# PV Asymmetry

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November 23th, 2015

# PC Asymmetry

- Runs #14785 - #15785.
- Normalized using conjugate pairs.
- Discarded dropped pulses, one before, and the next 8 pulses.
- Discarded bad runs.

# PC Asymmetry

1. Calculate the raw asymmetry ($A_{m,i}$) per conjugate pair-wire m per spin sequence i.

$1 \leqslant m \leqslant 4$

$$B^{+}_{-\,m,i} = \frac{Y^{-}_{m,i}}{Y^{+}_{-\,m^{*},i}}$$

$$2g_{m} A_{m,i} \approx \frac{B^{+}_{m,i} - B^{-}_{m,i}}{B^{+}_{m,i} + B^{-}_{m,i}}$$

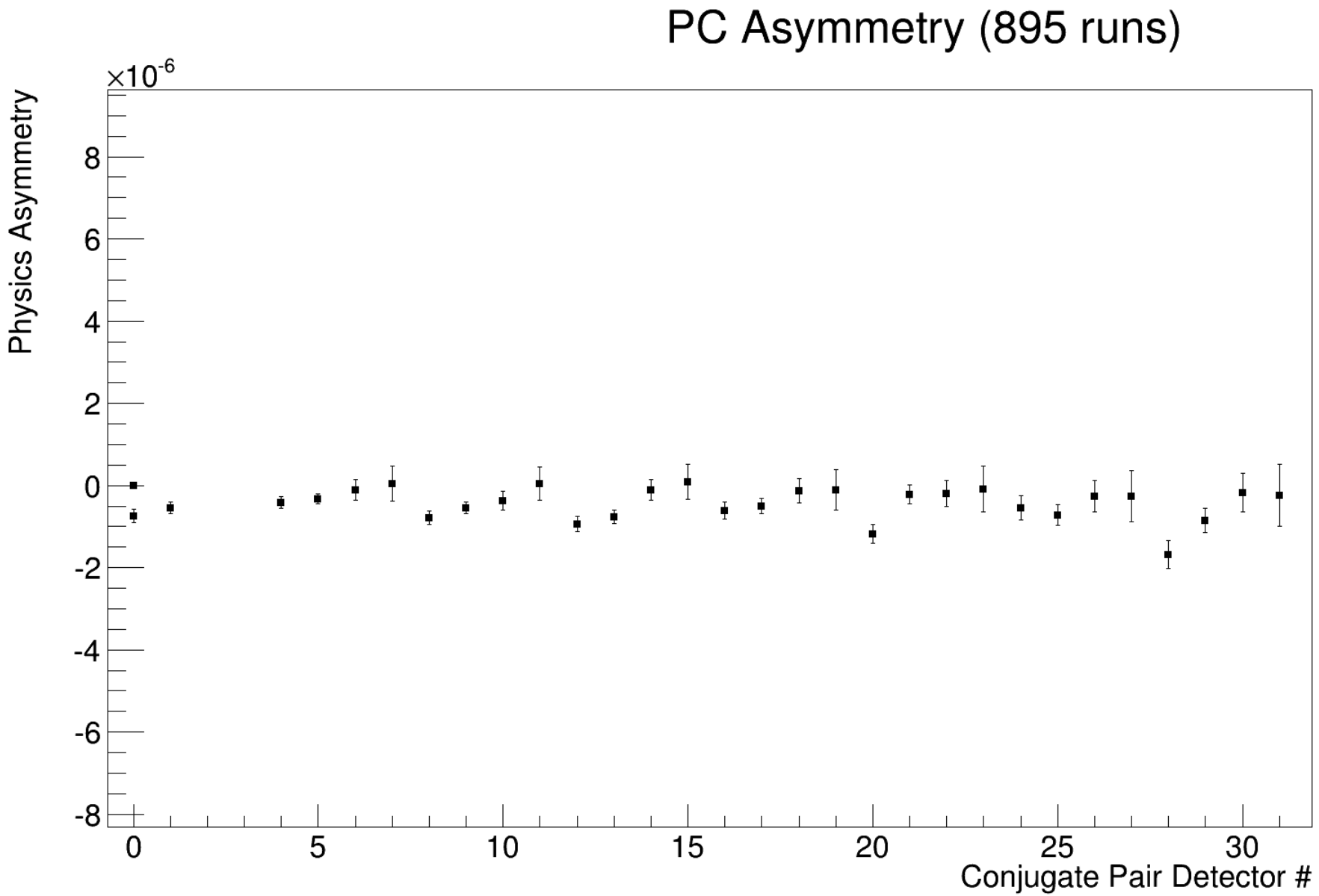
# PC Asymmetry

2. Calculate the total asymmetry using the weighted mean for detector,

$$\mu = \frac{\sum A_m \sigma_m^{-2}}{\sum \sigma_m^{-2}}$$

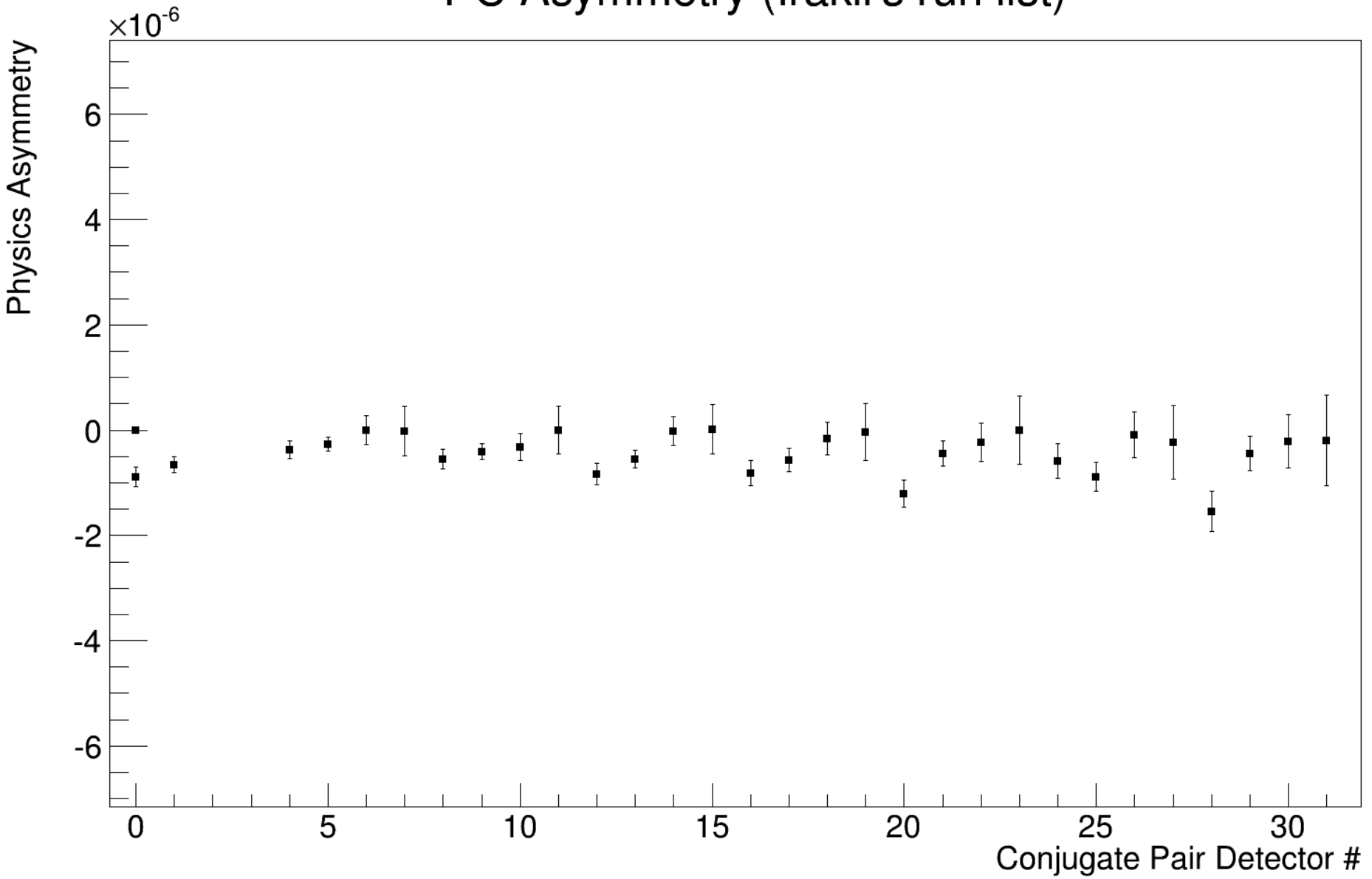
- The error in the asymmetry is,

