AOS: Engineering Time
Jan 24, 2013

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THE DARK ENERGY SURVEY

Summary

- Desire is to have full hexapod control always enabled.
- There are a few cases where donut analysis does not get a good fit (not enough stars). u-band, very short exposures, too many stars?, others?
- AOS updated to zero hexapod updates in case of "bad fit."
- Engineering time of Jan. 24 showed this is works
  - except for PID integral term (now fixed).

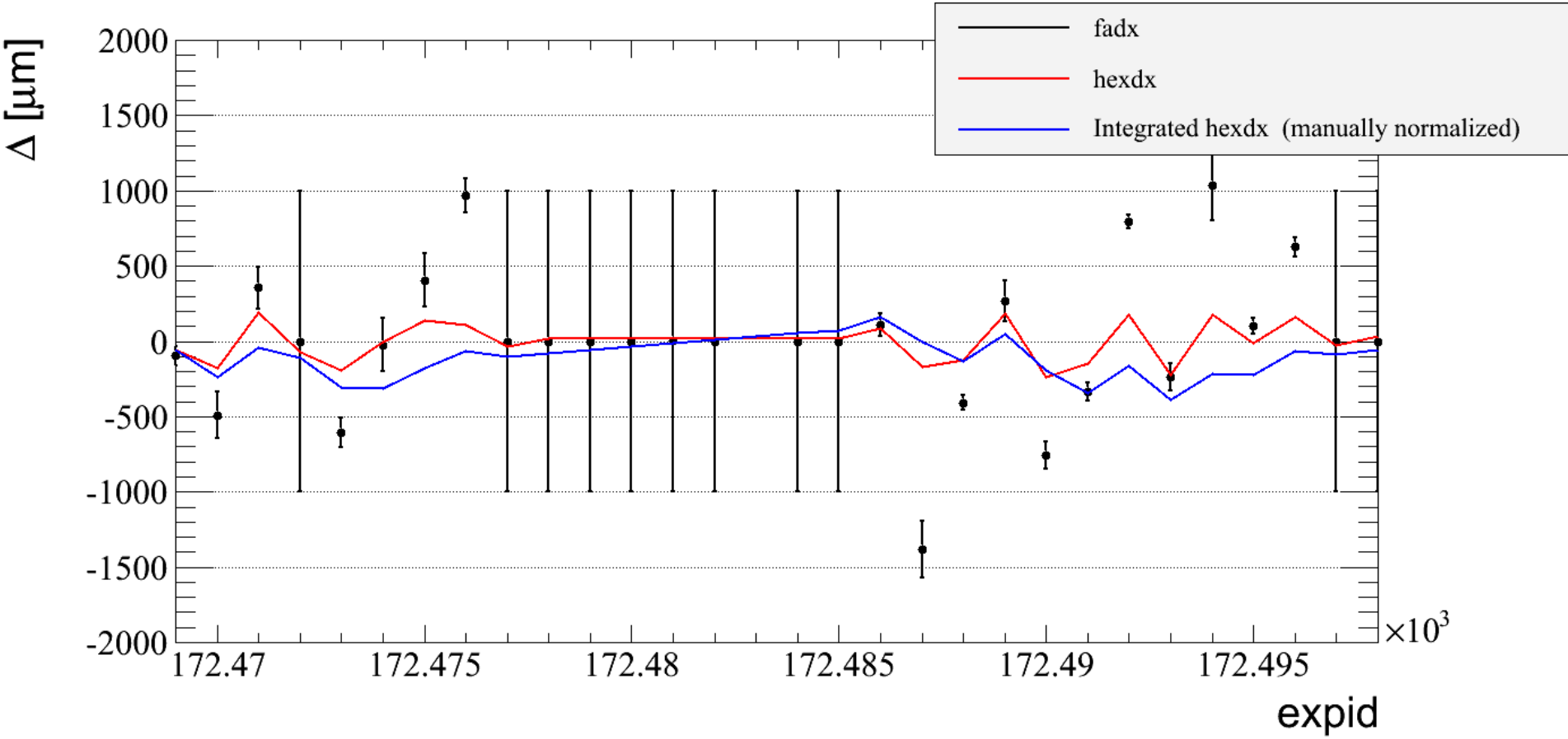
Stress tests

- Observe with low/medium and high stellar density
  - 30 second z filter exposures
  - Observe u filter in decreasing durations
  - 60, 30, 15, 5 second exposures in z
  - Single field tracked far all of the above exposures
- Data collected by Alistair Walker (thank you)

Figures that follow

- Pairs of slides dx/dy
- Low, medium, high, very high star counts
  - Black dots (with errors) – alignment error
    - Hexapod correction needed as measured by donuts
  - Red line – tweak sent to hexapod
    - Note tweak = alignment error after PID
  - Blue line – sum of tweaks (running trim)
- All cut alignment errors have error bars set to +=1000 um (easier to see which points ignored)

Low Stellar Density (b=-61)



