Update progress on CEPC Gaseous Tracker

Huirong Qi and Linghui Wu

On behalf of the gaseous tracker group

中国科学院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences

Content

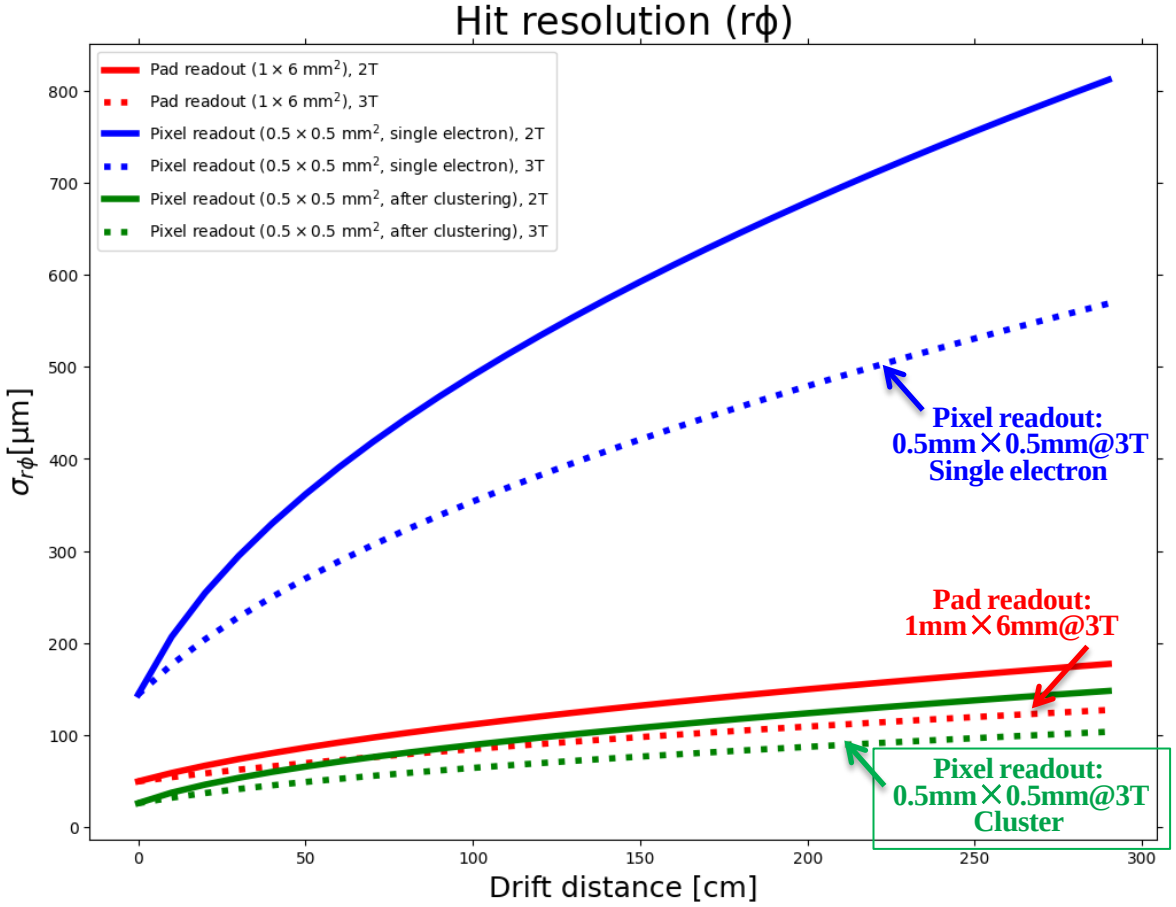
- TPC operating at low luminosity Z at 3T
- PID simulation
- International collaboration
- Work plan

TPC operating at low luminosity Z at 3T

Guang Zhao

Estimation of the **spatial resolution using pixelated readout**.