$$\sigma^2 = \frac{1}{\sigma_m^{-2}}$$



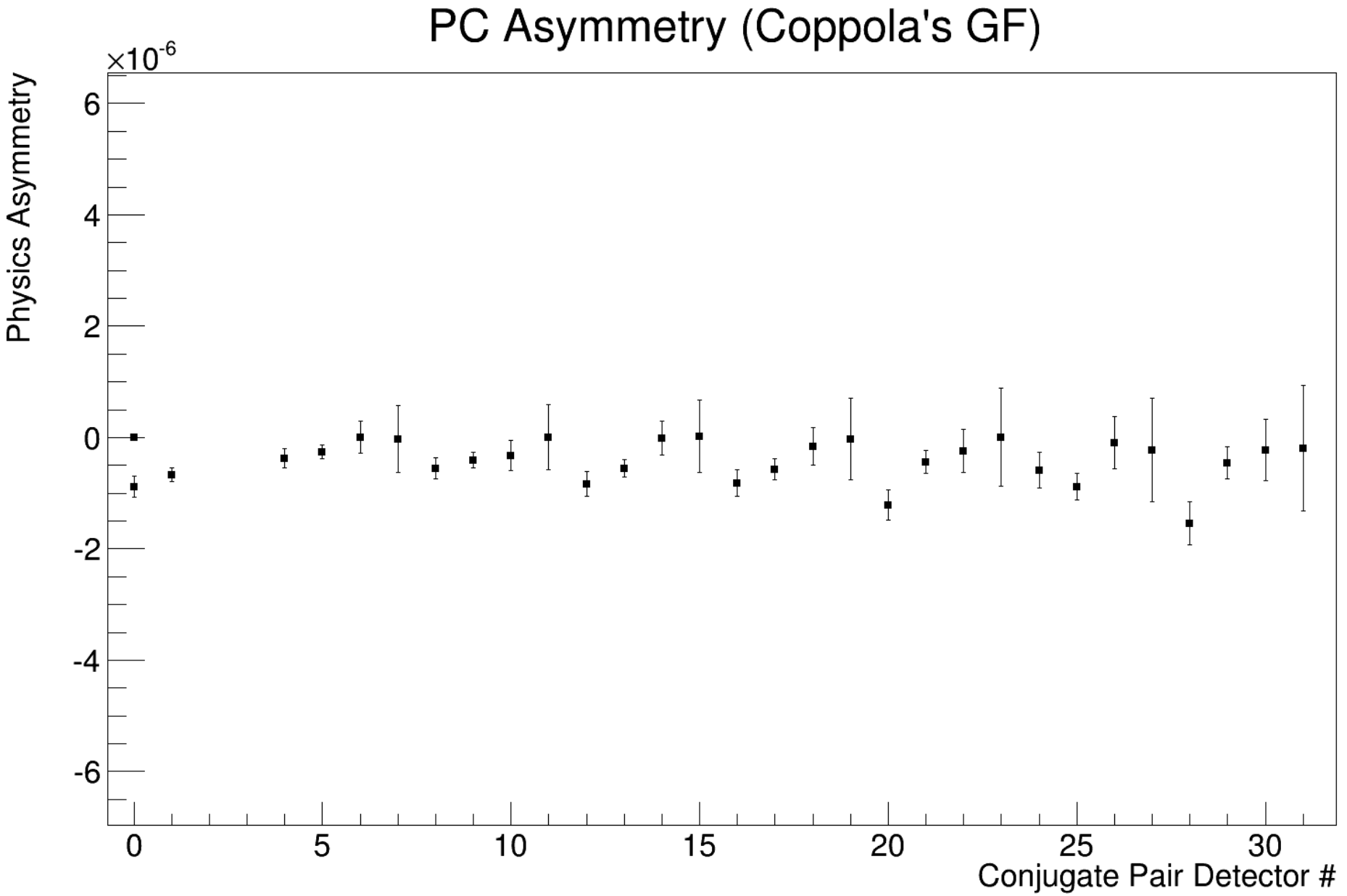

895 effective runs
1.09906e+07 Up-Down spin sequences

Asym=-5.23 x $10^{-7}$ (+/-) 4.008 x $10^{-8}$



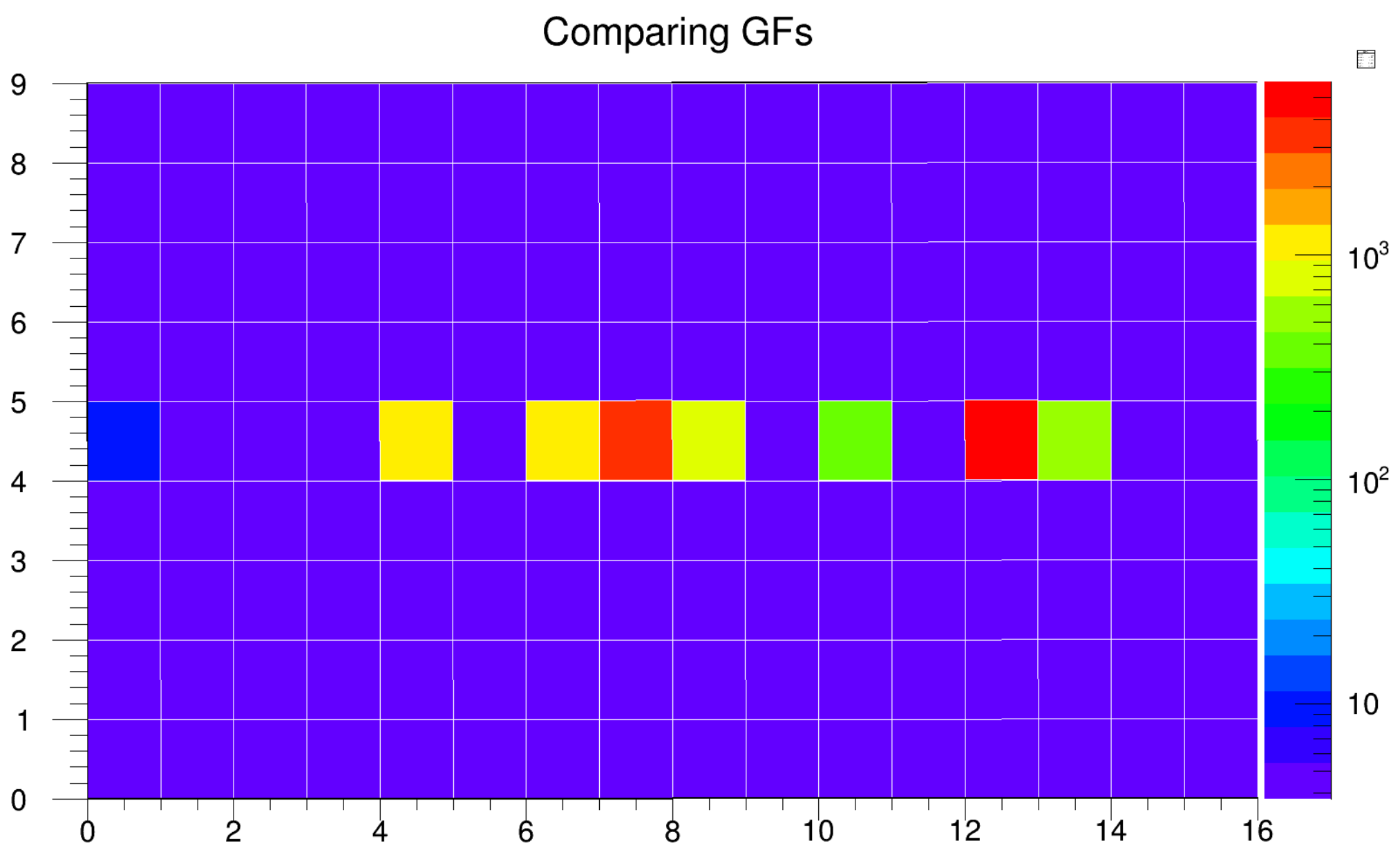

712 effective runs
8.74364e+06 Up-Down spin sequences

Asym=-4.96 x $10^{-7}$ (+/-) 4.49 x $10^{-8}$




732 effective runs
8.96614e+06 Up-Down spin sequences

Asym=-5.17 x $10^{-7}$ (+/-) 4.24 x $10^{-8}$