30 s z-band

Decreasing length u-band

Decreasing Length z-band

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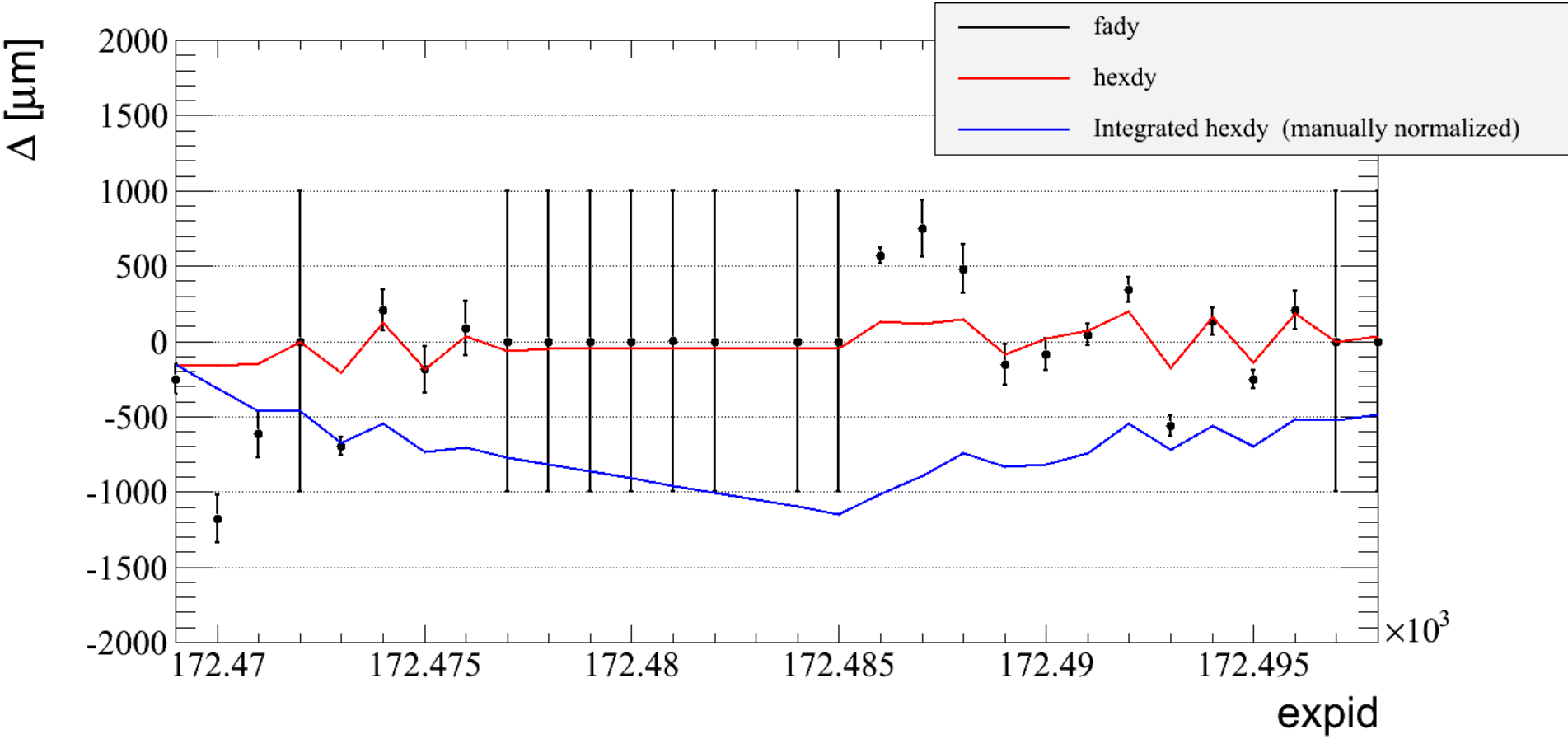
Low Stellar Density (b=-61)