- The granularity readout and the transverse diffusion are also taken into consideration..
- TPC can operates effectively at 3T B-field.
- Pixelated readout TPC can achieves superior spatial resolution at 3T compared to 2T.



Pad readout:

$$\sigma_{r\phi}^{\mathrm{pad}} = \sqrt{(\sigma_{r\phi 0}^{\mathrm{pad}})^2 + \sigma_{\phi 0}^2 \sin^2(\phi_{\mathrm{track}}) + L\frac{D_{r\phi}^2}{N_{\mathrm{eff}}}\sin(\theta_{\mathrm{track}})}$$

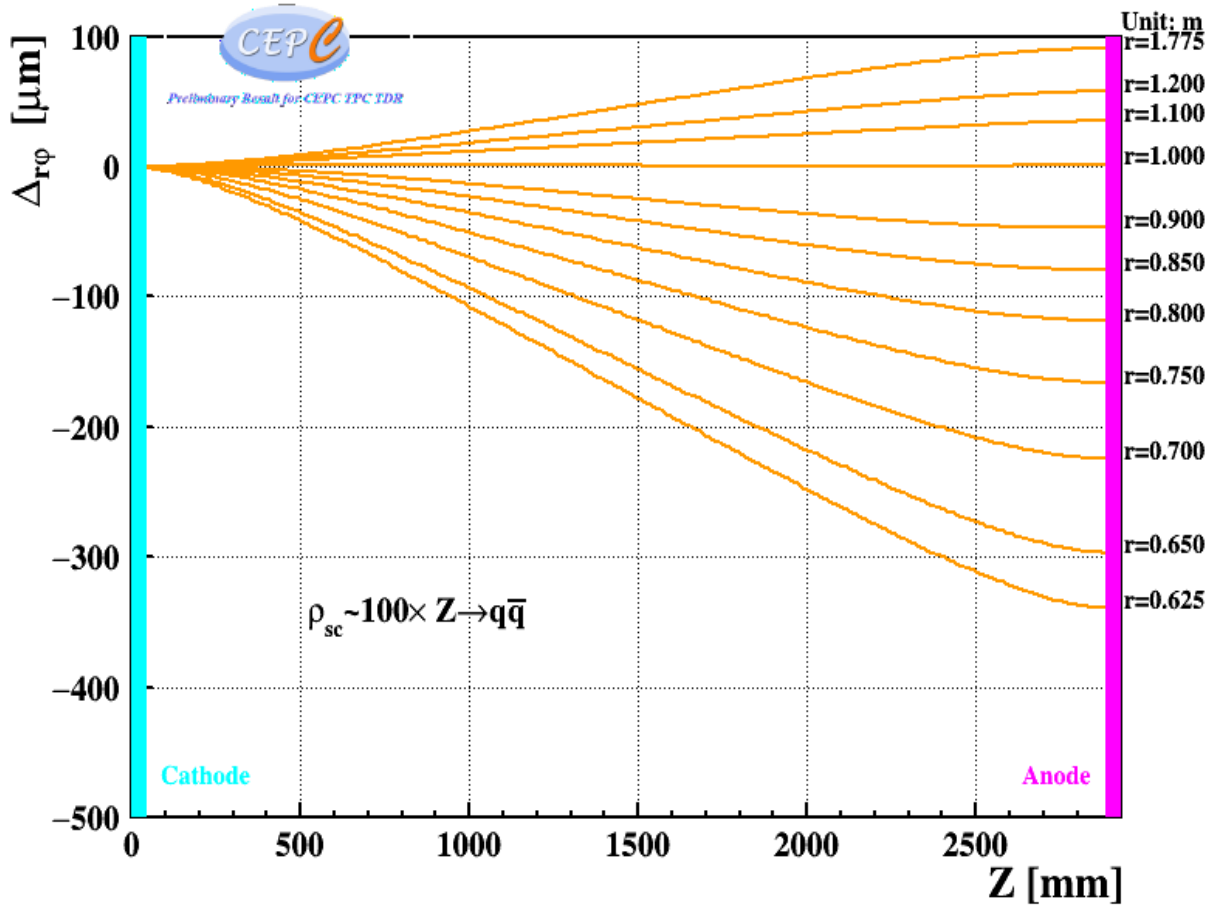
Pixel readout:

