Out-of-Plane Offset Study

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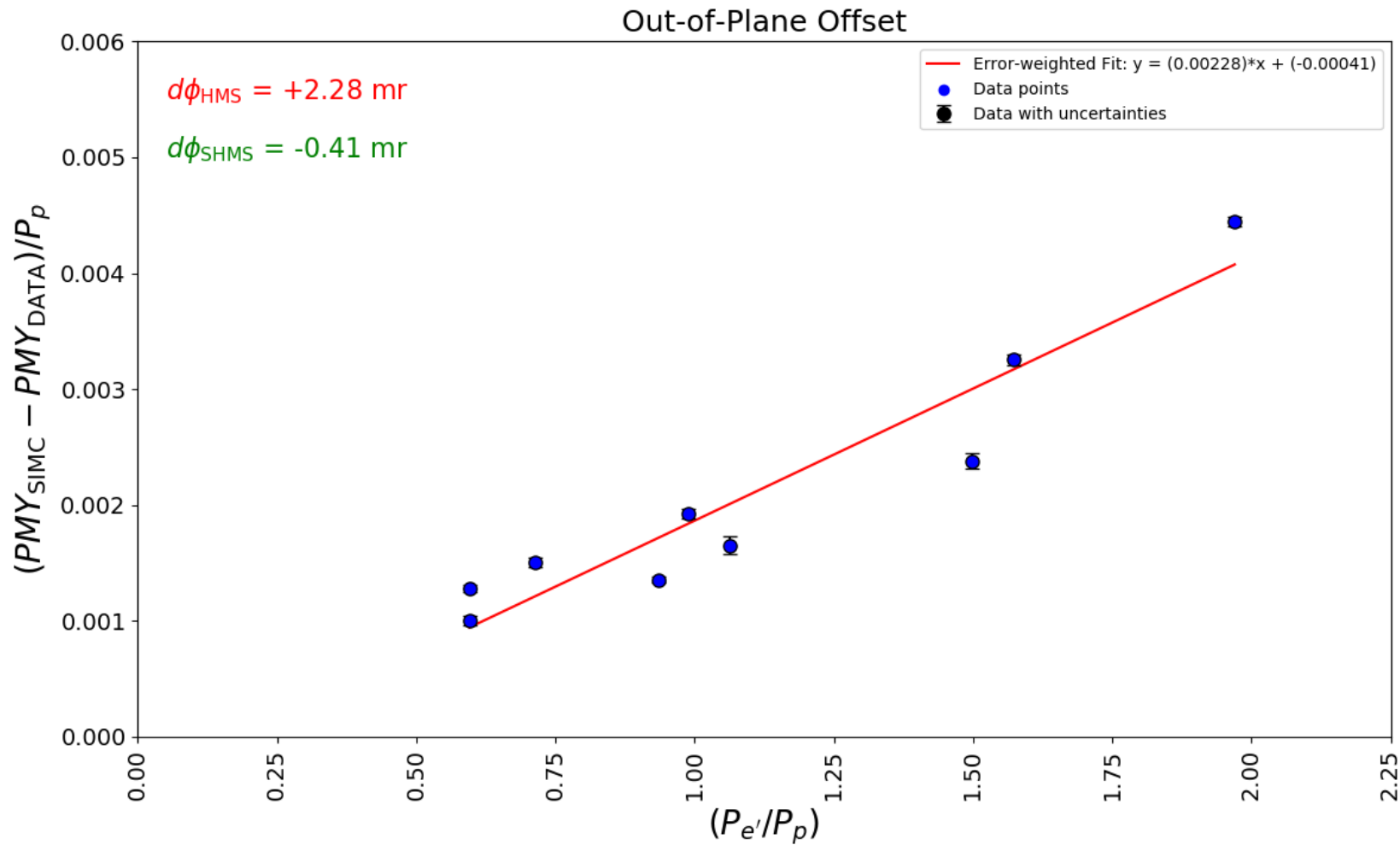**University of Regina, Canada**

HeeP Offset Study

- Working on HeePCoin offset.
- Two issues – Resolved.
- Beam energy value for 7.937GeV was not updated in the standard.kinematics files.
- We took 7.937GeV data in two parts: 1st data taken in Dec 2021 and 2nd data set was taken Jan 2022.