Comparing GFs
9
8
7
6
5
4
3
2
1
0
0
2
4
6
8
10
12
14
16
$10^3$
$10^2$
10

# PV Asymmetry

- So far runs #18000- #48914 (So far)
- 2.77667e+08 pairs of Up-Down spin sequences.
- Normalized using conjugate pairs.
- Discarded dropped pulses, one before, and the next 8 pulses.
- Discarded bad runs.

# PV Asymmetry

1. Calculate the raw asymmetry ($A_{m,i}$) per conjugate pair-wire m per spin sequence i.

$1 \leqslant m \leqslant 4$

$$B^{\pm}_{m,i} = \frac{Y^{\pm}_{m,i}}{Y^{\pm}_{m,i}} \qquad 2g_m A_{m,i} \approx \frac{B^{+}_{m,i} - B^{-}_{m,i}}{B^{+}_{m,i} + B^{-}_{m,i}}$$

# PV Asymmetry

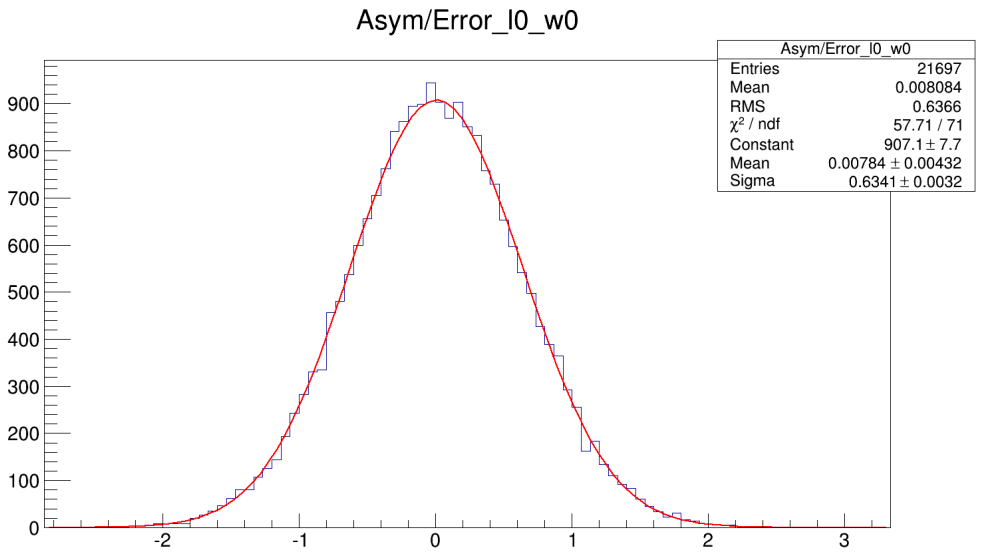
2. Calculate the total asymmetry using the weighted mean for detector,

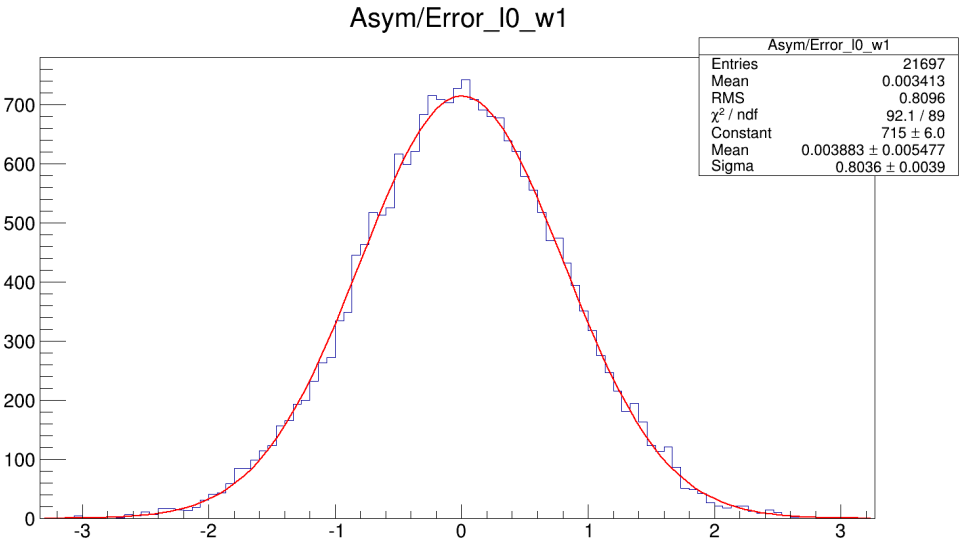
$$\mu = \frac{\sum A_m \sigma_m^{-2}}{\sum \sigma_m^{-2}}$$

