

# Status for the CEPC CDR -TPC tracker

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On behalf of the tracker detector subgroup

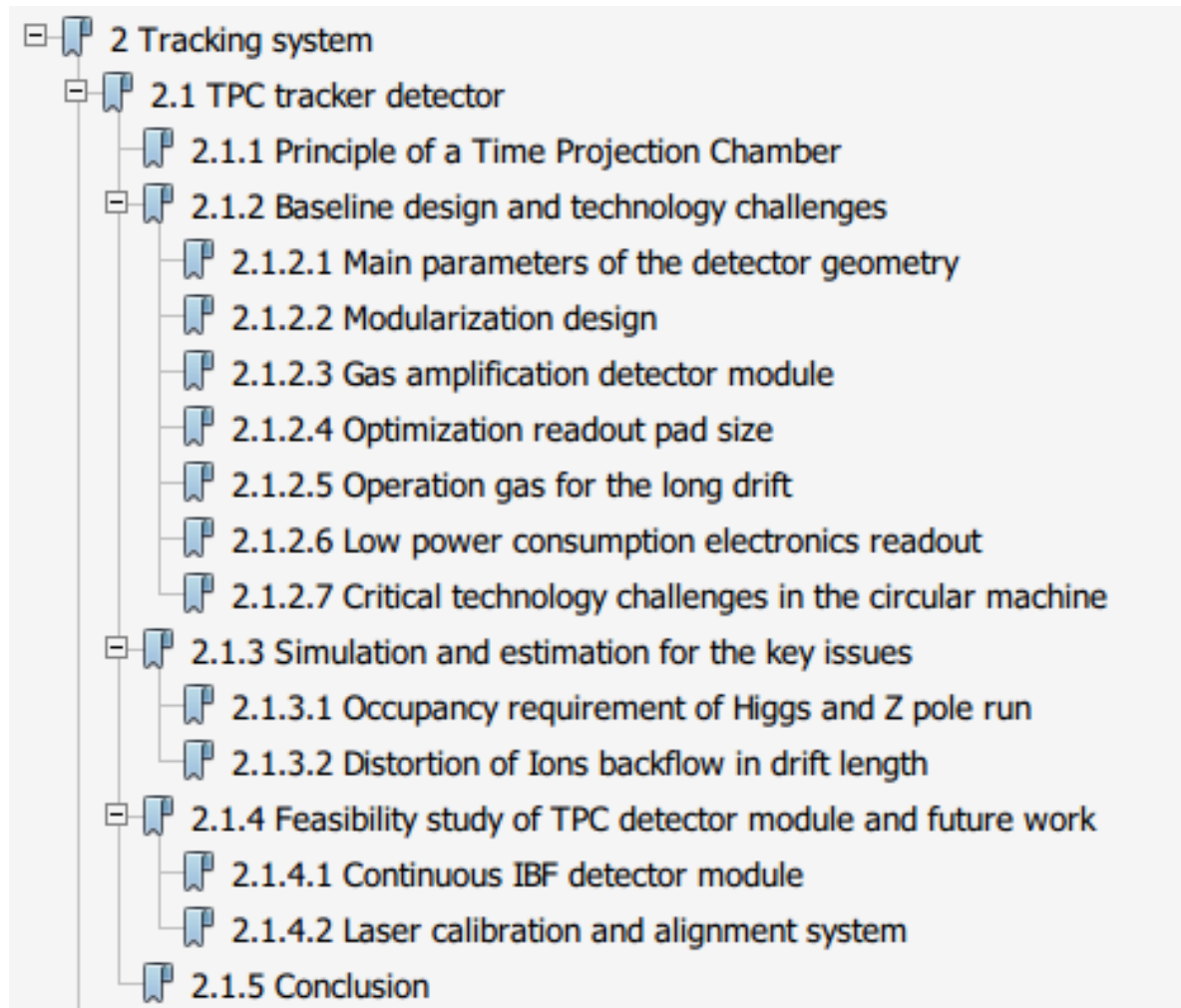
2018/07/13

# List of names of people that contributed text (discussion and preparing)

- IHEP,CAS
  - Huirong Qi, Jin Li
  - Yulian Zhang, Haiyun Wang, Zhiwen Zhang, Ling Liu, Zhiyang Yuan
- Tsinghua University
  - Yulan Li, Yuanning Gao, Deng Zhi, Hui Gong
  - Cai Yiming
- Shandong University
  - Chengguang Zhu
- Lanzhou University
  - Yi Zhang, Bitao Hu
- IMP,CAS
  - Limin Duan
- SINAP,CAS
  - Fei Lu
- CIAE
  - Xiaomei Li, Shouyang Hu

