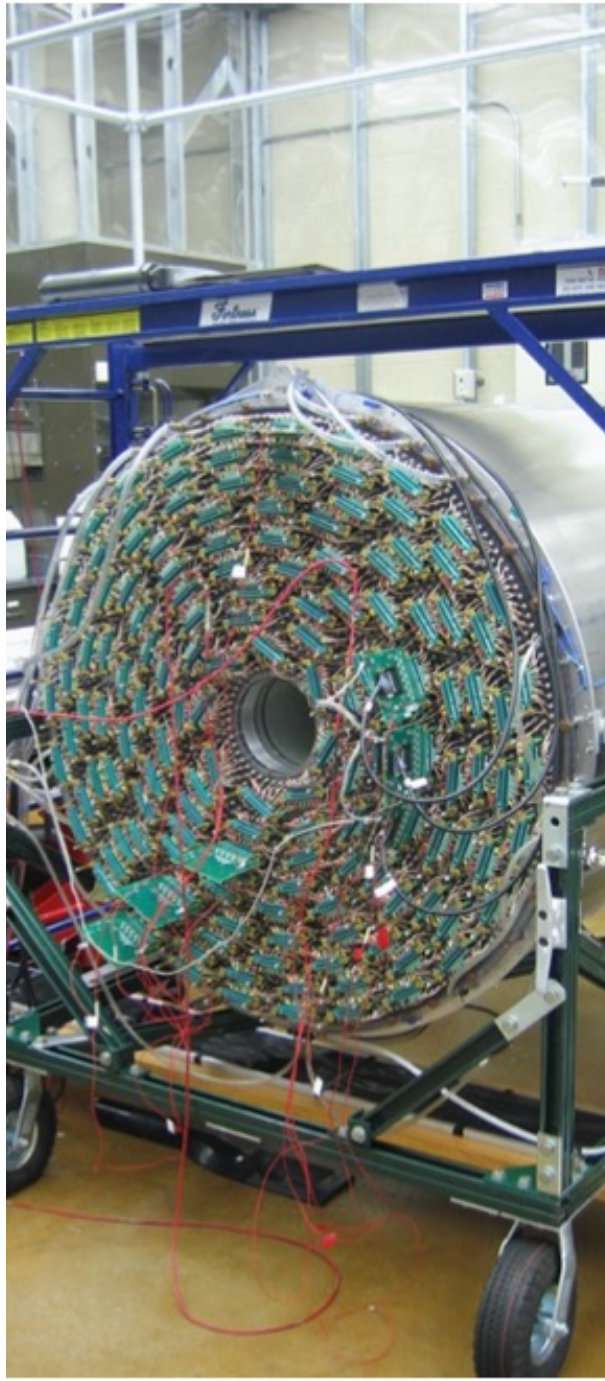
AI for Experimental Controls

Torri Jeske

ePIC AI Town Hall

8/30/2023



Jefferson Lab | Carnegie Mellon University | EPSCI

Diana McSpadden Thomas Britton David Lawrence Naomi Jarvis

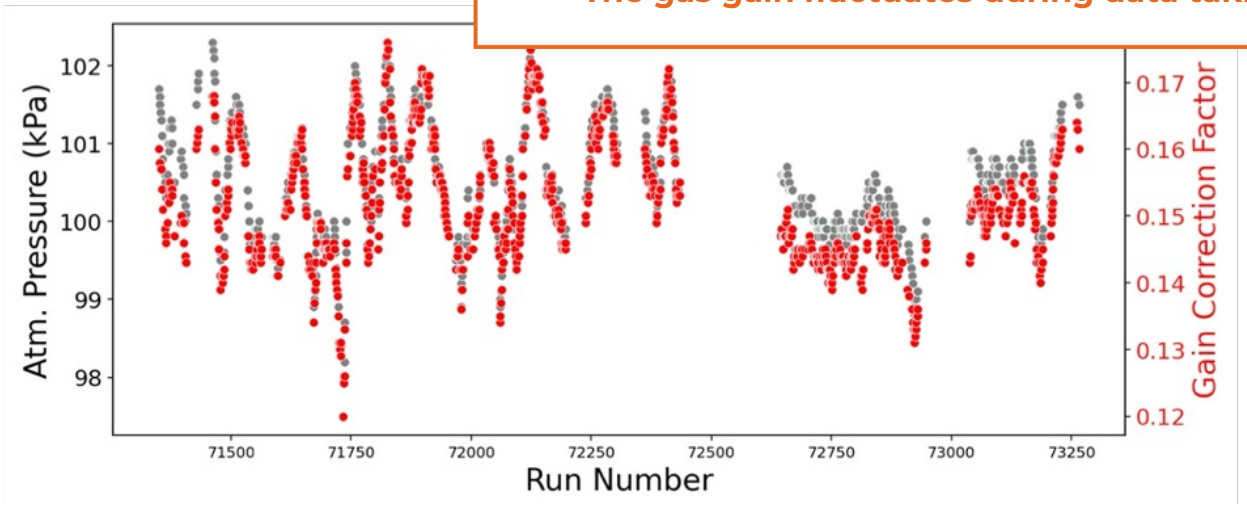
Online Calibration and Control

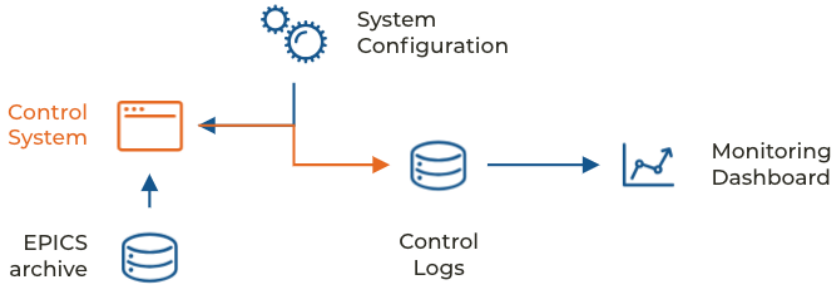
ML system to calibrate and control the GlueX Central Drift Chamber