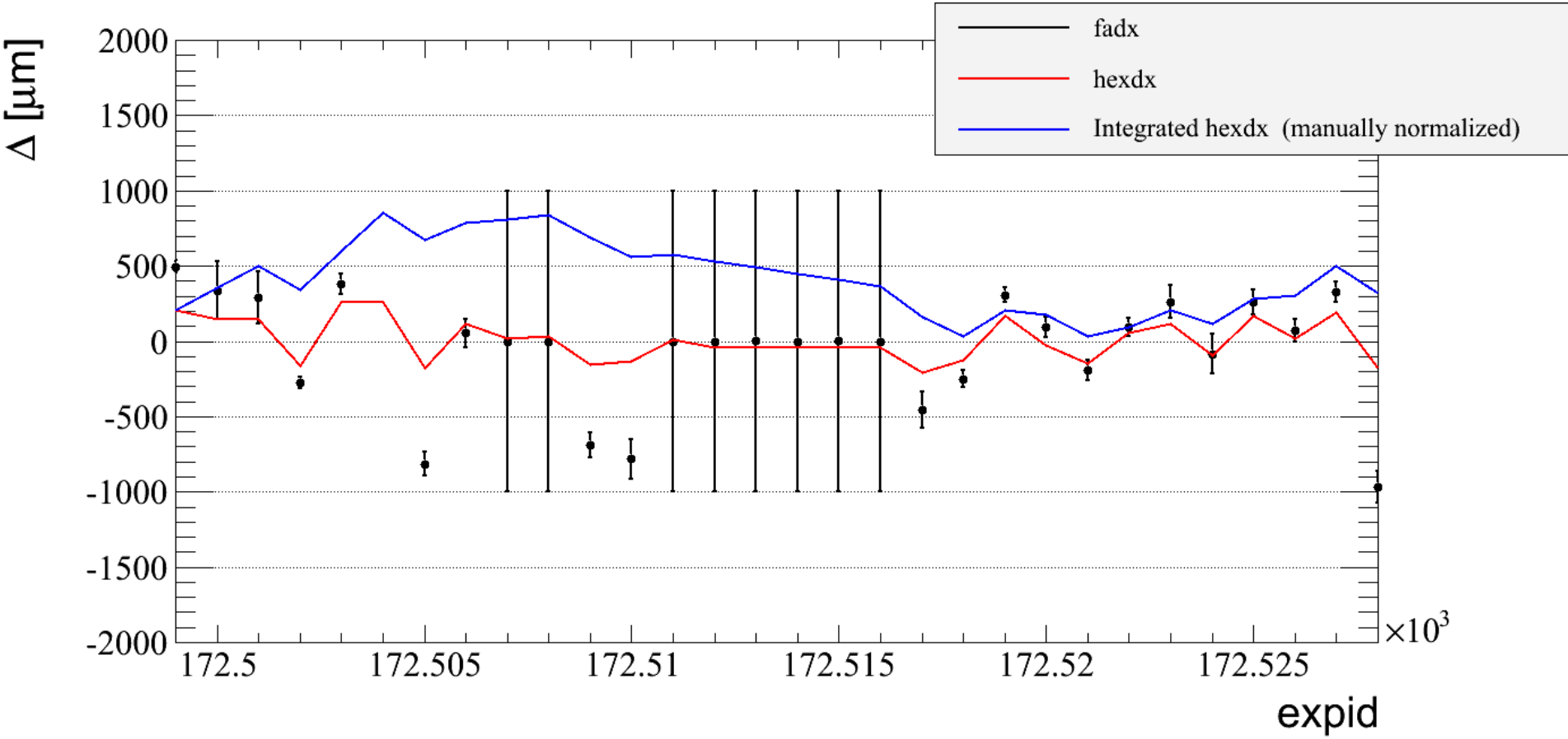
30 s z-band

Decreasing length u-band

Decreasing Length z-band

THE DARK ENERGY SURVEY

Med Stellar Density (b=-36)



