

Track 4 Gas Detectors: Task 4 Impact of readout granularity

Gas detectors allow to precisely follow the track of a charged particle. In contrast to pixel layers the trajectory is not only recorded on several layers, but in a full volume. This enables gaseous detectors to measure the full energy loss and ionization along the path. However, the precision of the position measurements is dependent on the pad-size used for readout. A detailed simulation of pions and kaons traversing a time-projection-chamber (TPC) with pad readout is provided as input. During the task, we will perform an analysis of 1000 identical particles per setting based on python and ROOT. After a quick introduction to, the goal is to identify the particle trajectory, describe it mathematically and finally to fit the trajectory to determine the momentum and resolution for all different pad sizes. Finally, we can compare the performance of the TPC for pions and kaons to verify the TPCs capability to identify the particle species.

The task is organized in a jupyter notebook, hosted at the naf. Simply open a browser and go to

naf-jhub.desy.de

Login with the username and password written on the blackboard. Spawning of the server will take a moment. Duplicate the notebook

`edit2020_final.ipynb`

and open the duplicated notebook. All further information can be found in the notebook itself.

Good luck and a lot of fun!