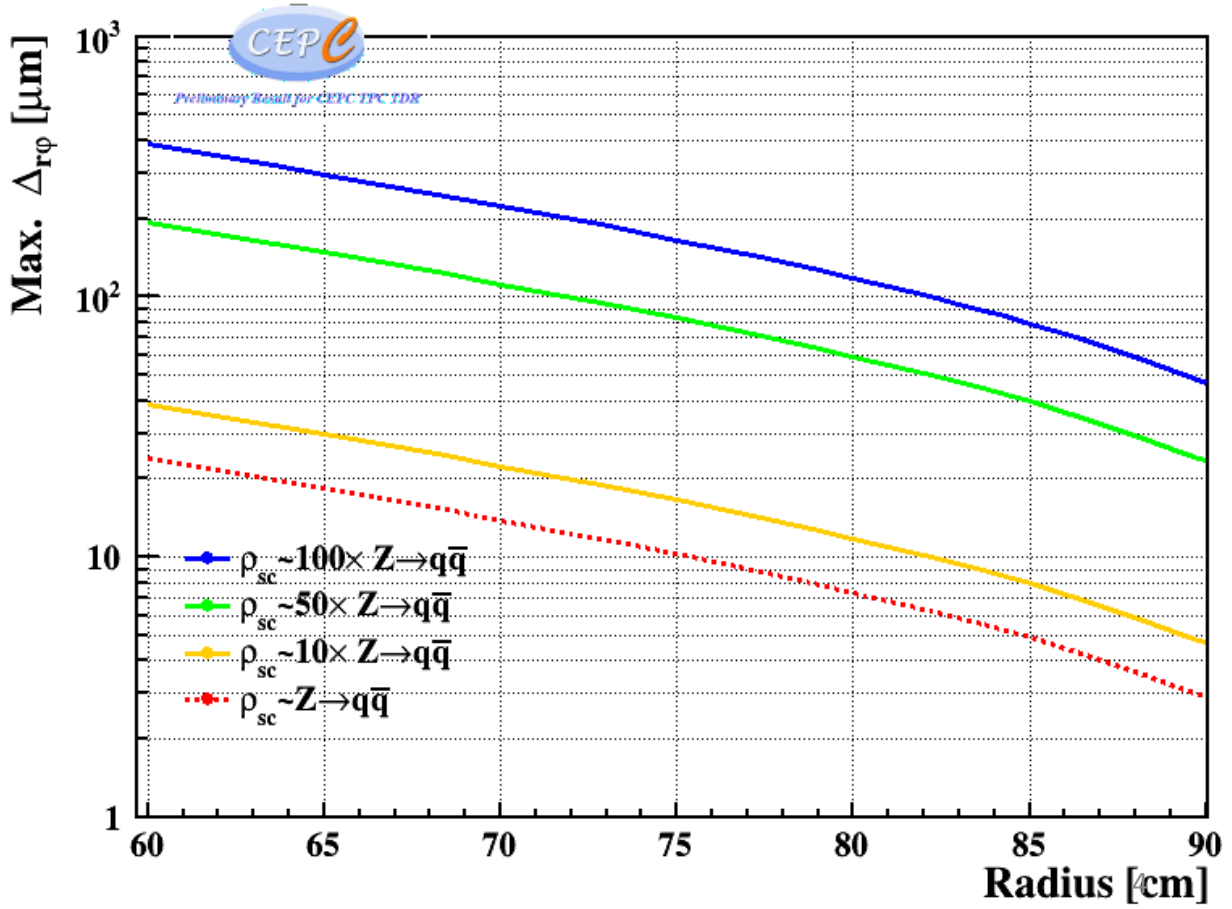
$$\sigma_{r\phi}^{\mathrm{pixel}} = \sqrt{(\sigma_{r\phi 0}^{\mathrm{pixel}})^2 + LD_{r\phi}^2}$$

TPC operating at low luminosity Z at 3T

Xin She, Haoyu Shi

- Maximum distortion with e+e- to qq at Z pole (Physics events only)
- Maximum distortion under various bremsstrahlung backgrounds (×10, ×50, ×100 Physics Events)
  - The BK simulation data will be input at the low luminosity Z run at 3T **next week**.