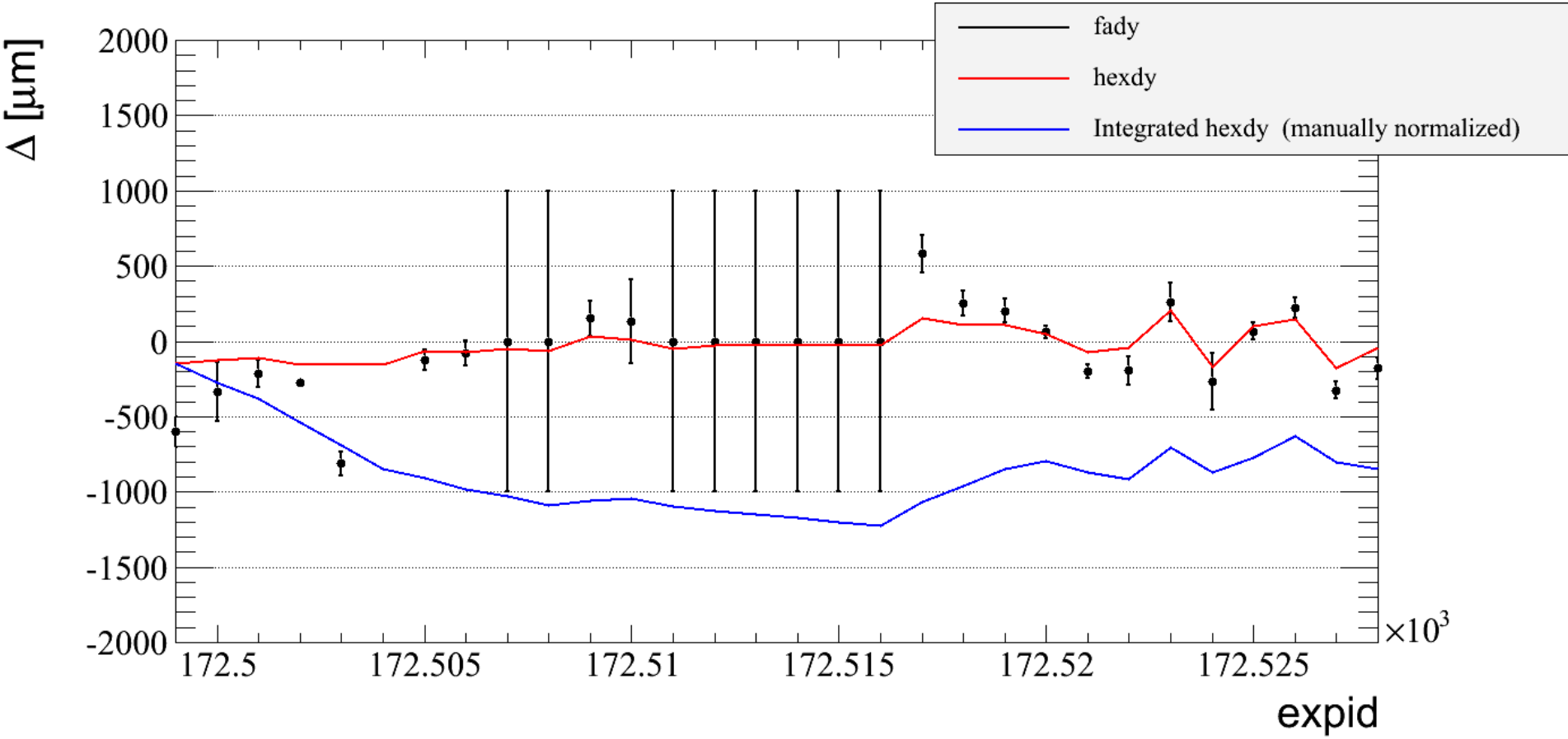
30 s z-band

Decreasing length u-band

Decreasing Length z-band

THE DARK ENERGY SURVEY

Medium Stellar Density (b=-36)



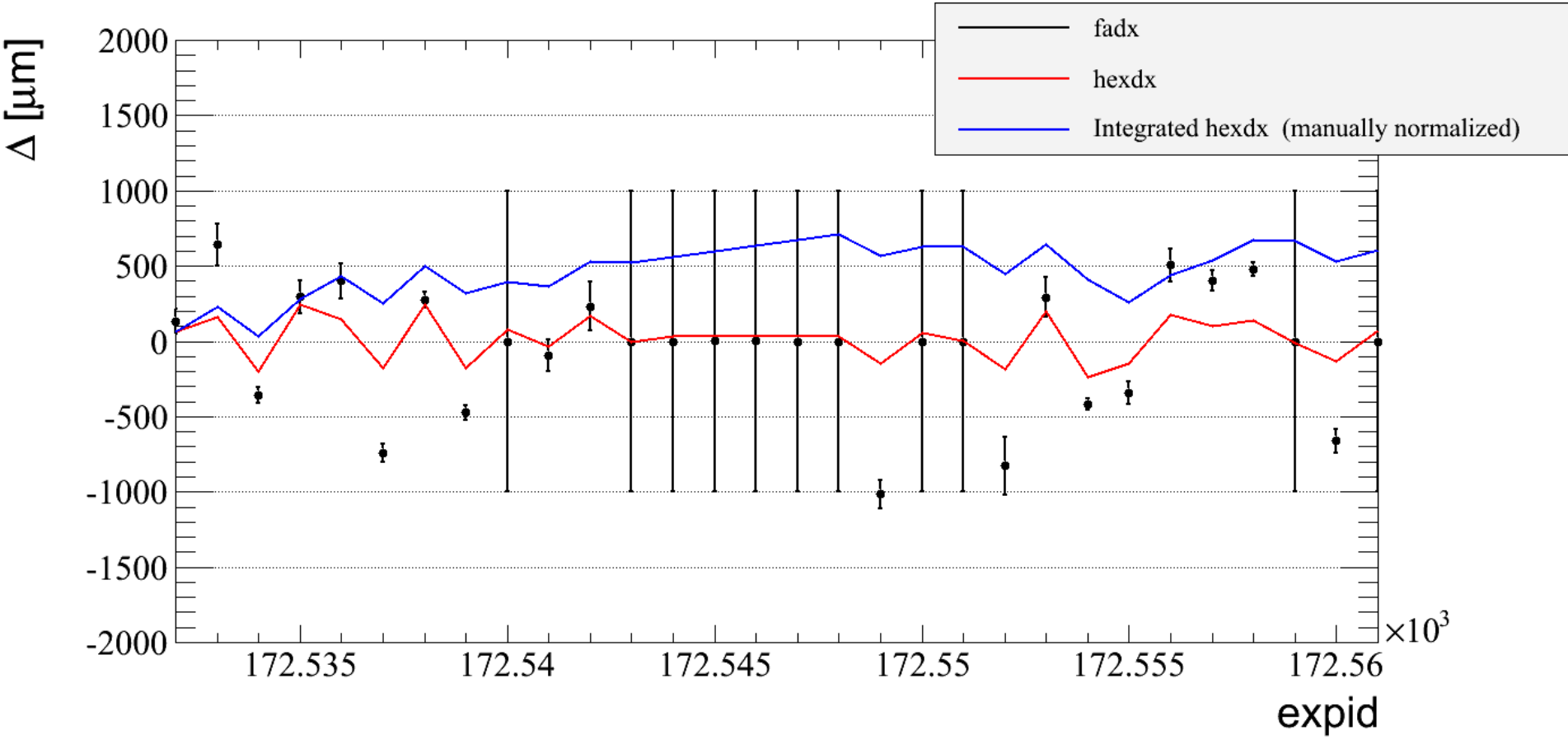
30 s z-band

Decreasing length u-band

Decreasing Length z-band

THE DARK ENERGY SURVEY

High Stellar Density (b=-20)