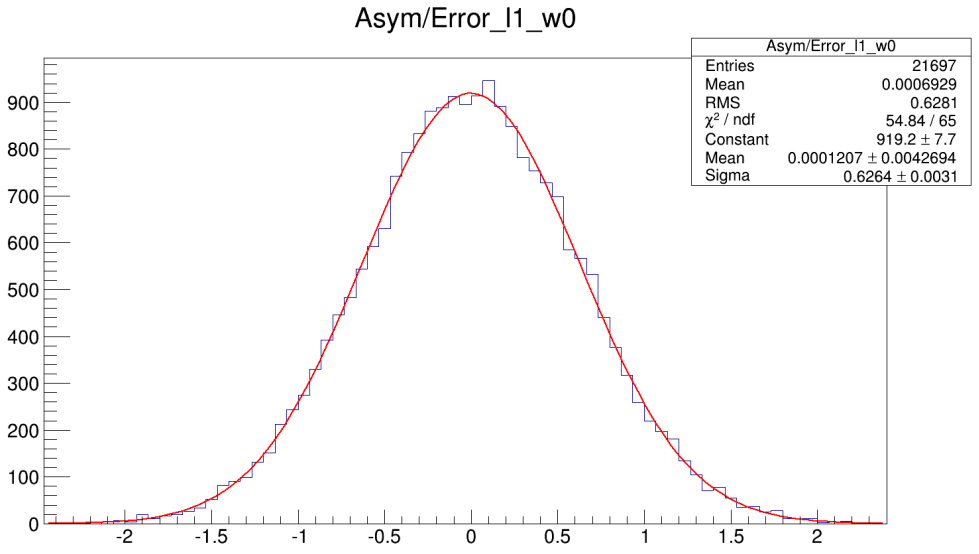
- The error in the asymmetry is,

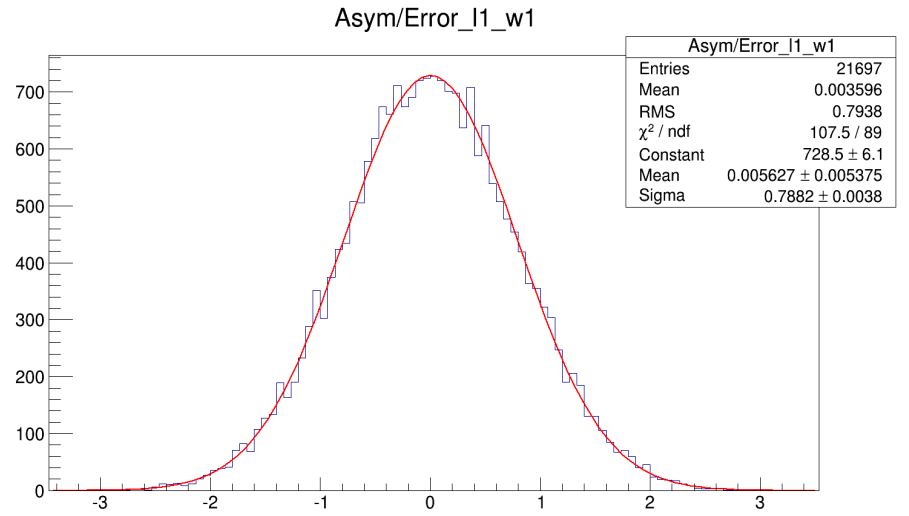
$$\sigma^2 = \frac{1}{\sigma_m^{-2}}$$

