



PFM3 Test Results

SPIRE SDAG Meeting

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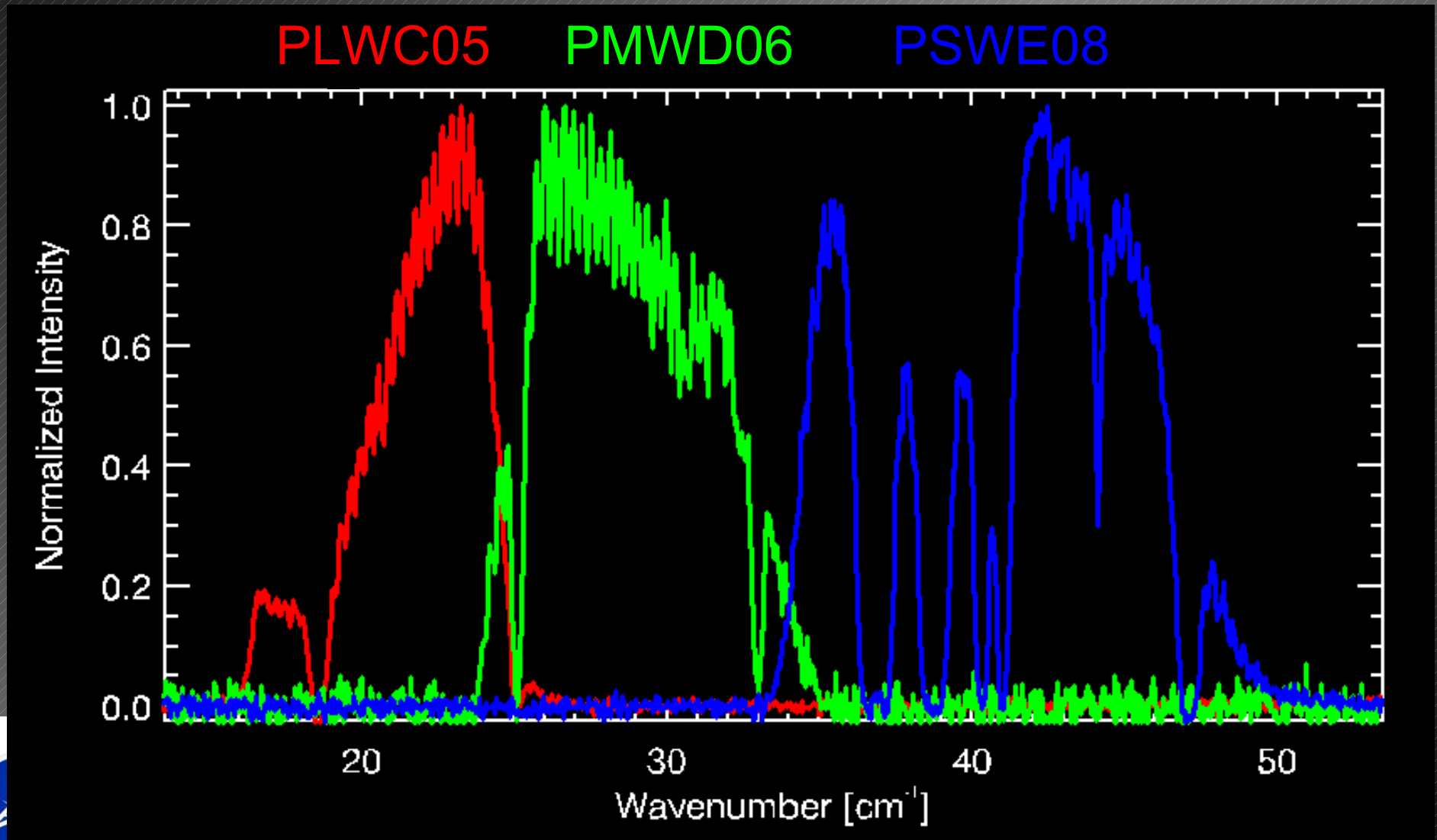
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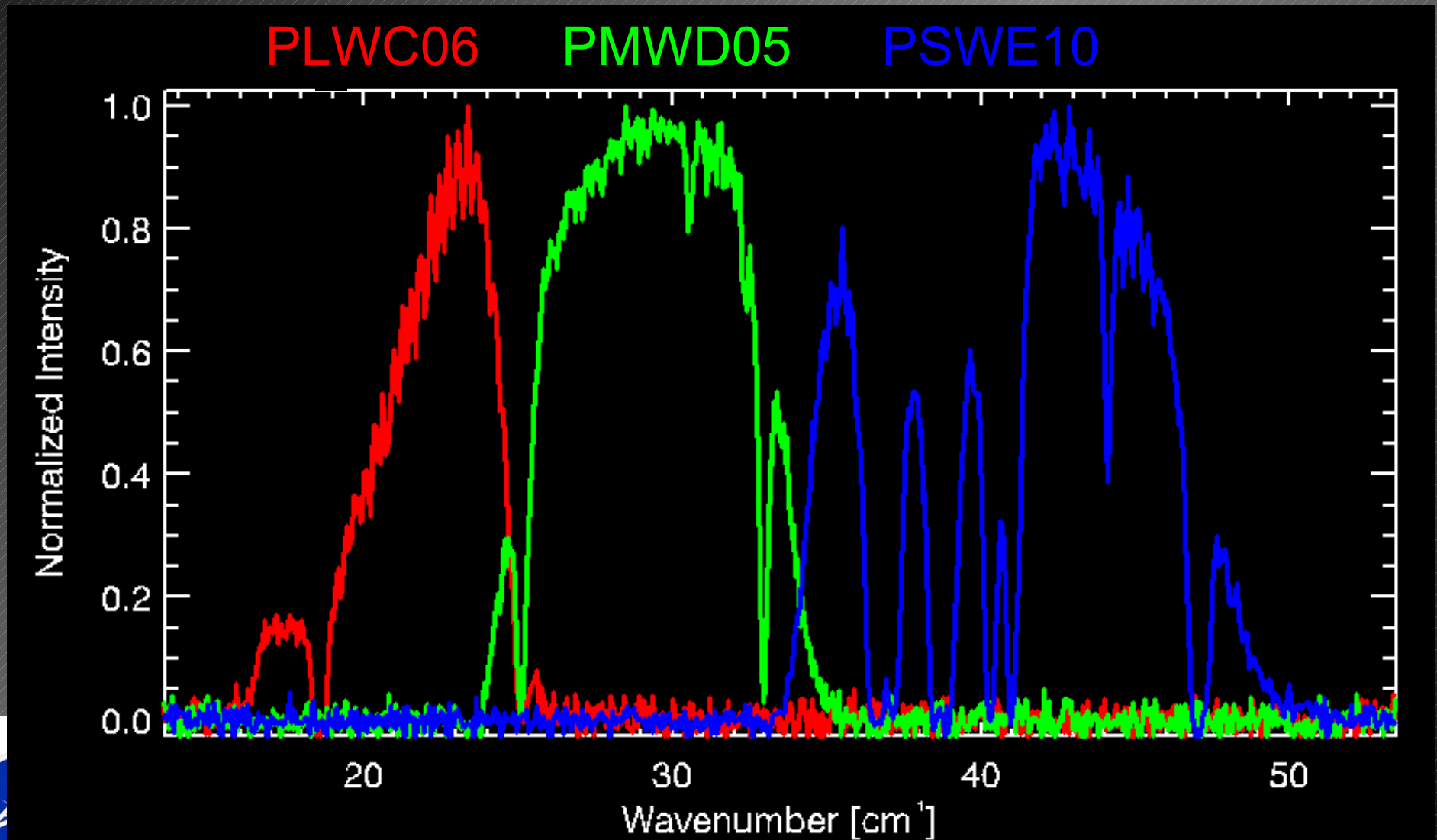
Photometer Results