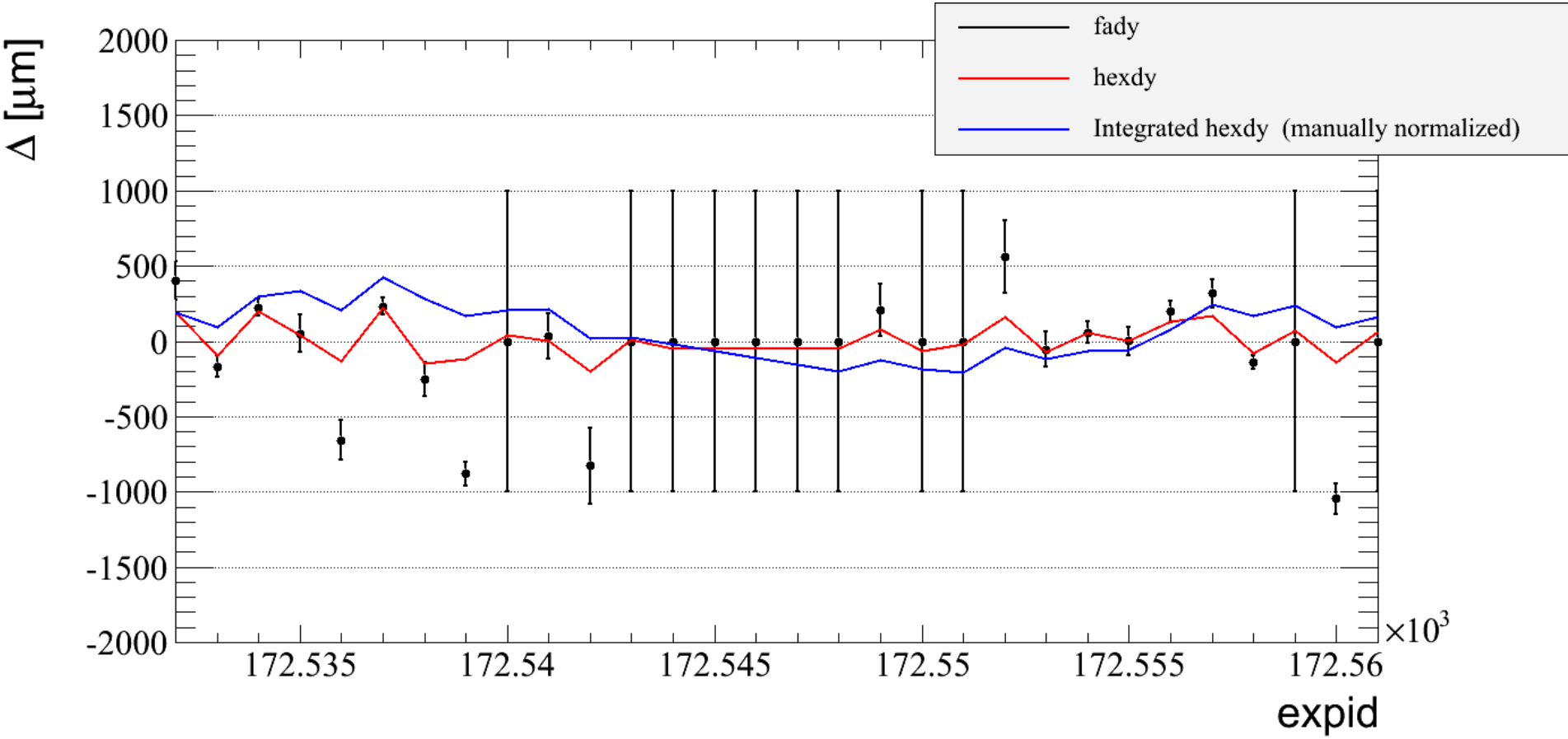
30 s z-band

Decreasing length u-band

Decreasing Length z-band

THE DARK ENERGY SURVEY

High Stellar Density (b=-20)



