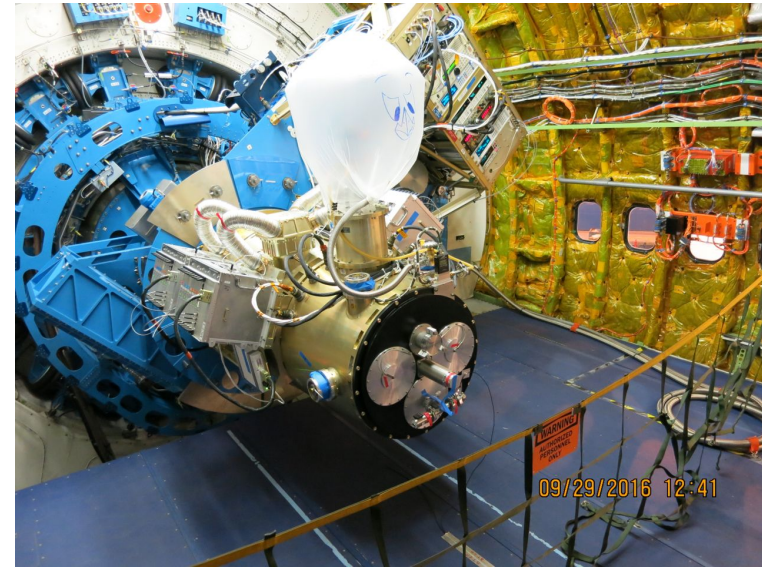


October 2016 Flight Overview

- 2016 Oct. 3-4 PDT:
 - 7.8 hours takeoff to landing
 - 6.6 hours with URD open – *limit for 0.2 K cooling system hold time at present*
 - targets: Neptune, W3 + engineering leg
 - 40,000 to 45,000 ft.
- 2016 Oct. 5-6 PDT:
 - 7.5 hours takeoff to landing
 - 6.3 hours with URD open
 - targets: Mars, W3 + engineering leg
 - 38,000 to 45,000 ft.



Busy Summer!



