

## ALERT meeting - Kalman Filter updates

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IJCLab

February 9, 2026

- ▶ The new AHDC geometry is available in **coatjava** and **gemc**
  - **coatjava** since the release **13.6.0**
  - **gemc** in dev version only
- ▶ I moved the **Kalman Filter** in **ALERTEngine**
  - Require **AHDCEngine** to have been run before
  - Remove redundant attributes in the object **Track** (everything with the **\_kf** extension)
  - Update the bank **AHDC::hits** in the **ALERTEngine**
  - Define the **number of iterations** and the **PID** as variable in the Kalman Filter
  - A pull request has been submitted

- ▶ For now, moving the Kalman Filter in ALERTEngine has no effect on the result but:
  - the new implementation allows us to use it several times
  - example: **KF 1 → clean bad hits → KF 2**
- ▶ Also, it was a mistake at the beginning, but now these quantities can be filled independently (the values for the Helix fitter are empty.)

```
position for [AHDC::track] == 21525
* NODE * group = 23000, item = 21, type =
  trackid :          1
    x :     -0.0069
    y :      0.0908
    z :   -366.9206
    px :   187.7031
    py :    14.2650
    pz :  -82.4034
  n_hits :          0
  sum_adc :         0
  path :    0.0000
  dEdx :    0.0000
  p_drift :   0.0000
  chi2 :    0.0000
  sum_residuals : 0.0000
```

```
Choose (n=next,p=previous, q=quit, h=help),
position for [AHDC::kftrack] == 21673
* NODE * group = 23000, item = 26, type =
  trackid :          1
    x :     -0.0266
    y :     -0.0307
    z :   -116.4564
    px :   175.5621
    py :    13.6844
    pz :  -90.1957
  n_hits :          8
  sum_adc :        2330
  path :    77.2190
  dEdx :    30.1739
  p_drift :  195.5157
  chi2 :    0.2074
  sum_residuals : -0.5212
```

1. Make a routine to eventually clean bad hits after a first use of the Kalman Filter
2. Include the ATOF hit in the Kalman Filter
  - o It was one of interest of moving the KF in ALERTEngine
  - o For now, the AHDC-ATOF matching is only done with **wedges**. We ideally would like to use **ATOF bars**
3. Check that the PID is correctly used by the Kalman Filter (RungeKutta and energy lost)

- ▶ Run 22712 on D2 target, 2.23951 GeV beam energy
- ▶ Elastic cuts:  $3.4 \text{ GeV}^2 < W^2 < 3.9 \text{ GeV}^2$  and  $\Delta\phi < 45^\circ$
- ▶ Deposited energy dEdx versus momentum p of the track (after the Kalman filter)