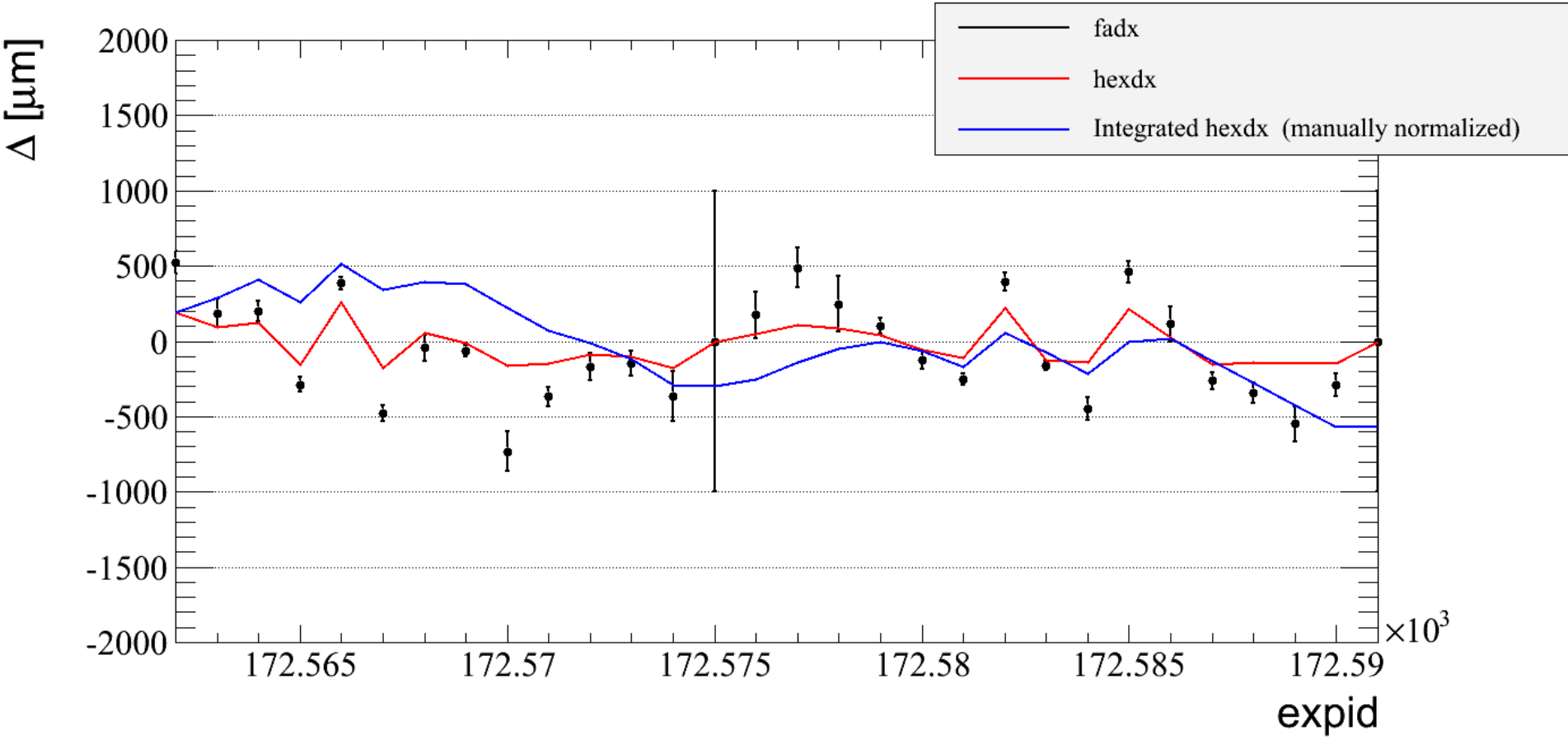
30 s z-band

Decreasing length u-band

Decreasing Length z-band

THE DARK ENERGY SURVEY

High Stellar Density (b=0)