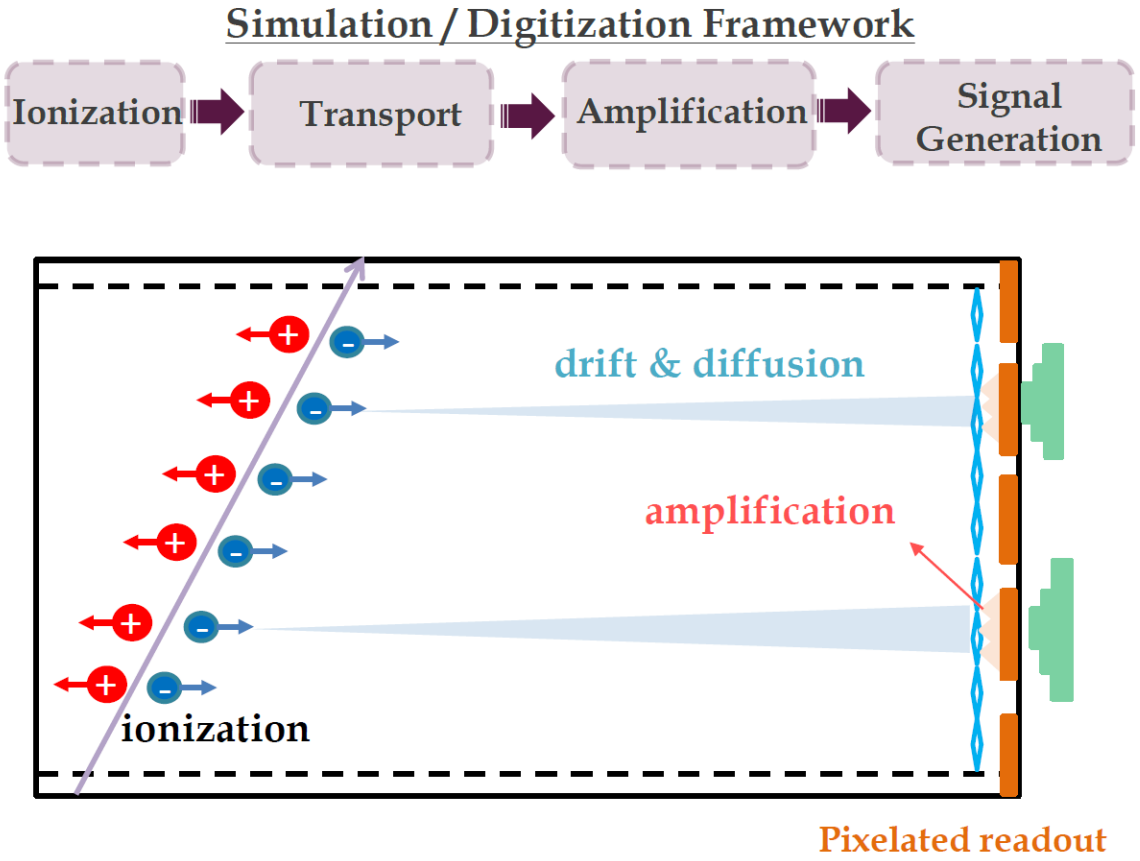


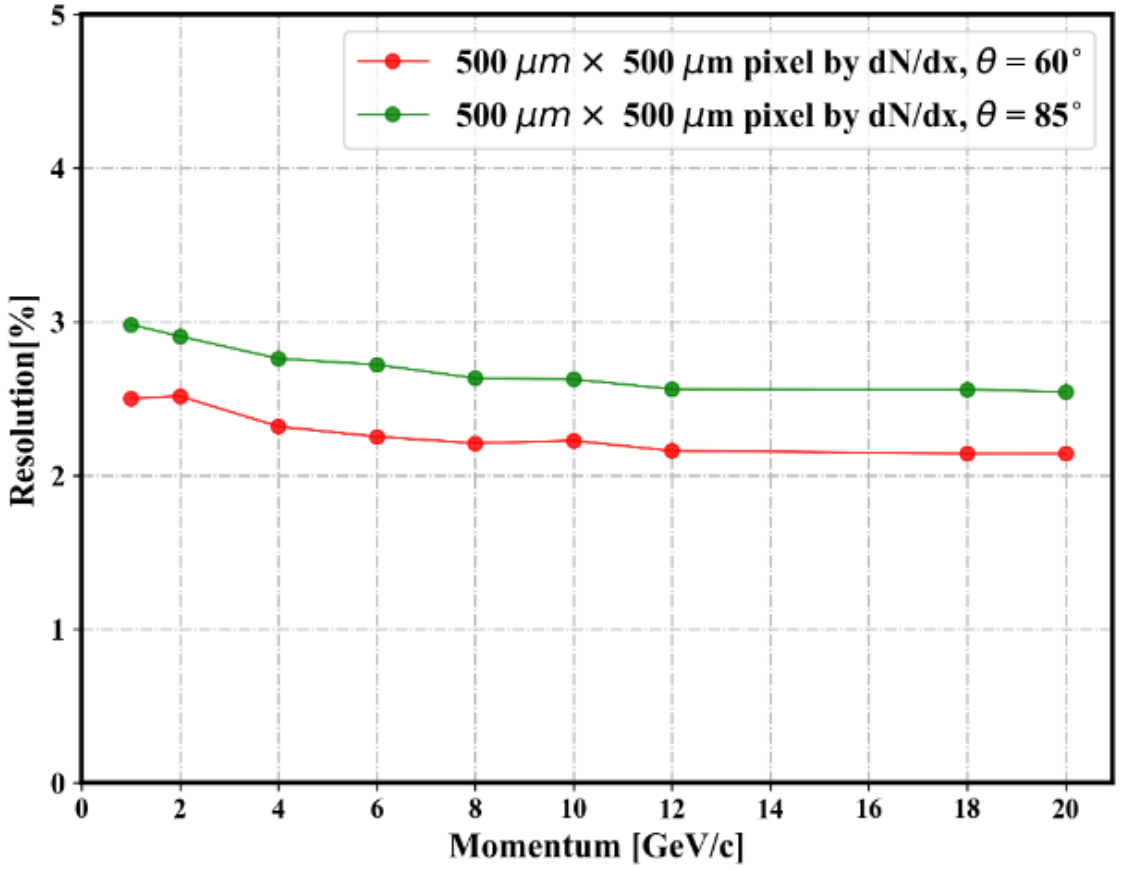


PID simulation: dN/dx

Yue Chang, Guang Zhao

- Performance of the pixelated readout TPC
  - PID resolution using dN/dx at θ=60° and θ=85°