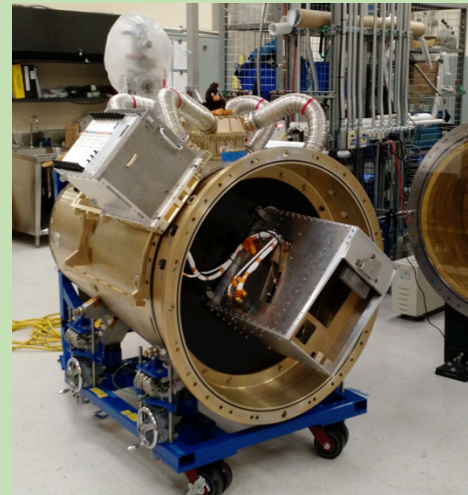
May 5: SOFIA removal



June 29: Disassembly

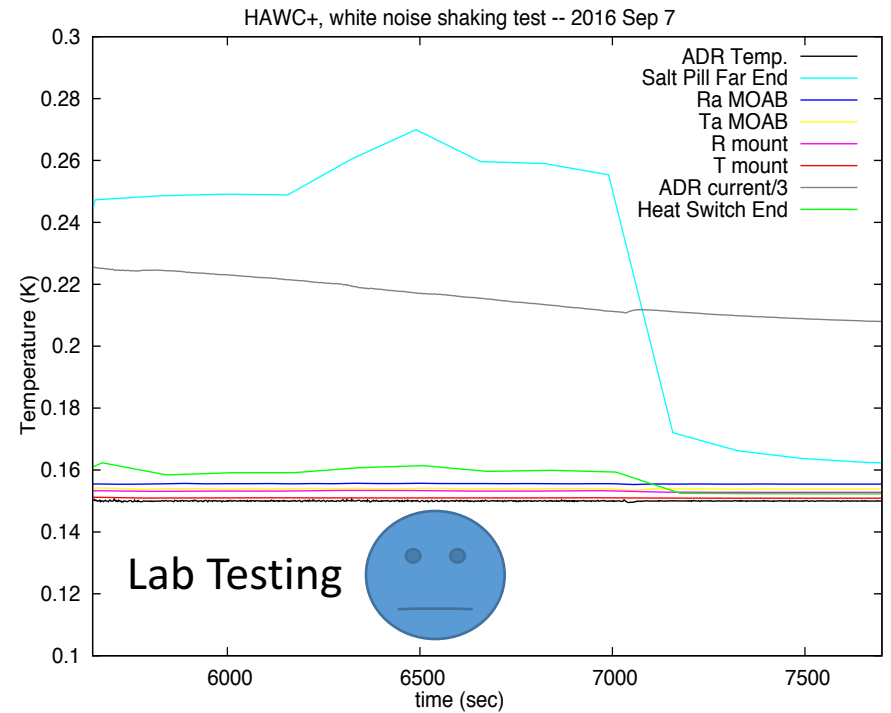
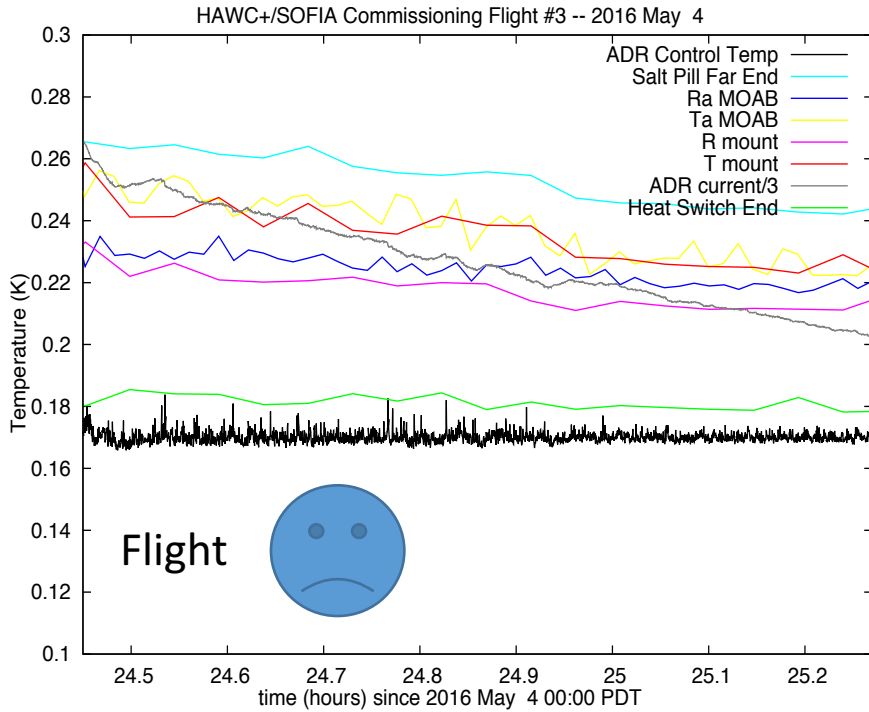