- Two overnight TFTS observations were analyzed:
 - May 9: PSWE08, PMWD06, PLWC05
 - May 11: PSWE10, PMWD05, PLWC06
 - For both observations:
 - Scan Range: 10mm – 90mm MPD (ZPD@~35mm)
 - Resolution ~ 0.045 cm⁻¹
 - Scan Speed: 0.1 mm/s MPD

Photometer Results



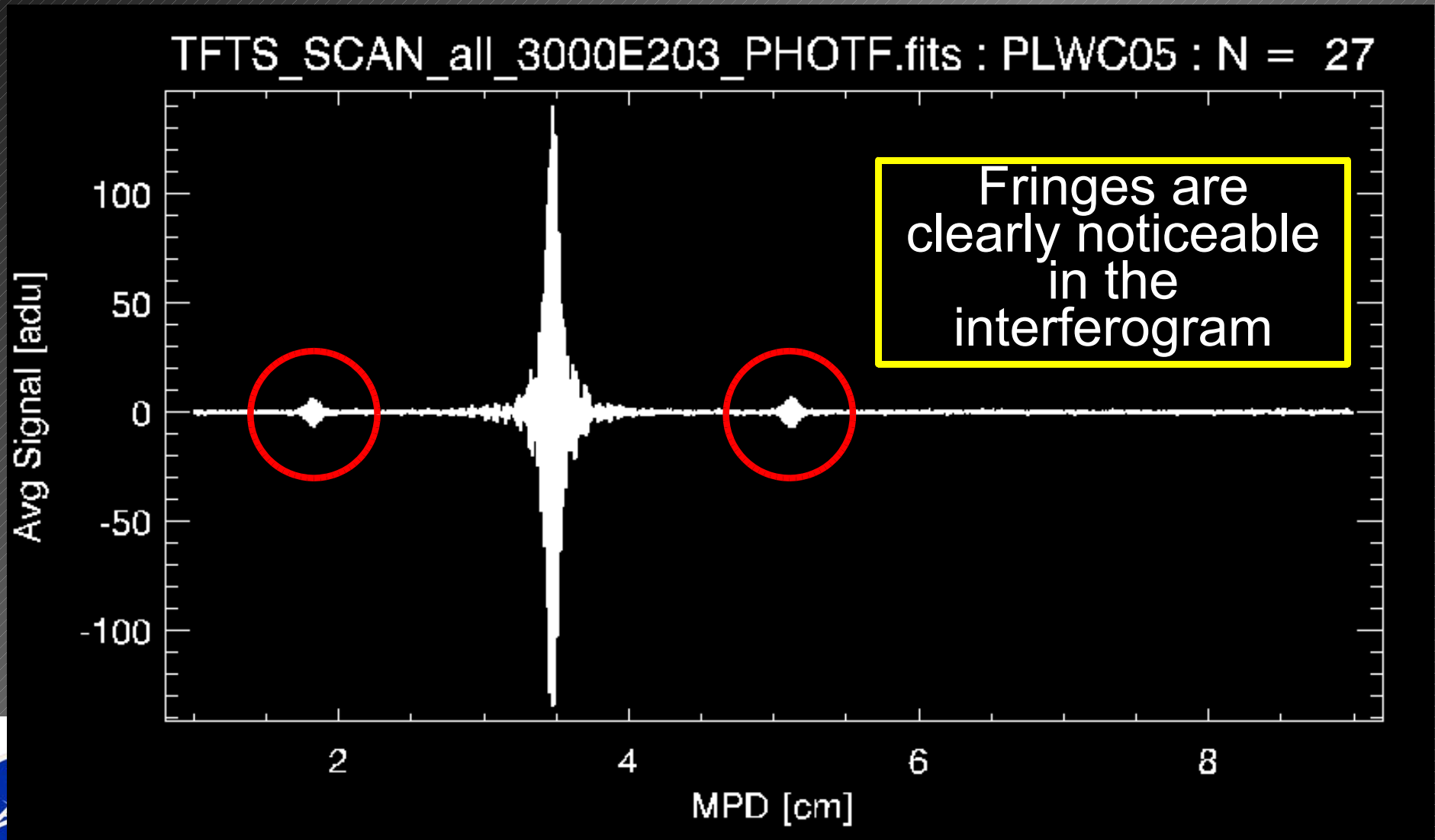
Photometer Results



Photometer Results

- Observations:
 - Response seems to trail off at high wavenumbers for pixel PMWD06.
 - Still see the lower response at low wavenumbers for PLW pixels.
 - Fringing is noticeable on PLW and PMW pixels, though not so much on PSW pixels.
 - Fringing of this kind has been seen on the spectrometer pixels, but had not been noticed previously for the photometer pixels.

