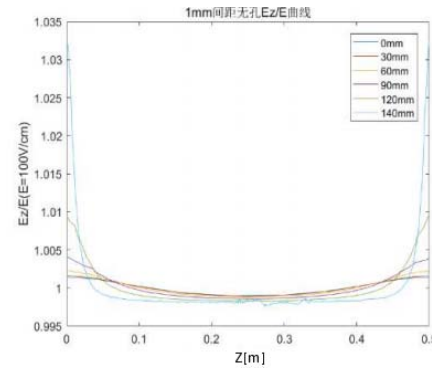


original

solution1

solution2

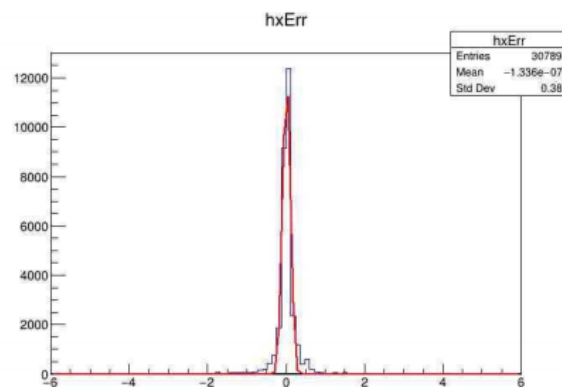
Through a 2-d simulation we can draw the conclusion: dig holes in the field cage is the best choice which can maintain the uniformity and stability of the electric field.



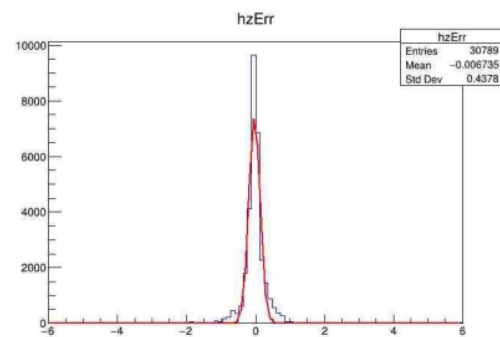
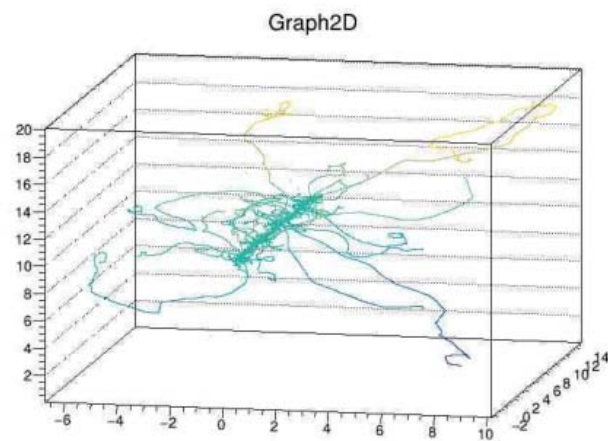
Research-simulation

- The reconstruction of the track

- Without laser calibration system
- @ T=300k B=1T P= 1atm E_drift=300V/m @T2K gas
- Generate tracks using Garfield++ instead of Geant4
- Simulation of process of drift and diffusion using sampling of Gaussian distribution
- Calculation of the spatial resolution using the charge center-of-gravity method



Sigma=97.9um



Sigma=165um

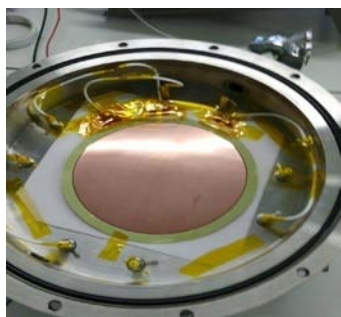
- Lack of the process of avalanche

- An important role in diffusion because B limit the diffusion during the process of drift
- Still ongoing

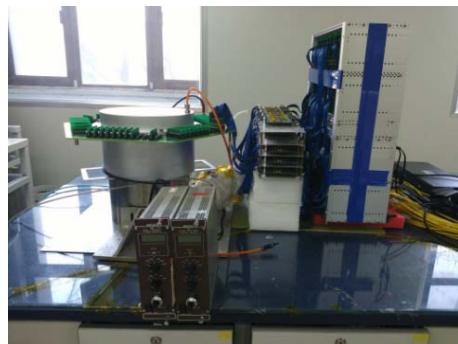
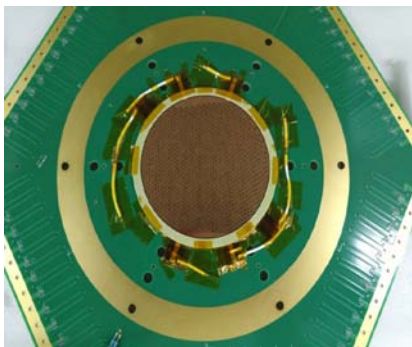


Research-experiment

- Test leak current of the GEM
 - Gradually increase voltage and to measure the current



- The assembly of the TPC system



Prospective in CEA-Saclay

- To study a complete framework like Marlin TPC or Kalman filter to simulate tracks in the TPC and reconstruct the tracks in order to utilize those tools to optimize the performance of TPC by optimizing the read out module.
- To join in the test of ion back flow research with micromegas model
- To have the opportunities to attend a beam test and learn how to operate TPC.
- Work hard to be helpful in the team.



Some other things

- The passion for Handball
- Former captain of Tsinghua University Handball Varsity



PARTITTLE CUP in Gothenburg, Sweden

Other competitions like 43th Interamnia World Cup in Teramo, Italy



27th national college student handball championship

- I would like to join a local handball club in Paris if any.



Thanks