Aug 15: Assembly



Sep 27: Ready to Install

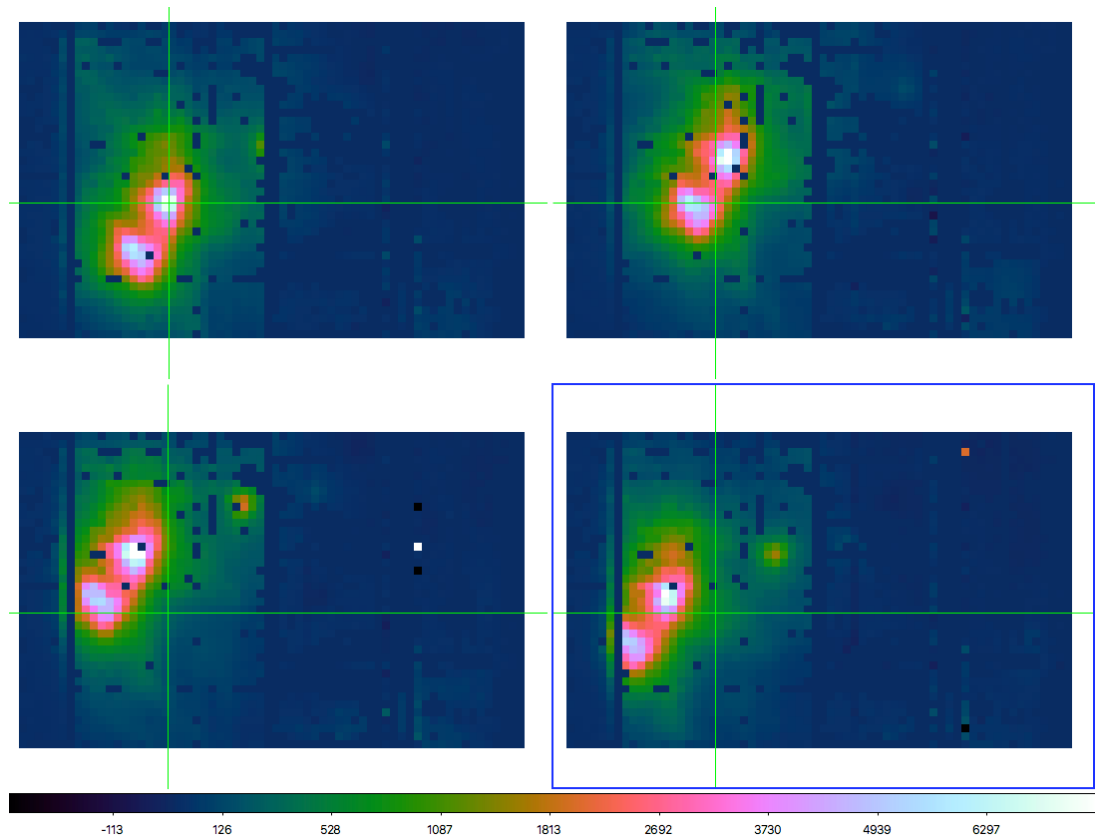
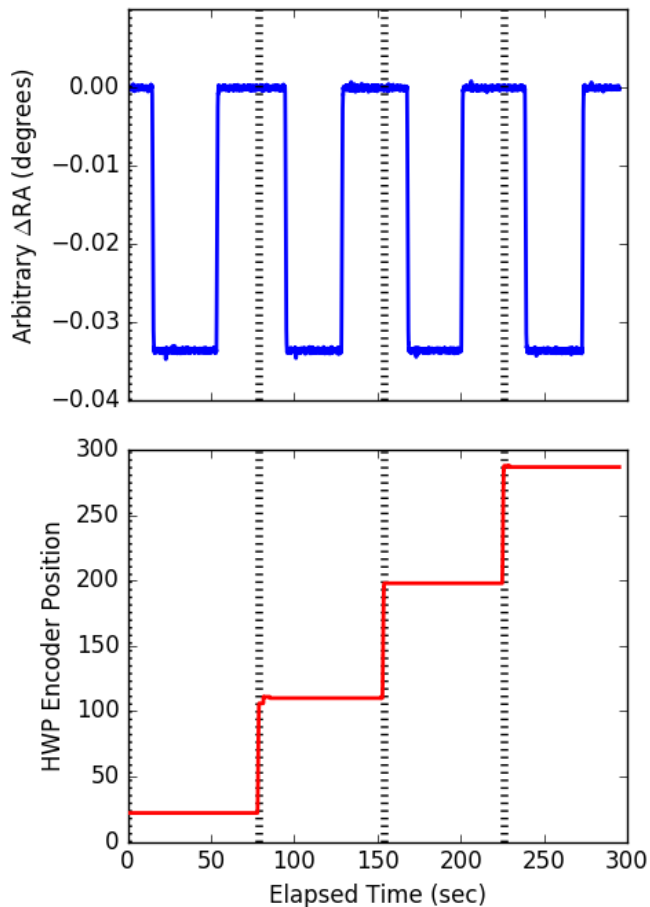
HAWC+ Getting There...