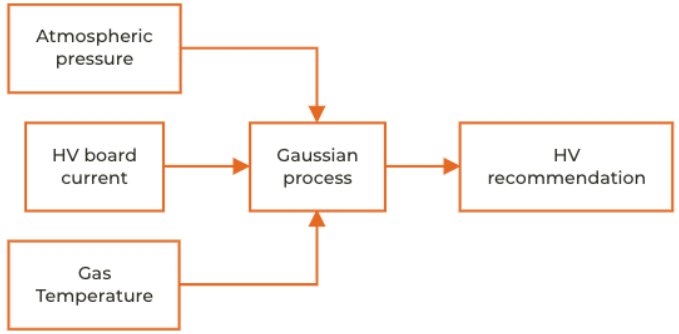
Stabilize the response of the detector during the experiment

Successful collaboration of physicists and data scientists!

The gas gain fluctuates during data taking.



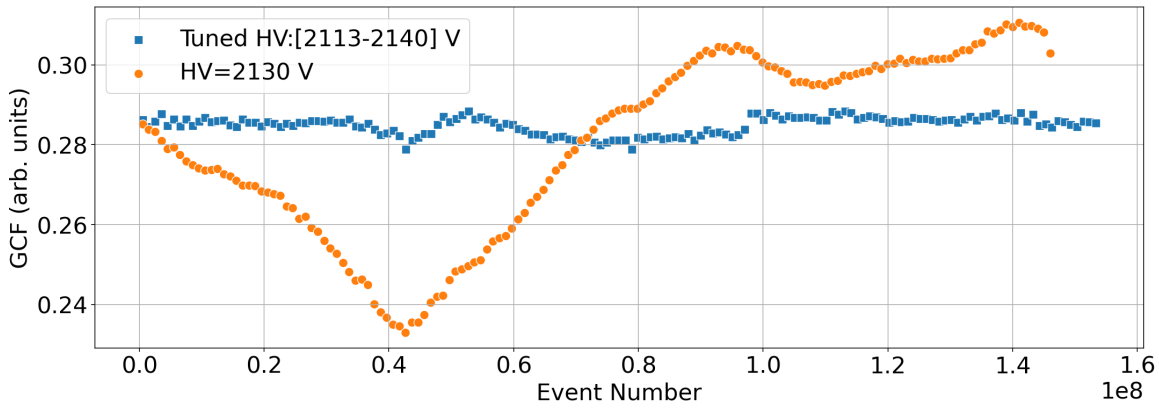




We developed a system to stabilize it by adjusting the HV.

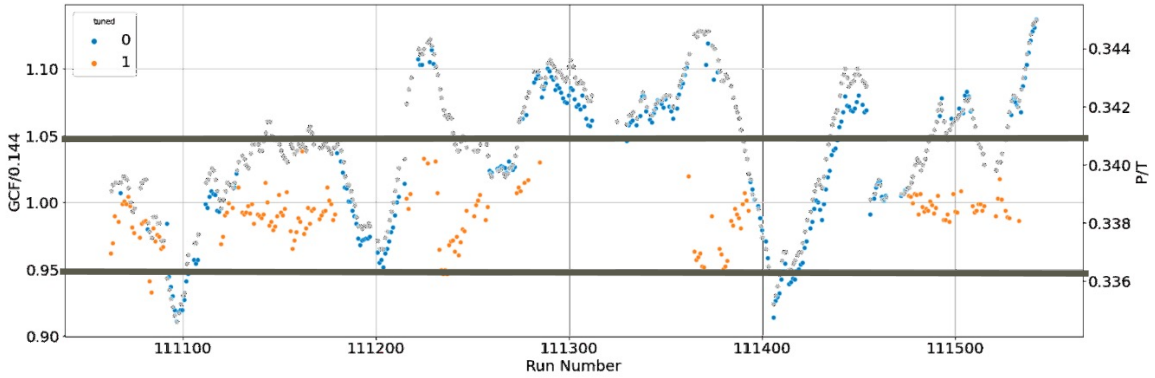
Results and **Current Status**

The CDC HV is set run-by-run based on the GP predicted gain correction factor.



Initial Cosmics test, 2021

Orange points indicate the gain correction factor using a **fixed** HV.
Blue points indicate the gain correction factor while using the **tuned** HV setting.



Primex-Eta Run Period, 2022-2023

Orange indicates tuned HV depending on environmental conditions.
Blue indicates fixed HV.
The gray points are the ratio of atmospheric pressure and gas temperature. The horizontal lines indicate our error tolerance as determined by the detector expert.