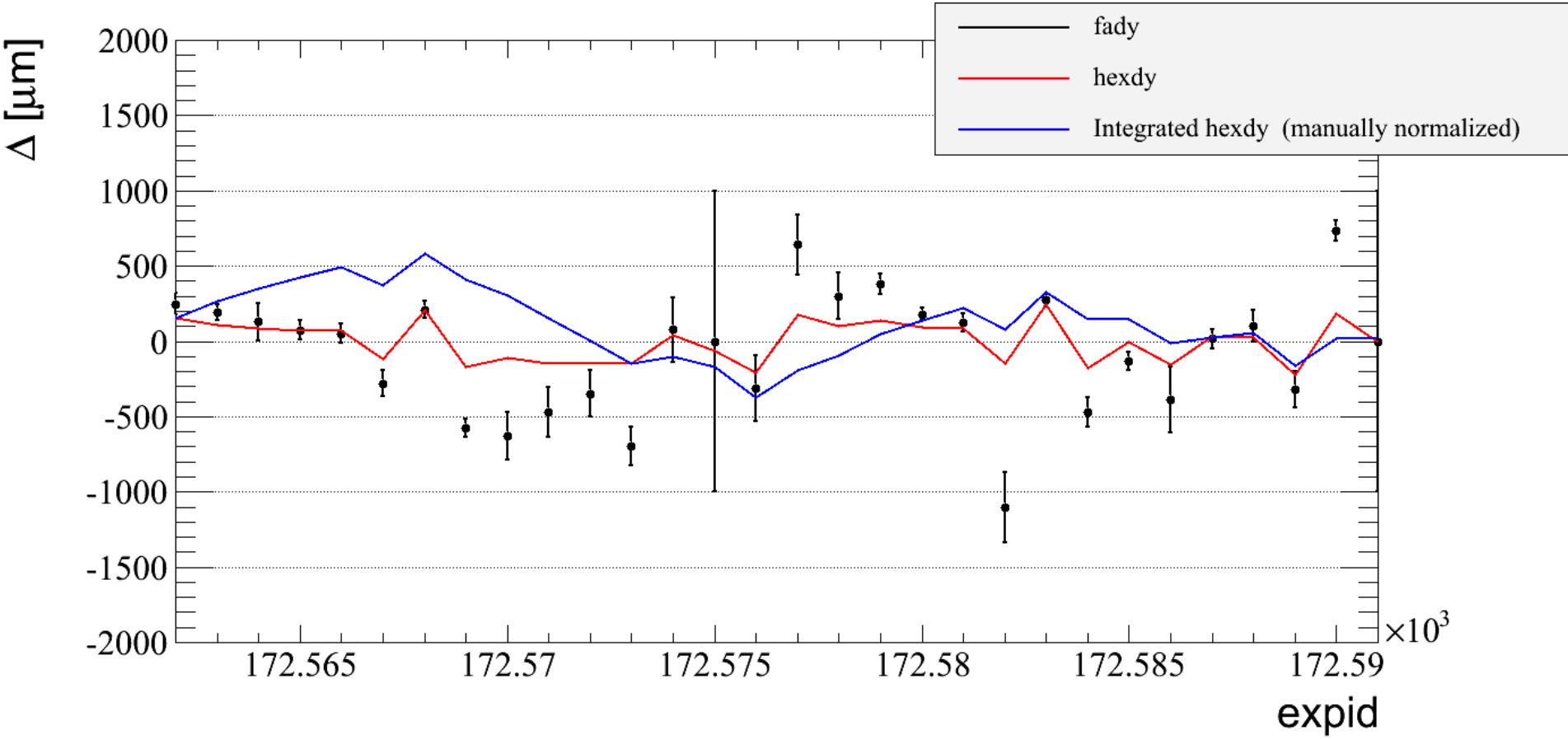
30 s z-band

Decreasing length u-band

Decreasing Length z-band

THE DARK ENERGY SURVEY

High Stellar Density (b=0)