Photometer Results



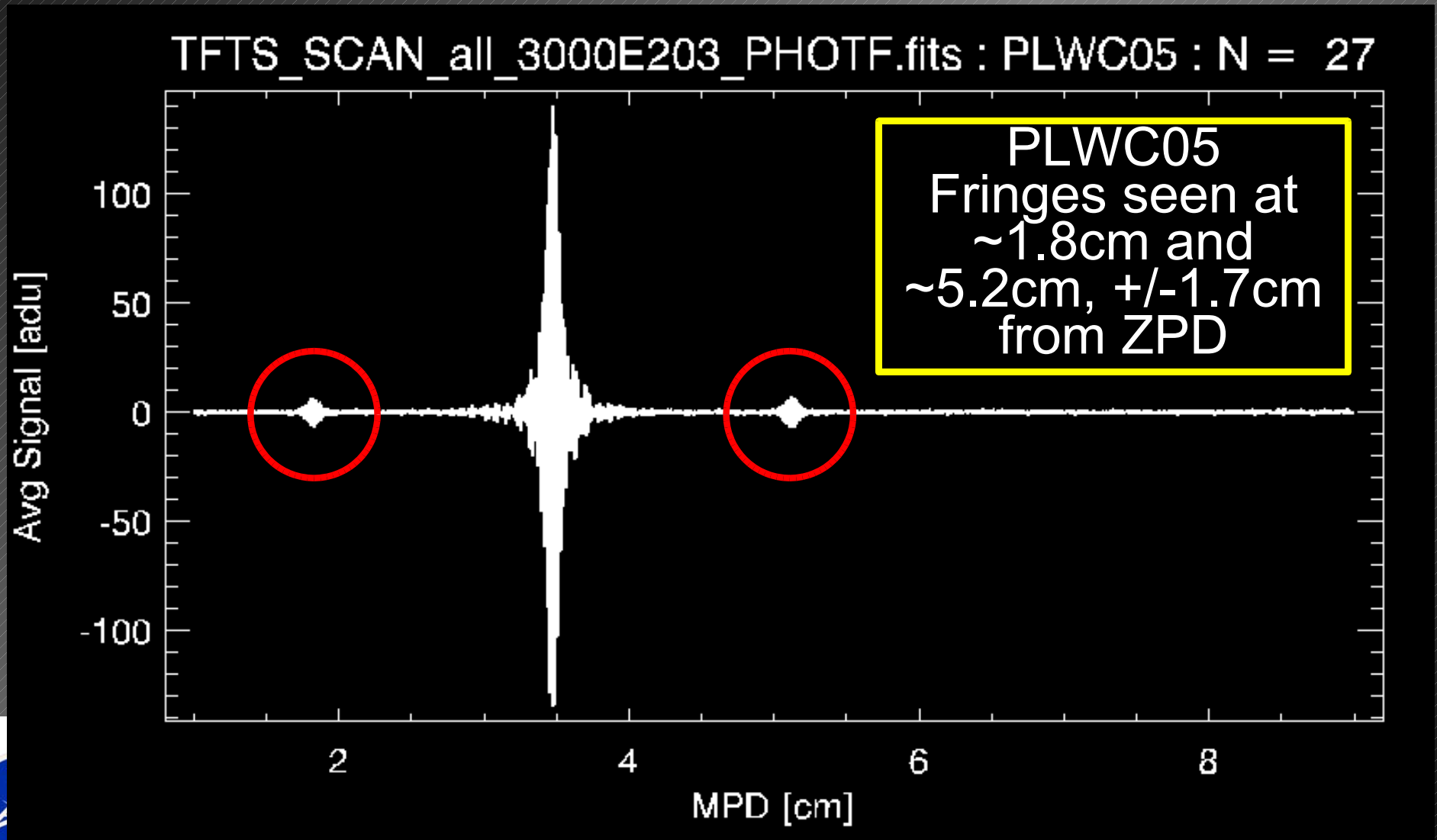
Photometer Results

- Fringing of this kind is caused by plane parallel cavities within this system.
- Possible causes for this fringing:
 1. A thermal filter that was installed inside the cryostat for the PFM3 test campaign.
 2. Filter assembly of the Photometer BDAs (similar to the cause of the Spectrometer fringing).

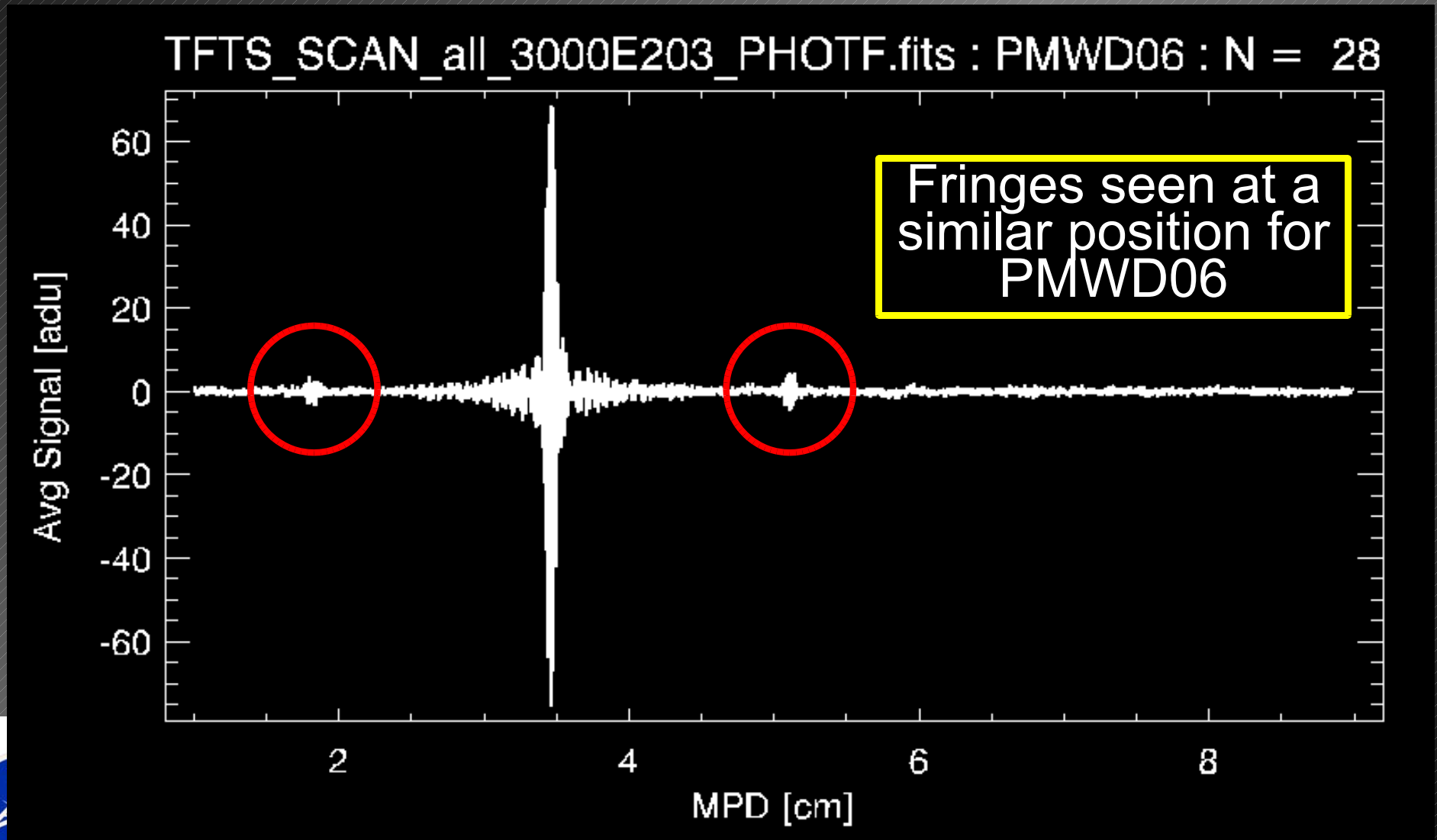
Photometer Results

1. A thermal filter that was installed inside the cryostat for the PFM3 test campaign.
 - If this were the cause, we would expect to see the fringing at the same MPD for all pixels (independent of the BDA).
 - Also, since this component is new for PFM3, we would not expect to see evidence of fringing in the PFM2 interferograms.