- Used the beam energy values from Mark's wiki page and updated standard.kinematics.
- Updated the report template files and BCM2 for current.
- Calculated the errors for out of plane offset. Got **+1.90mr for HMS** and **-0.07mr for SHMS**

Next step, working on HMS detector efficiencies.

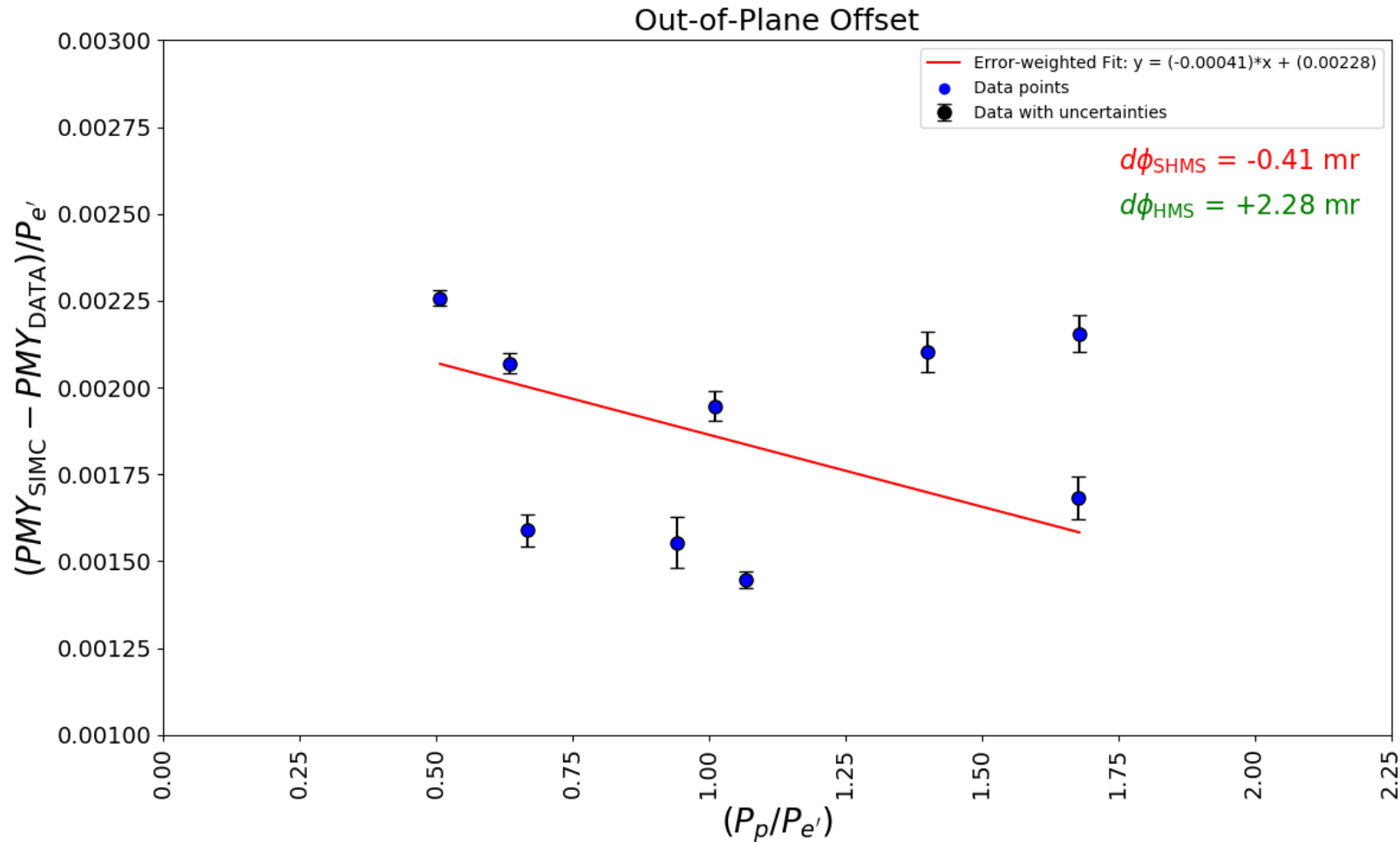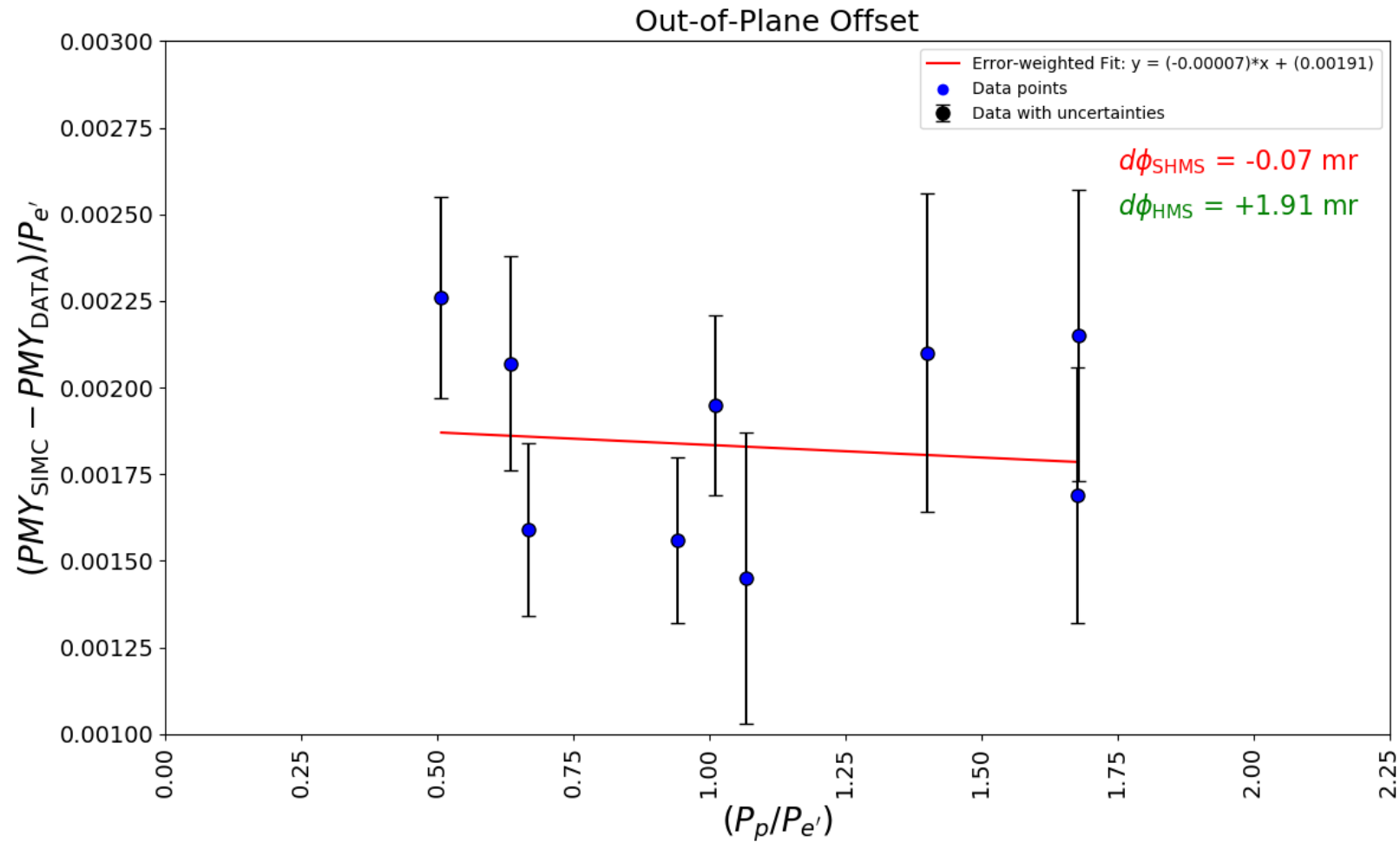**Before**