30 s z-band

Decreasing length u-band

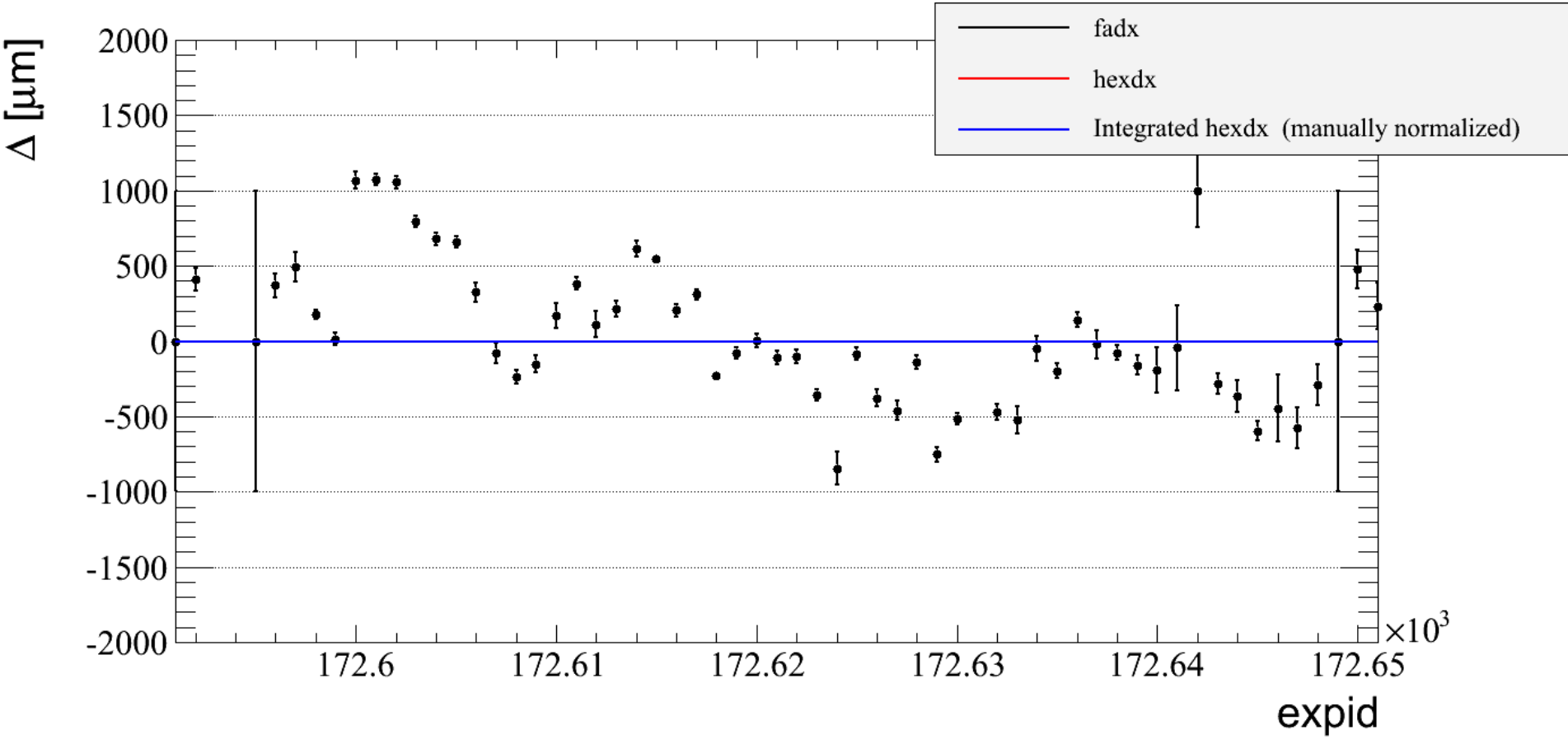
Decreasing Length z-band

THE DARK ENERGY SURVEY

Items of note

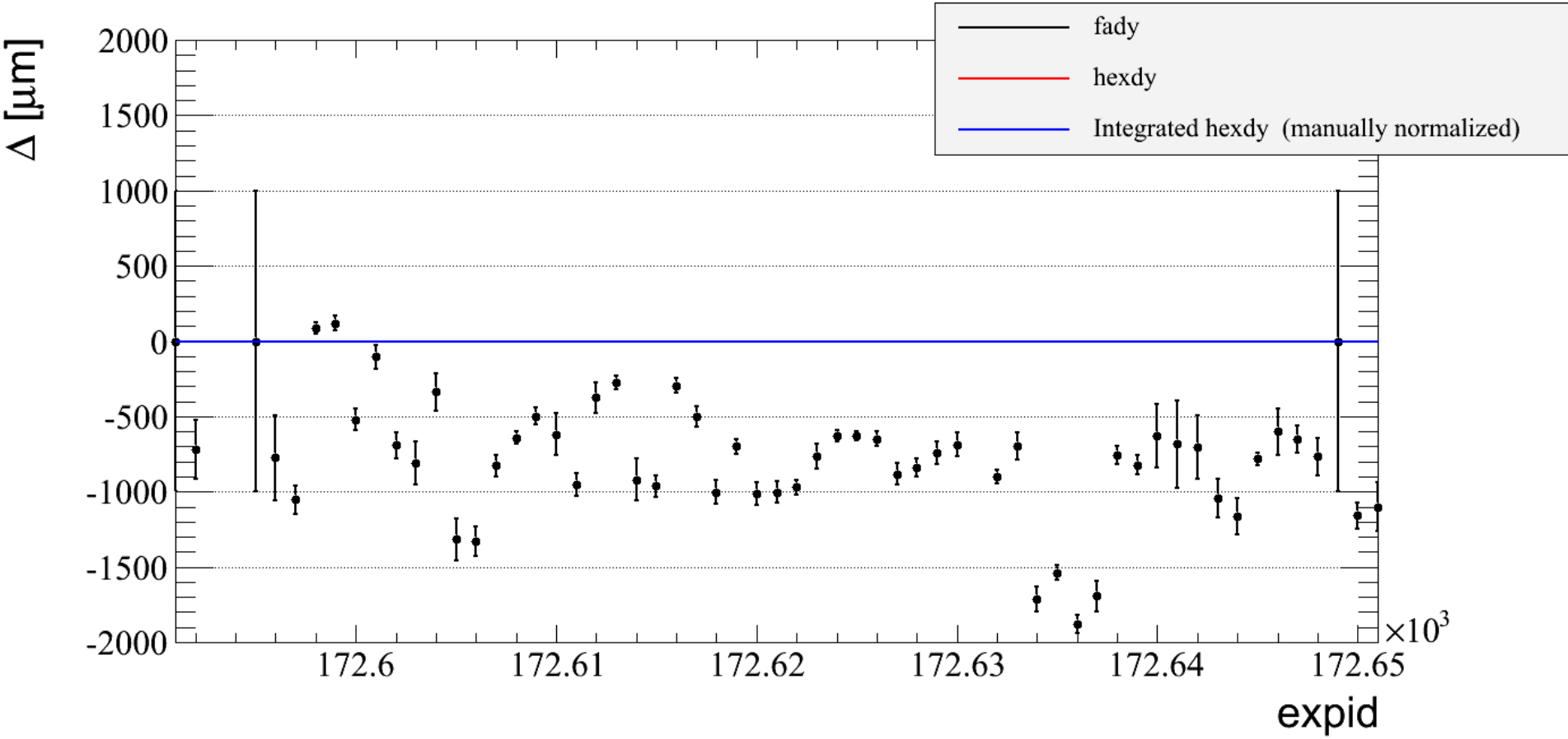
- AOS zeros update request in u-band as needed
  - Small hexapod update continues due to PID integral term (now fixed)
- Even at high star counts AOS performs well (and even works in u-band)
- Only small changes to hexapod per exposure
  - But mean kept near zero

AOS off (LUT only)



THE DARK ENERGY SURVEY

AOS off (LUT only)



THE DARK ENERGY SURVEY

Summary

- With PID integral fix (done)
  - the full AOS should perform well even in conditions far from nominal
    - Short exposures
    - u-band
    - Galactic plane
- New code has been in use for several weeks now.