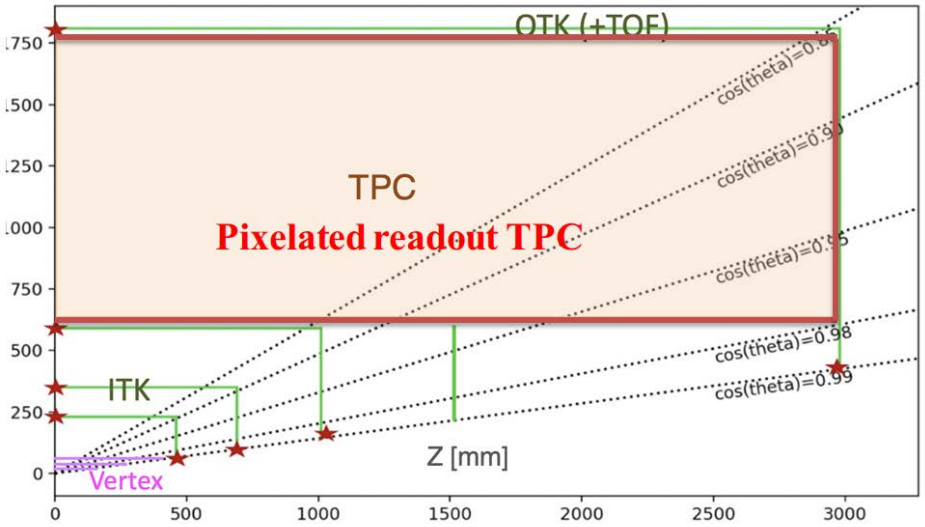


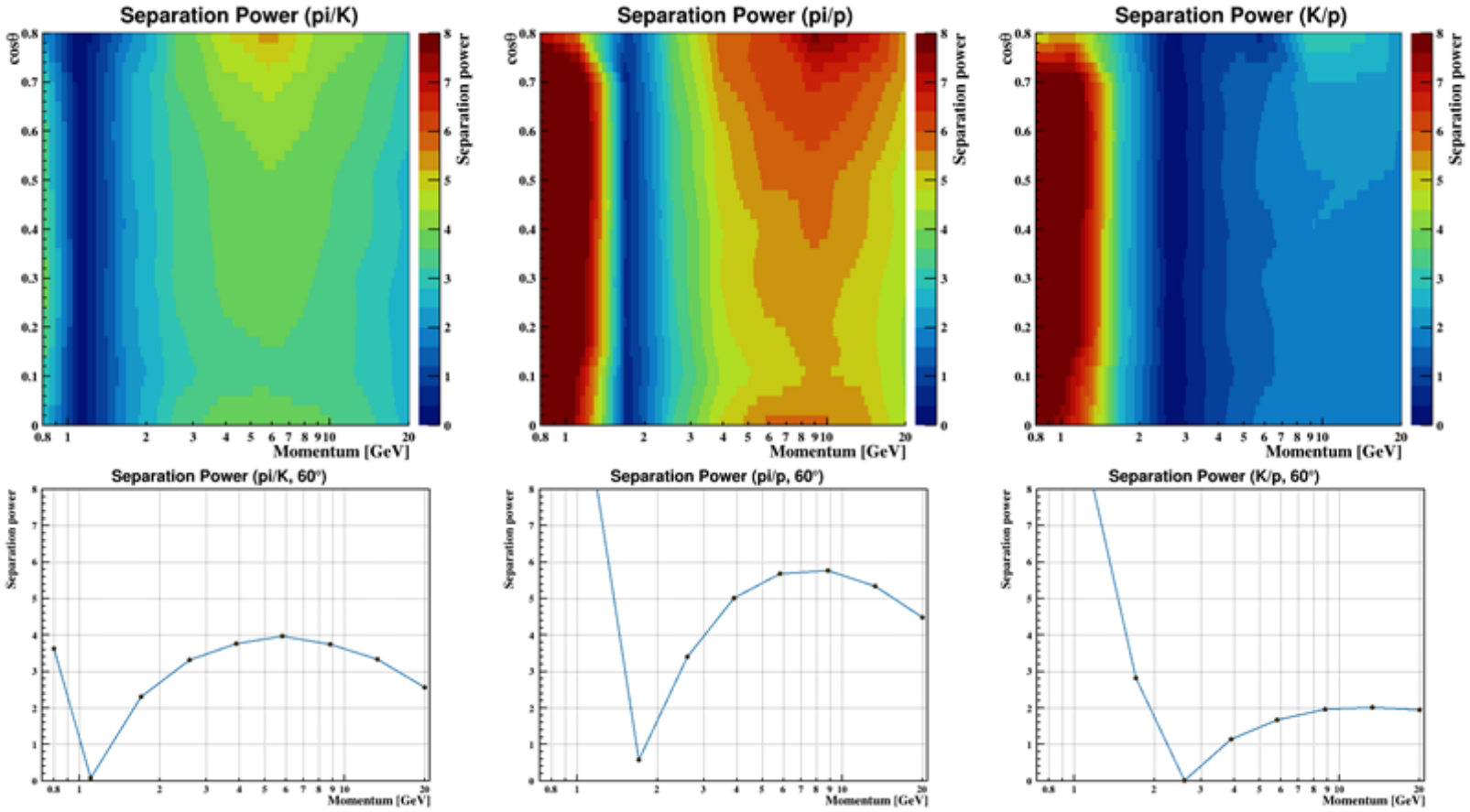


PID simulation: Separation power

Jinxian Zhang, Guang Zhao

- Performance of the pixelated readout TPC
  - Simulation of π/K, π/p, and K/p separation power with varying momentum and cosθ





International collaboration

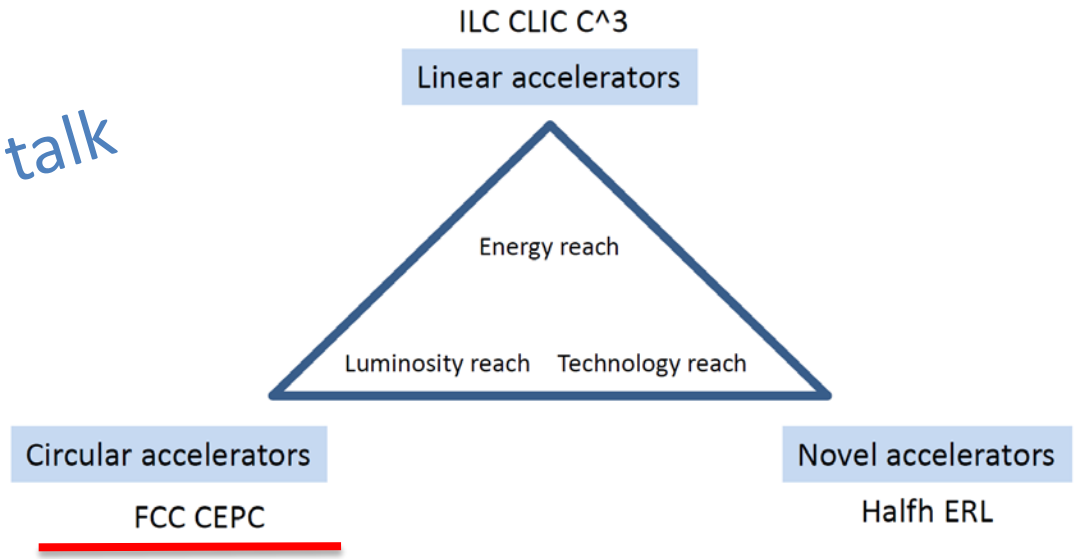
- ILD collaboration: Show that ILD is feasible at a circular collider
  - Huirong will give a CEPC TPC report at ILD meeting on behalf of LCTPC in November.
  - Paul, Maxim, Jochen agreed to join the Chapter of gaseous tracker.
  - Serguei and Paul also join the beam test at DESY.

What do we want to achieve

- Get an update on recent work on ILD
- Get an update in the inclusion of ILD into the circular collider community, FCC-ee in particular
- Status of the ILD group
- Our contribution to the global studies towards a H/EW factory
- Our contribution to the EPPSU effort 2025/ 2026

Ties Behnke's talk

The environment/ Options



ILD meeting connected to ECFA 2024 https://agenda.linearcollider.org/event/10442

Work plan

- Chapter 6: Gaseous tracker
  - ~10 pages (in this week)
  - ~30 pages before 20, Nov.
  - ~50 pages in the end of this month

Chapter 6 Gaseous Trackers

Many thanks!