# Status of TPC chapter

- ❑ All chapter has been **DONE and uploaded**
- ❑ Reference bib file would be finalized



- 2 Tracking system
  - 2.1 TPC tracker detector
    - 2.1.1 Principle of a Time Projection Chamber
    - 2.1.2 Baseline design and technology challenges
      - 2.1.2.1 Main parameters of the detector geometry
      - 2.1.2.2 Modularization design
      - 2.1.2.3 Gas amplification detector module
      - 2.1.2.4 Optimization readout pad size
      - 2.1.2.5 Operation gas for the long drift
      - 2.1.2.6 Low power consumption electronics readout
      - 2.1.2.7 Critical technology challenges in the circular machine
    - 2.1.3 Simulation and estimation for the key issues
      - 2.1.3.1 Occupancy requirement of Higgs and Z pole run
      - 2.1.3.2 Distortion of Ions backflow in drift length
    - 2.1.4 Feasibility study of TPC detector module and future work
      - 2.1.4.1 Continuous IBF detector module
      - 2.1.4.2 Laser calibration and alignment system
    - 2.1.5 Conclusion

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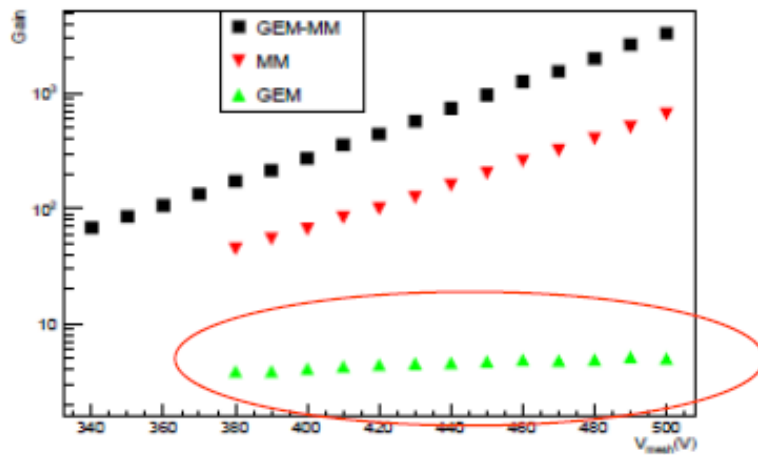
# Some comments from LCTPC, Sacaly TPC, MOST international review meeting

To adapt to the specifications of CEPC, the project proposes to use hybrid MicroMegas and GEM techniques to decrease the gain of each single avalanche structure and suppress the sparks. These characteristics have been experimentally verified. Also this hybrid structure is good for suppressing the ion back flow, a very important issue for the TPC. Experiment shows the product of IBF and gain would be around 5, which is quite advanced. The chosen technology option is suitable for the detector design within this project. For this option, the pad design should be optimized to achieve 1) the spatial resolution needed and 2) the density of readout electronics.