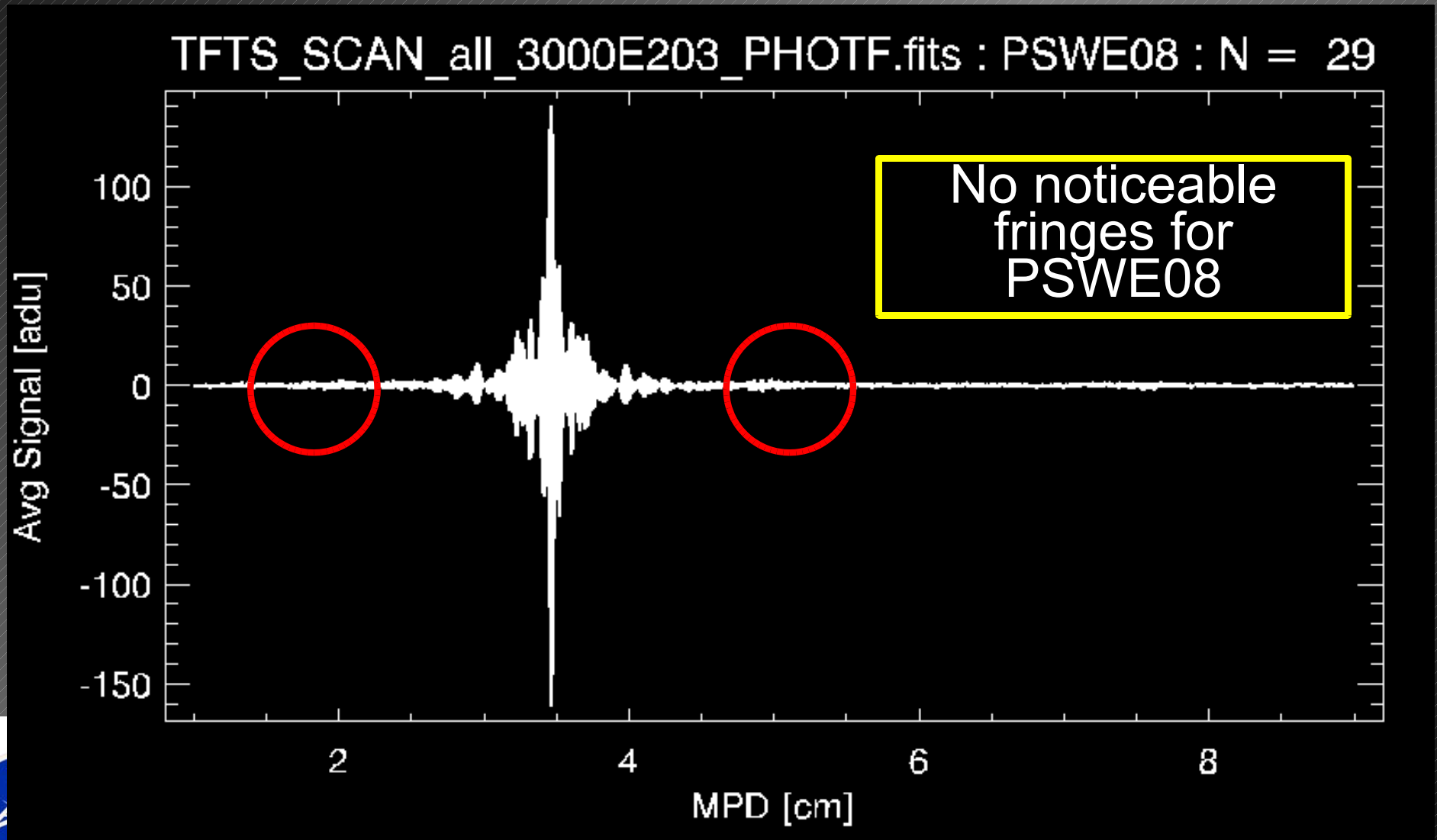
Photometer Results



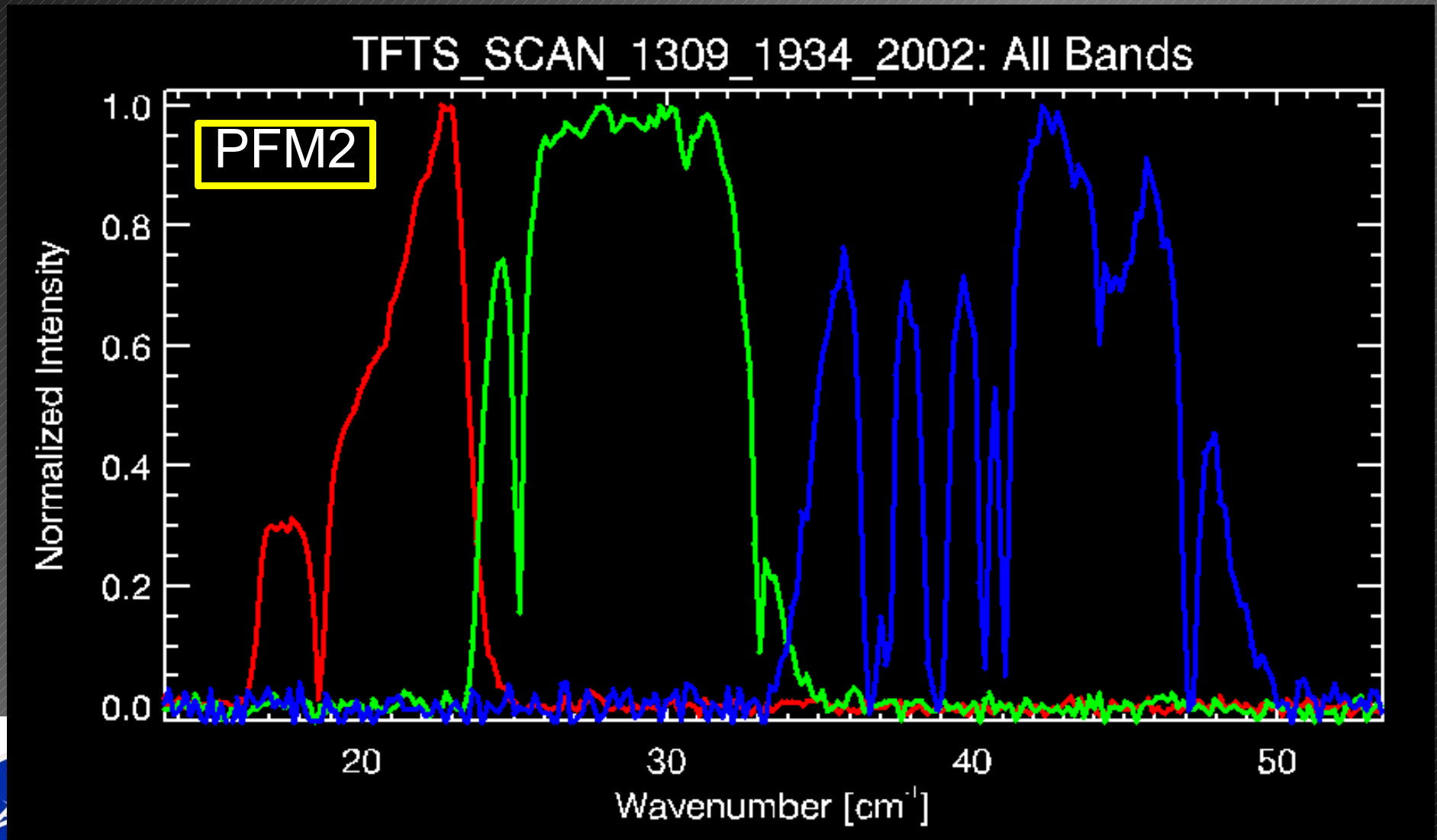
Photometer Results



Photometer Results



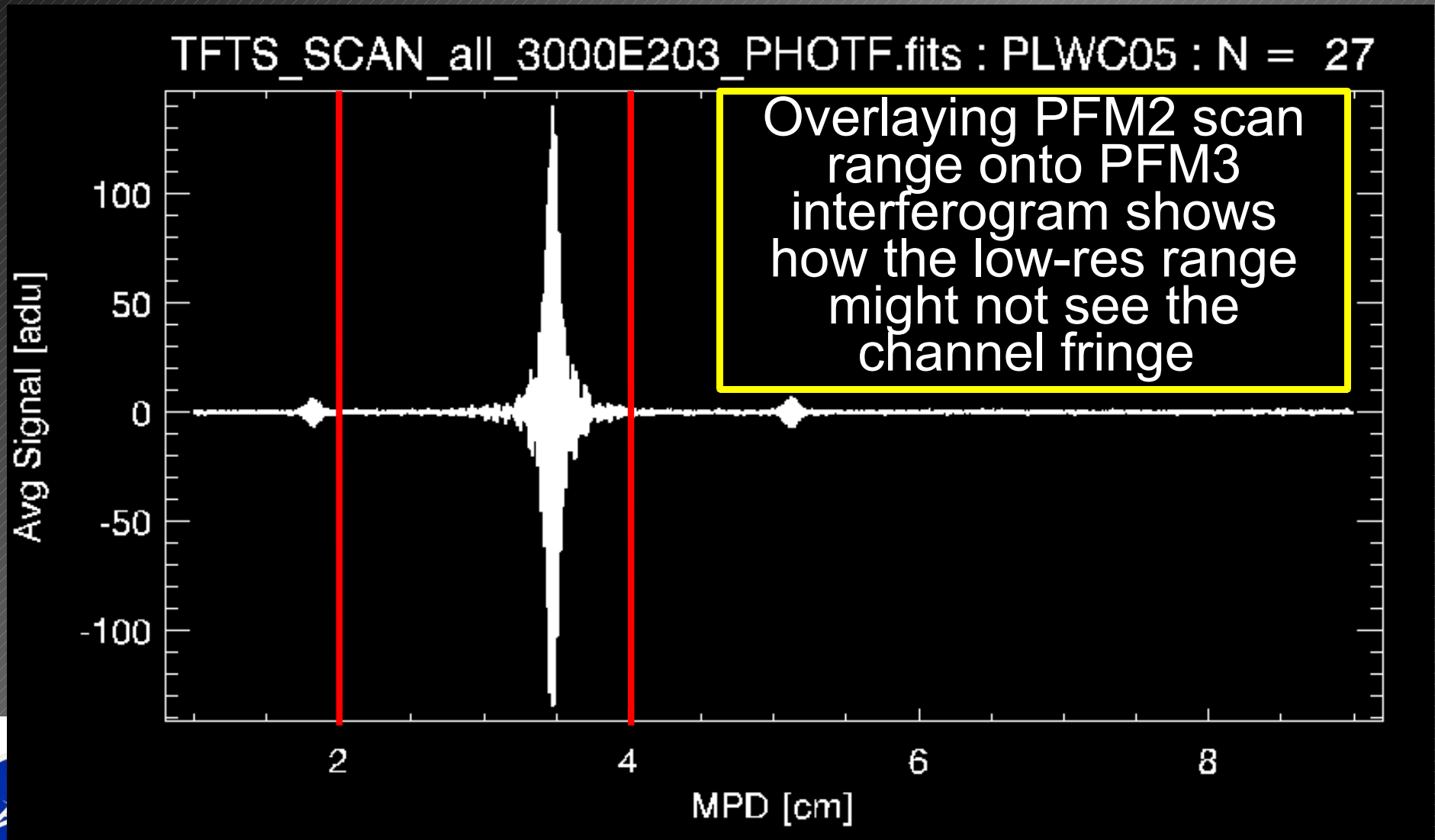
Photometer Results



Photometer Results

- Fringes (apparently) not present in the PFM2 observations.
- Keep in mind that the vast majority of the PFM2 TFTS observations consisted of low resolution scans;
 - Scan Range 20mm – 40mm.
- Fringes seen in PFM3 appear outside this range.