Out-of-Plane Offset

$d\phi_{HMS} = +2.28$ mr

$d\phi_{SHMS} = -0.41$ mr

Legend:
— Error-weighted Fit: y = (0.00228)*x + (-0.00041)
• Data points
⬤ Data with uncertainties

y-axis: $(PMY_{SIMC} - PMY_{DATA})/P_p$

x-axis: $(P_{e'}/P_p)$

After

Out-of-Plane Offset

$d\phi_{HMS}$ = +1.90 mr

$d\phi_{SHMS}$ = -0.07 mr

Error-weighted Fit: y = (0.00190)*x + (-0.00007)
Data points
Data with uncertainties

$(PMY_{SIMC} - PMY_{DATA})/P_p$

$(P_{e'}/P_p)$
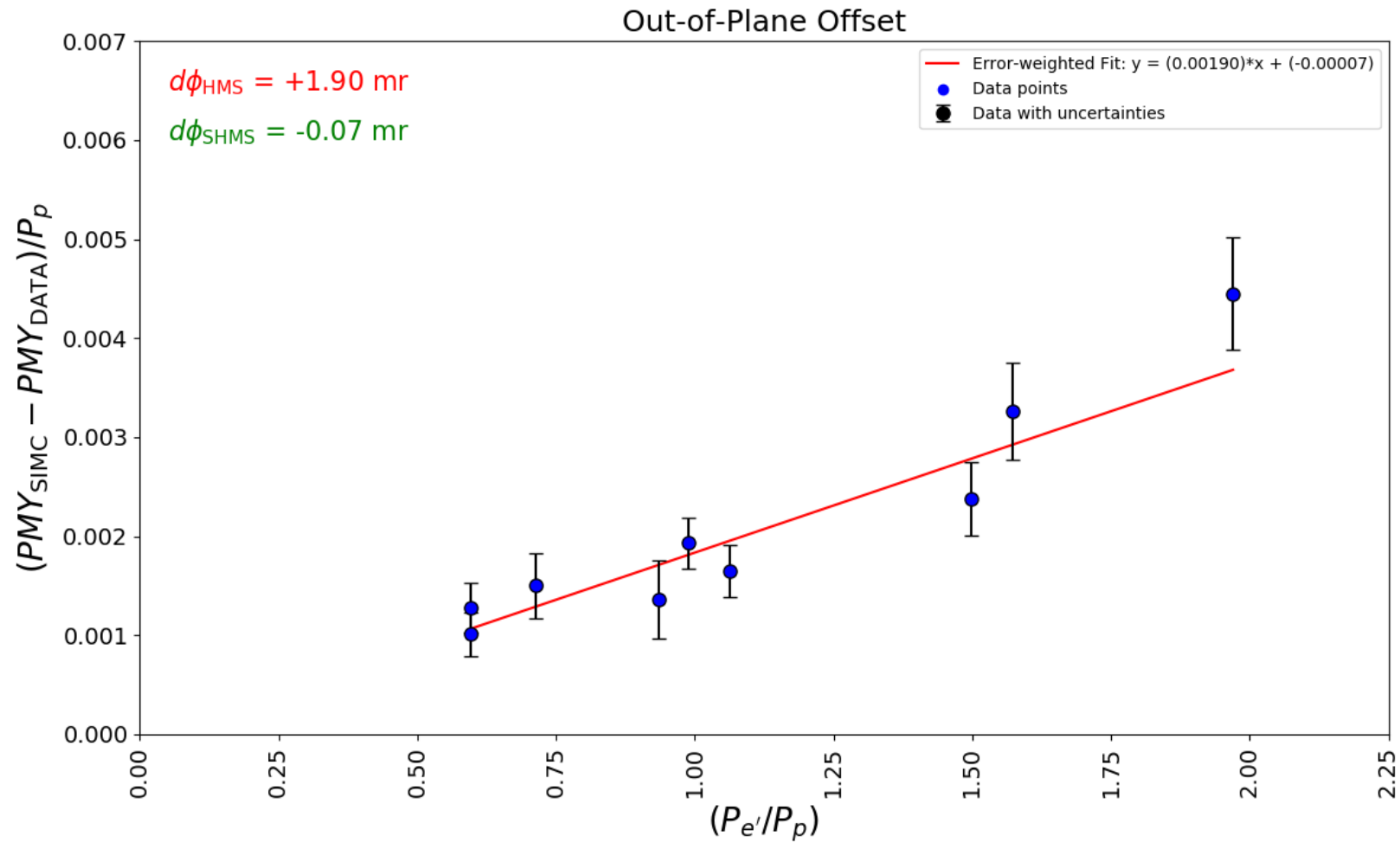
Before

After

- Error Calculation:

$$\sqrt{\left(\frac{Pmyerr\_simc}{p}\right)^2 + \left(\frac{Pmyerr\_data}{p}\right)^2 + \left(\frac{0.00137}{p}\right)^2}$$

- Added systematic uncertainty to my error calculation.

- And got;

$$\frac{\chi^2}{NDF} \approx 1$$