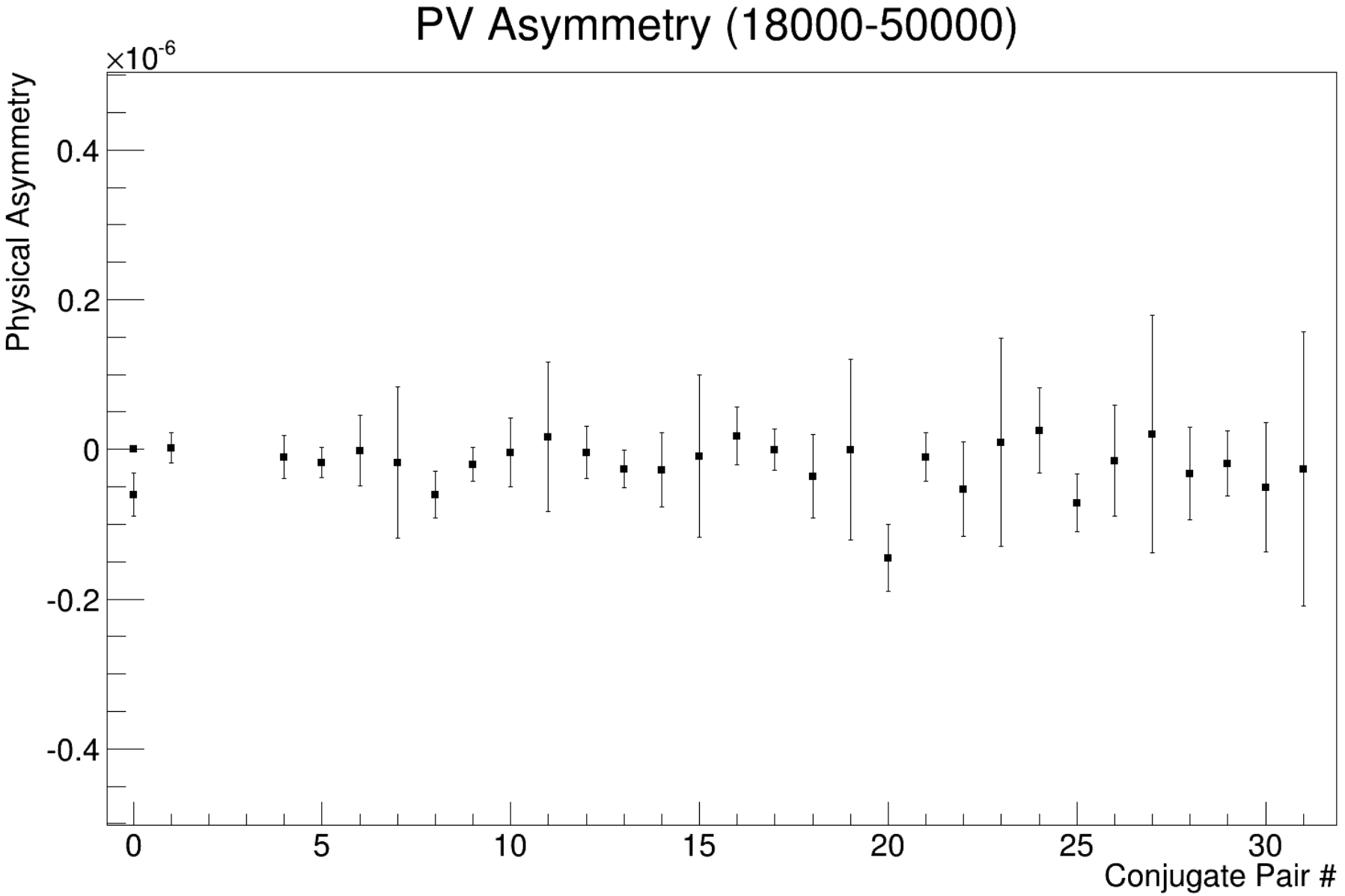
# PV Asymmetry / Error ratio






23475 effective runs

2.87983e+08 Up-Down spin sequences

Asym=-2.22 x $10^{-8}$ (+/-) 6.93 x $10^{-9}$