Photometer Results

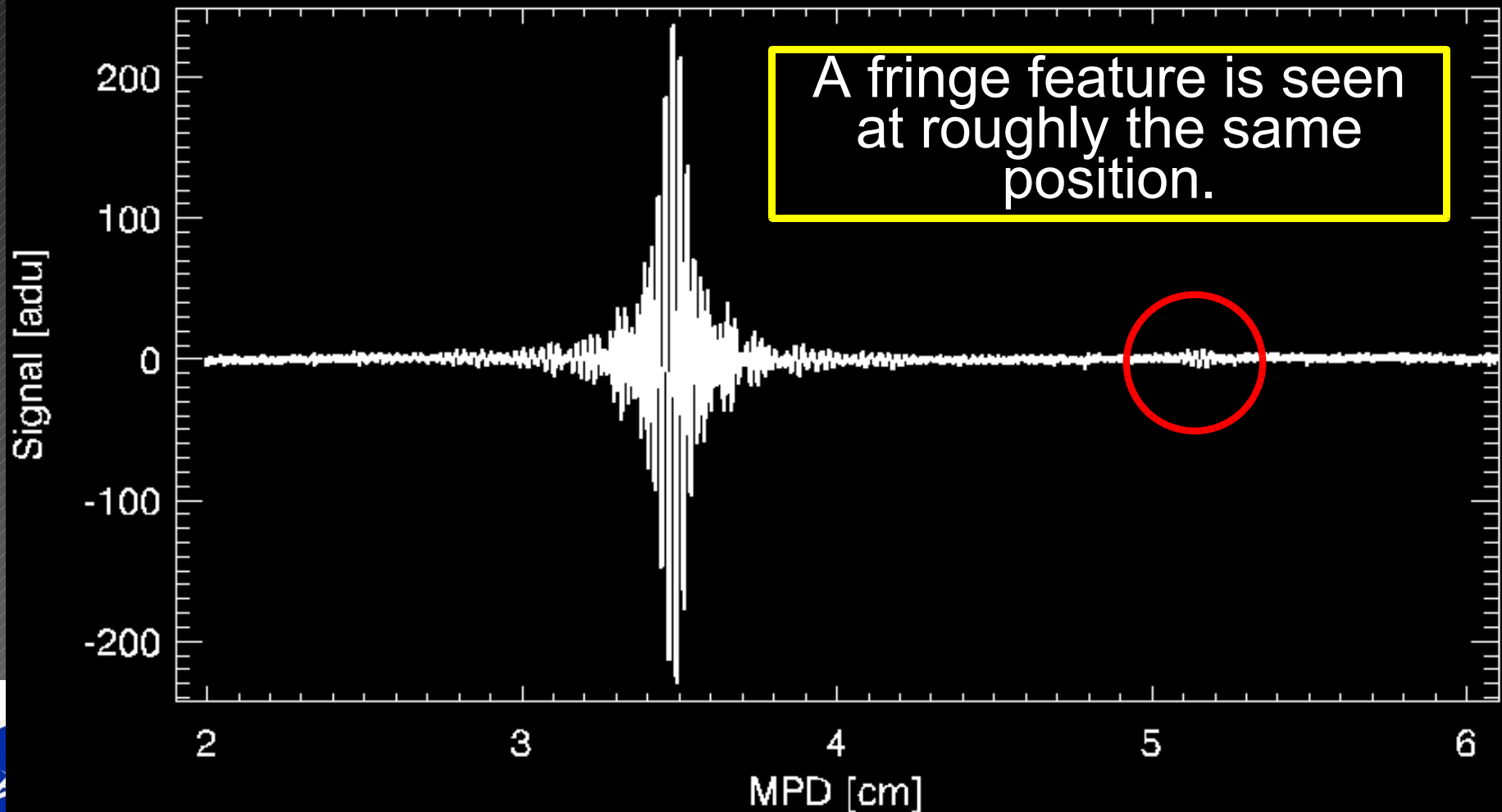


Photometer Results

- From the PFM2 logs, there were three observations that could be used for comparison in this situation.
- Two of the three did not have proper TFTS telemetry.
- The third had a low S/N.
- From the first type, three interferograms for pixel PLWC06 were derived.

Photometer Results

PFM2 Interferogram, Pixel PLWC06



Photometer Results

- The presence of the fringe feature in the PM2 data suggests that the thermal filter may not be the cause of the fringing.
- Similar to the analysis that was done for the spectrometer, the filter/detector plane and filter/feedhorn entrance distances were considered to see if these matched.

Photometer Results

- Predicted fringe locations based on BDA layout:

BDA	Predicted (mm MPD)	Observed (mm MPD)
PLW	15.7	~ 17
PMW	13.8	~ 17
PSW	21.1	N/A

- Predicted and observed fringe locations do not quite agree (are these distances correct?)

Photometer Results

- Presence of the fringe in the PFM2 data indicates that the thermal filter may not be the primary cause of the fringing.
- On the other hand, similar fringe locations for PLW/PMW suggest something external to both BDAs and common to both as the primary cause of the observed fringing.
- Analysis of the Photometer BDA components suggests that the observed fringes are not caused by the cavity between the BDA filter and the feedhorn entrance, though these distances need to be verified.