HAWC+ observing modes

- **NMC/C2N - Chop-Nod-Dither-Pol**

- ABBA nod sequence with 4 HWP positions (left) at each dither position (right)
- Only delivered mode for polarimetry - Stokes I measured, in addition to Q, U

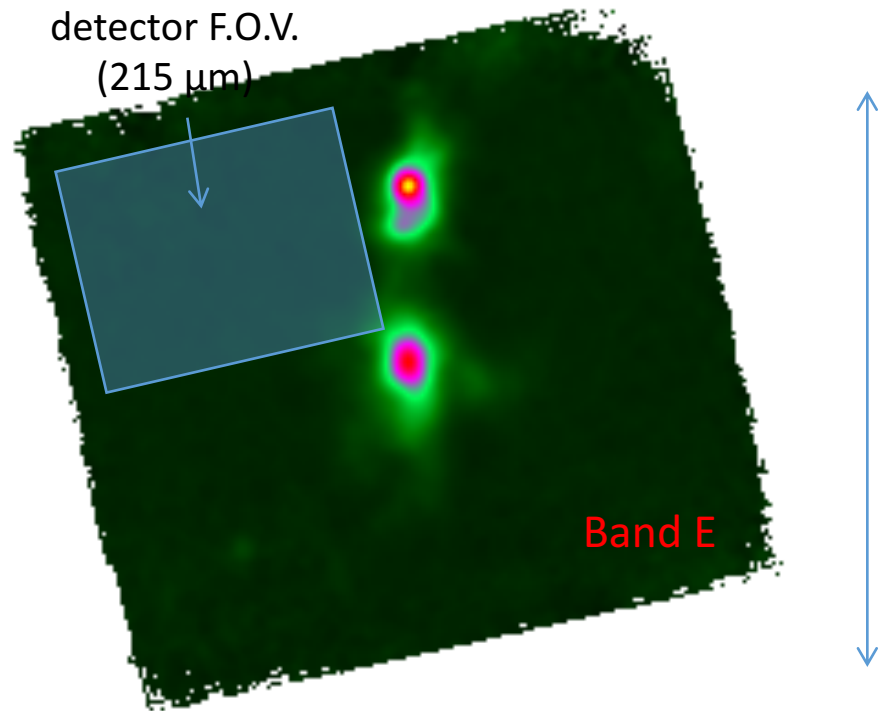
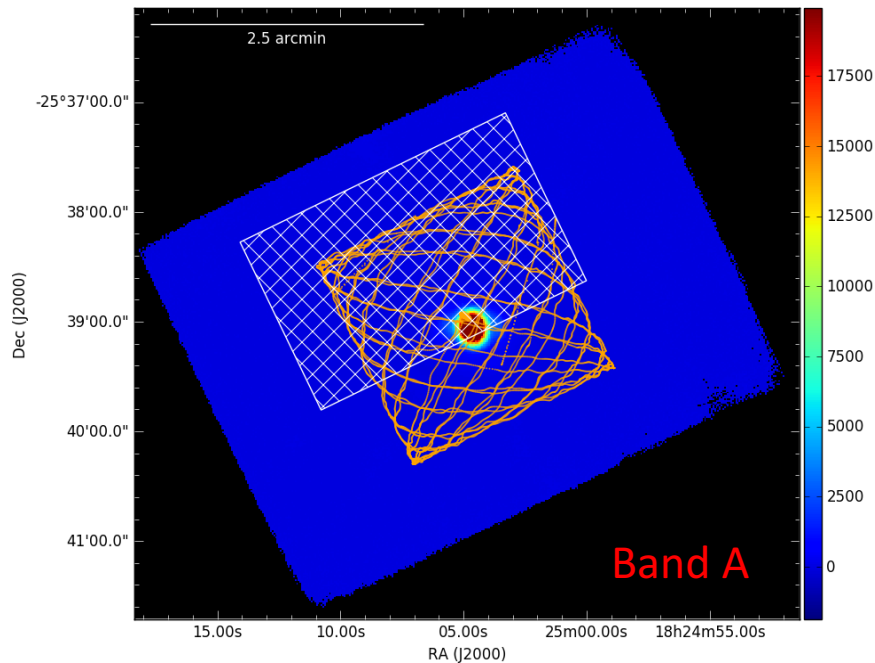


