Animation of clusters drifting in TPC

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The animation of the drifting of clusters in the TPC for p+p and Au+Au collisions using the TPC-ClusterAnimation module are presented here. This module allows one to animate the cluster positions using the output file from the standard Fun4All macro or the json file used for the event display. The user defined values in the TPC_Cluster_Drift_Animator.py are set to TPC_drift_speed = 8cm/μs, collision_rate = 4MHz for p+p and 50kHz for Au+Au, dimensions of the TPC are set to length=105cm, inner radius=20cm and outer radius=80cm. Event times generated from a Poisson distribution with mean calculated from collision rate. The output is a matplotlib animation that can be viewed in different angles along with a mp4 video file of the animation for future use. The sPHENIX animations of p+p ($\sqrt{s_{NN}}$ = 200 GeV, 4MHz) and Au+Au ($\sqrt{s_{NN}}$ = 200 GeV, 7fm <b< 20fm, 50kHz) collisions are attached to the indico page.

The animation serves several purposes such as it helps in

1. Demonstration of the working of new-generation streaming TPC to general audience
2. Display of the real time cluster positions and their drift to help in tracking
3. Visualization of multiple events at the same time to help in detector calibrations

Previous presentations and resources

1. sPHENIX software and simulations meeting, 25April 2023
2. TPC-ClusterAnimation module on github