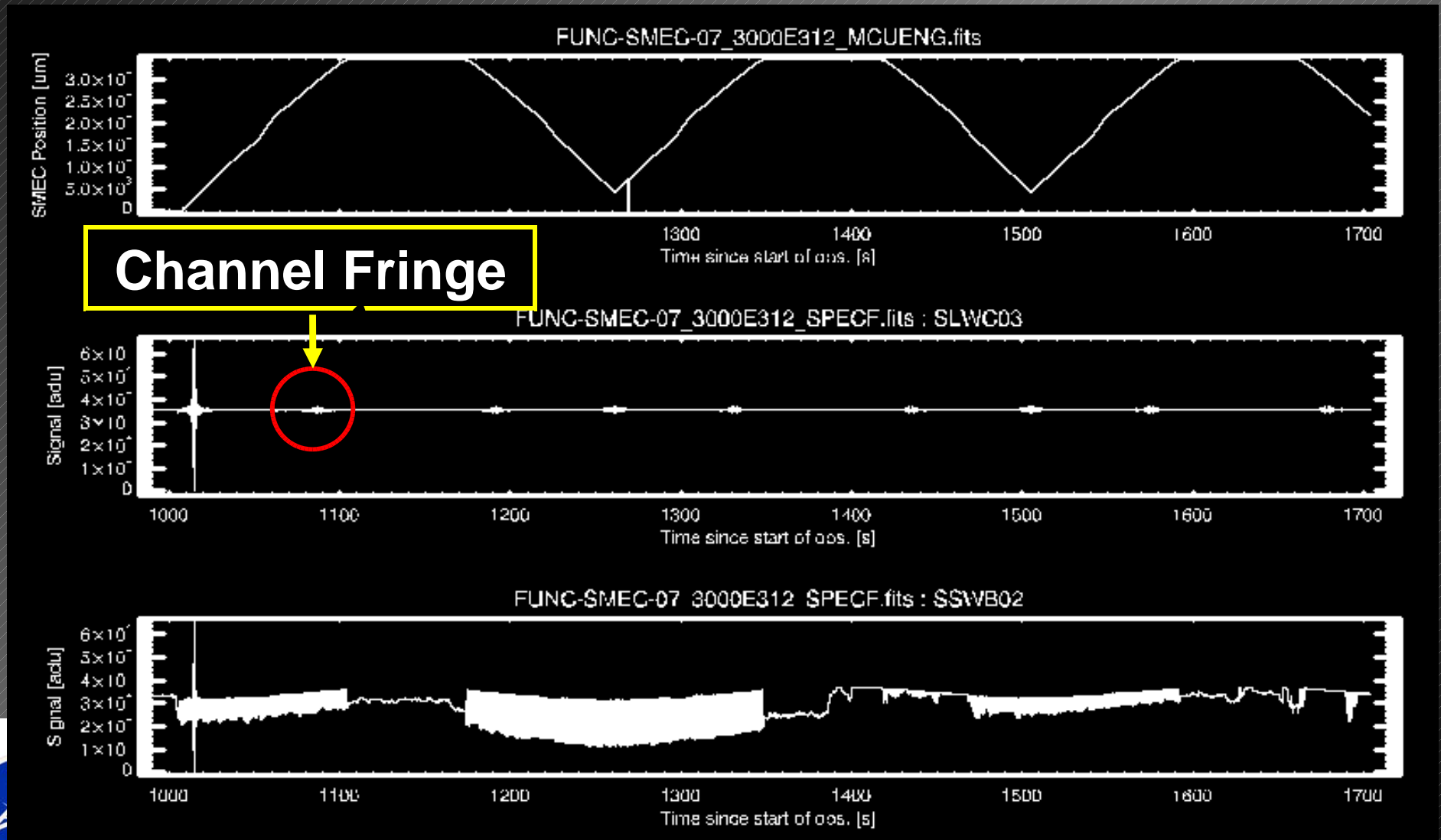
Photometer Results

- Some further questions:
 - Fringes seem to be strongest on the central pixel. For the spectrometer this can be explained by the curved field lens; is there a similar curved surface for the photometer?
 - Neither proposed cause of the fringes can explain why none are seen on the PSW pixels.
 - Other suggested causes?

Spectrometer Results

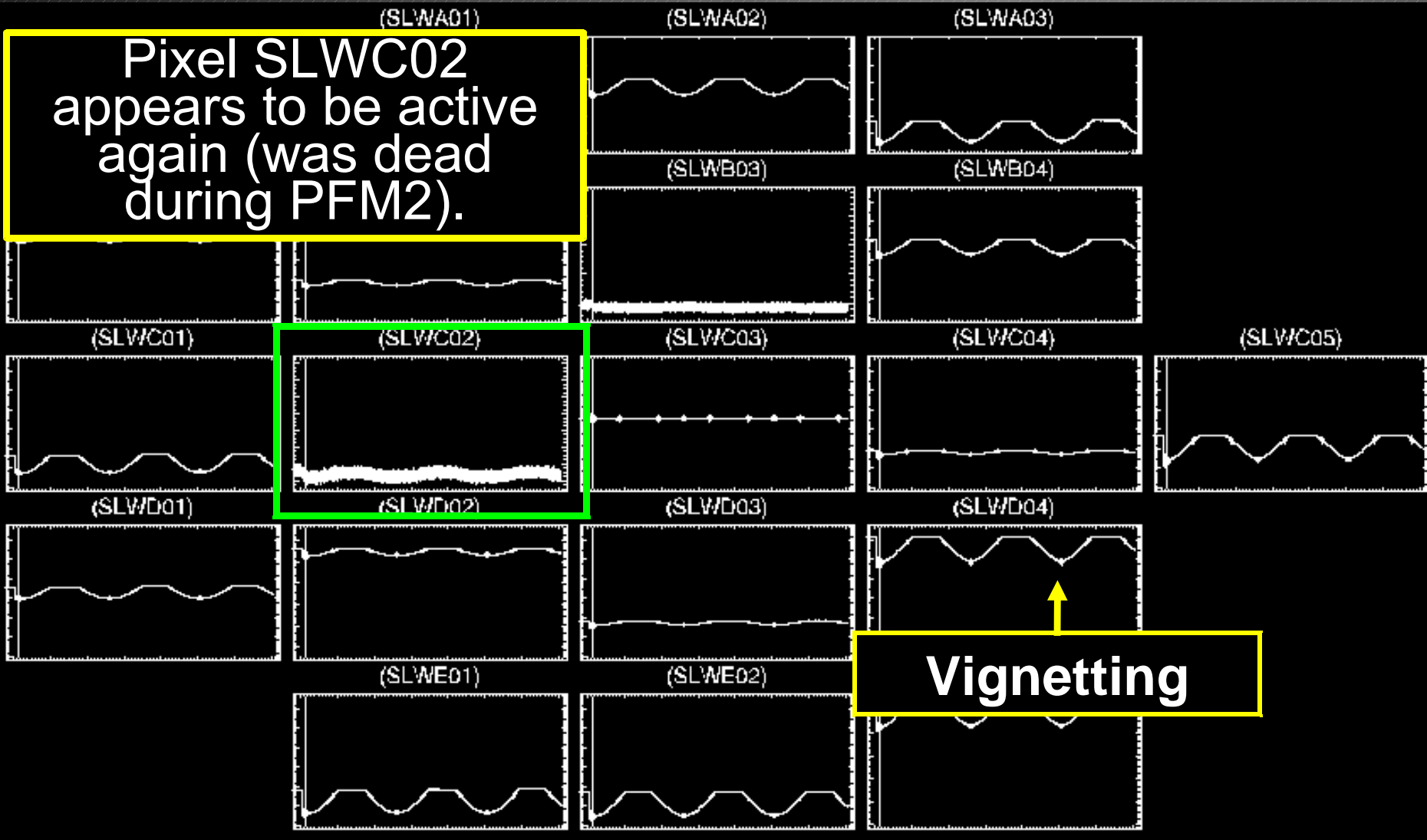
- Characteristics such as vignetting and channel fringes qualitatively similar for PFM3 data when compared to PFM1/PFM2.
- Pixel SWLC02 appears to be functional again after not being active during PFM2.
- Half of the SSW array was inactive for the one PFM3 Spectrometer observation analyzed thus far.