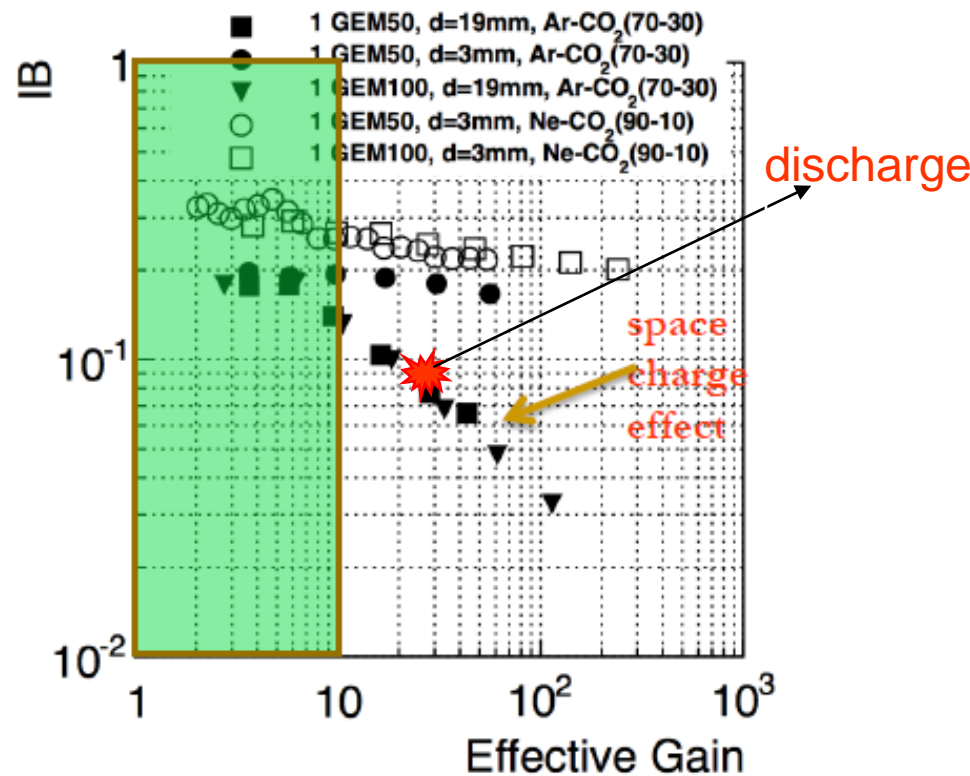
# X-ray tube test

Single GEM with very low Gain in our Exp.

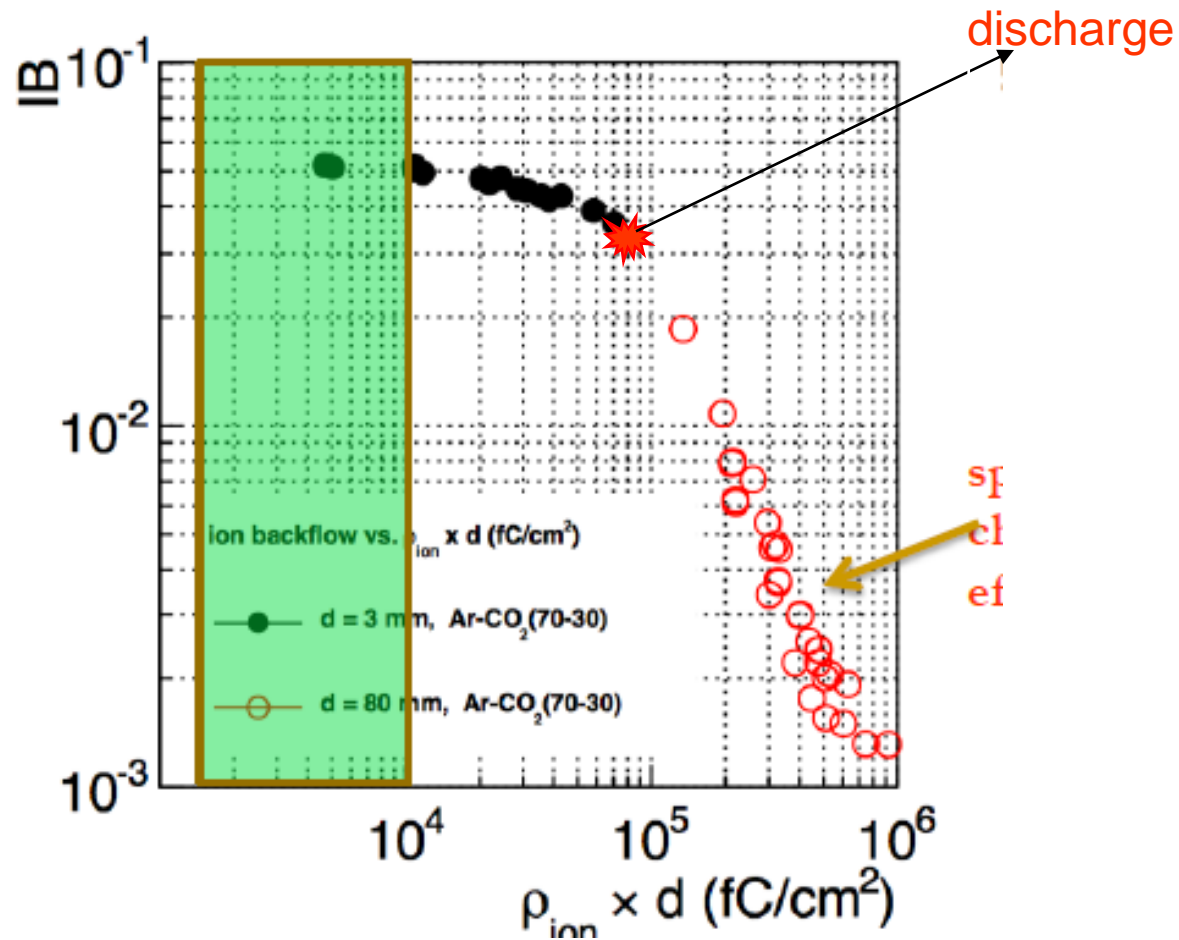
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(b)



# X-ray tube test



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# Next steps

- To add in next week