Spectrometer Results

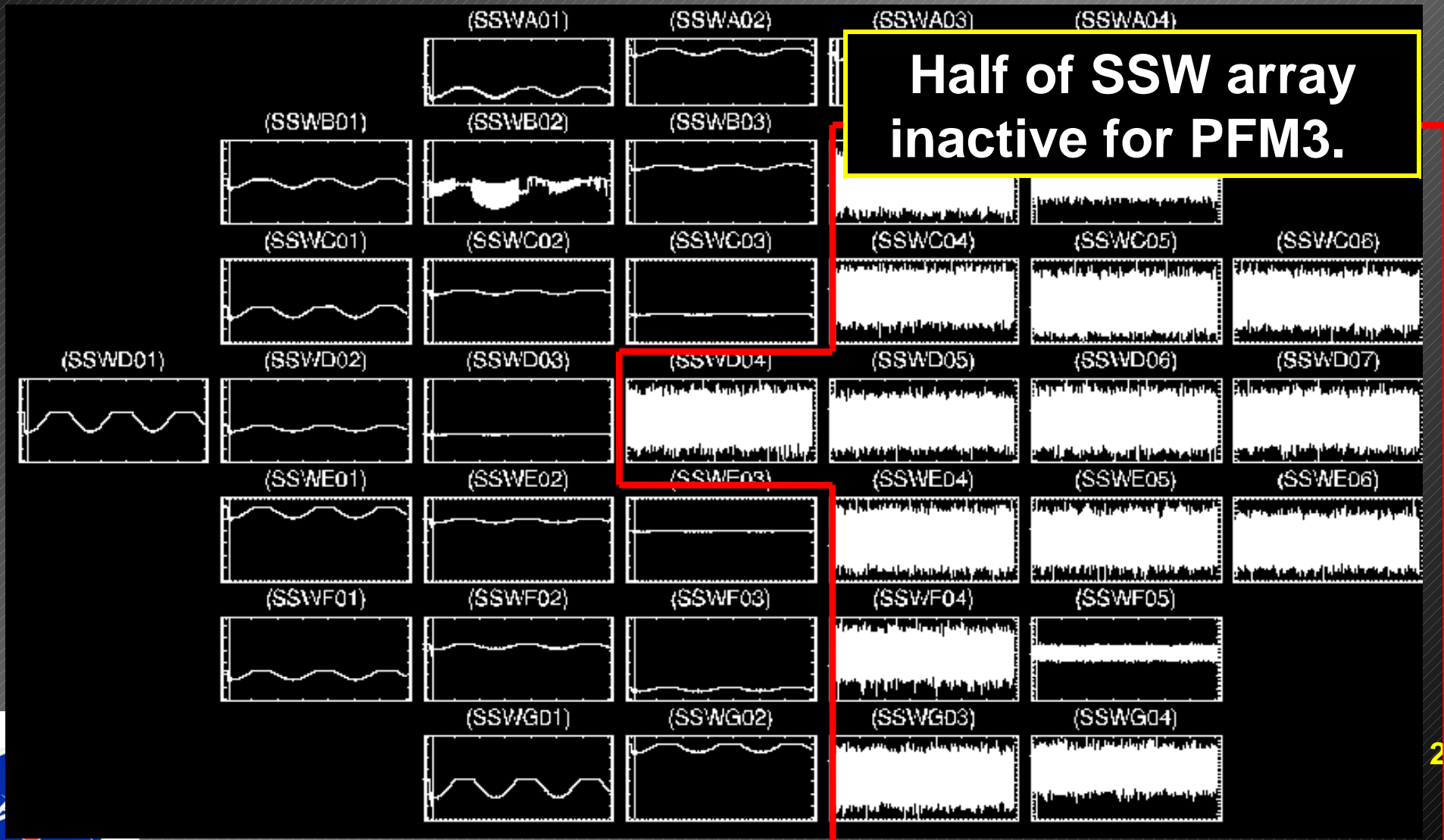


Spectrometer Results

Pixel SLWC02 appears to be active again (was dead during PFM2).



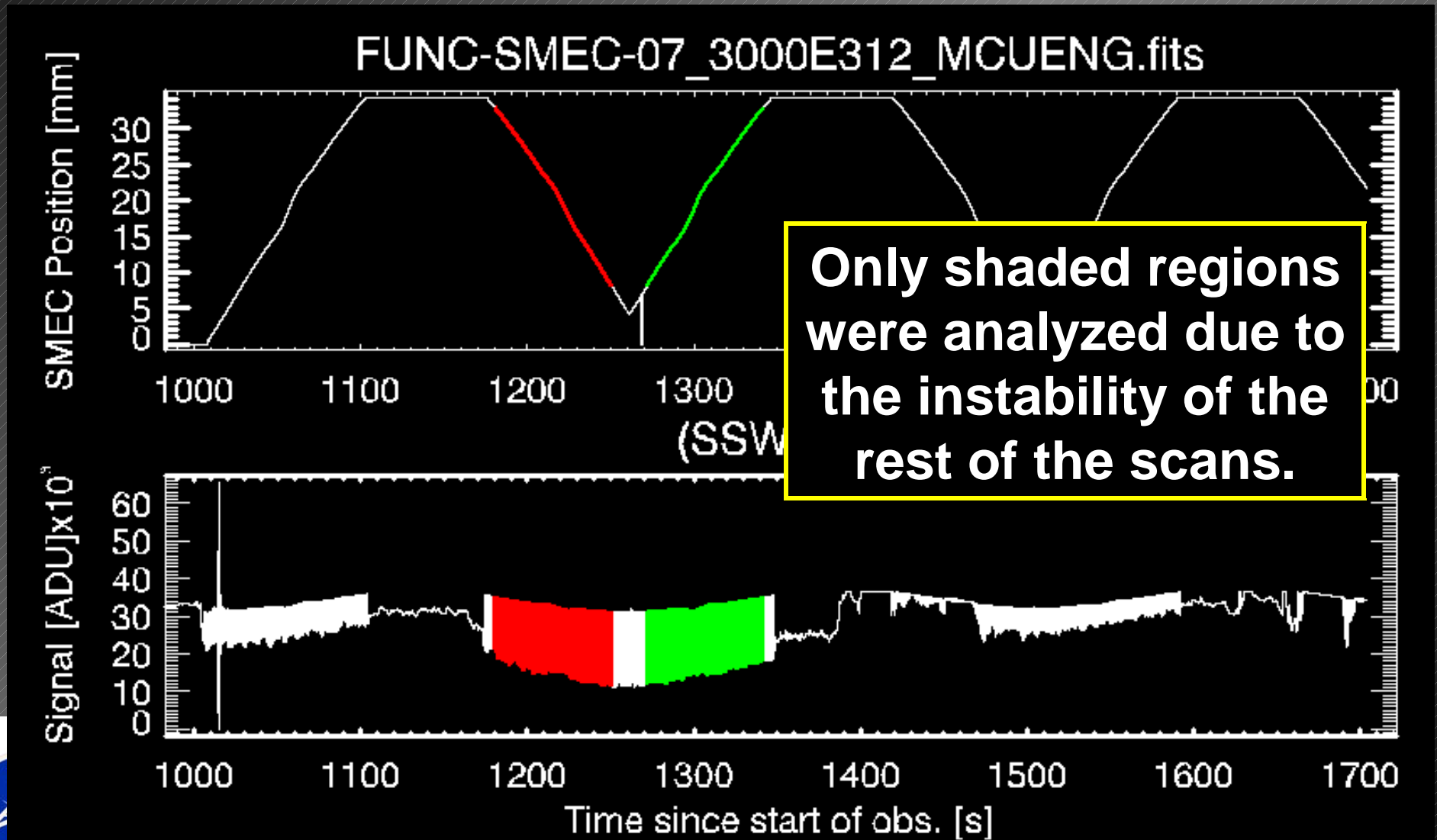
Spectrometer Results



Spectrometer Results

- Analysis of the spectrometer consisted of 202 μm laser scans with pixel SSWB02 as the target.
- Region near ZPD was ignored due to saturation of the detectors.

Spectrometer Results



Spectrometer Results