4-position dither sequence

HAWC+ observing modes

- **OTFMAP – Lissajous**

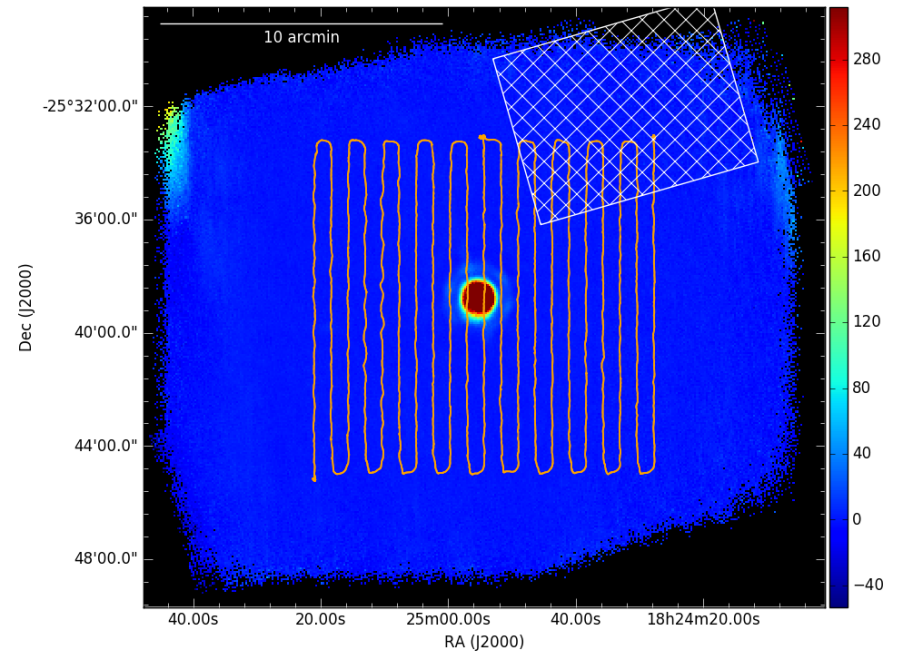
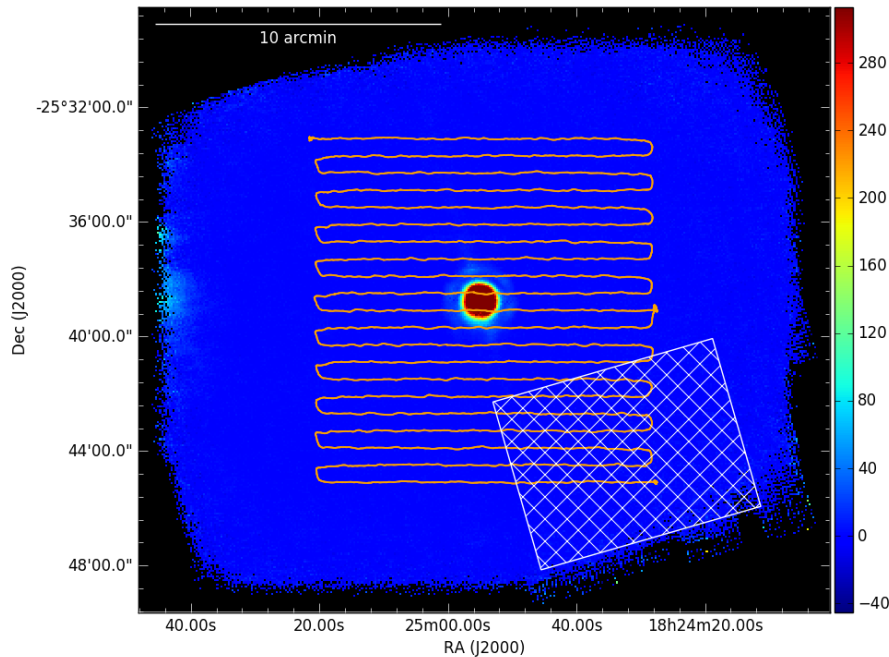
- Recommended scan mode for imaging compact sources
- Works very well!
- Mars (left) from October; DR 21 (right) from April



360 arcsec pk-pk, 200 arcsec/sec, 60 sec duration

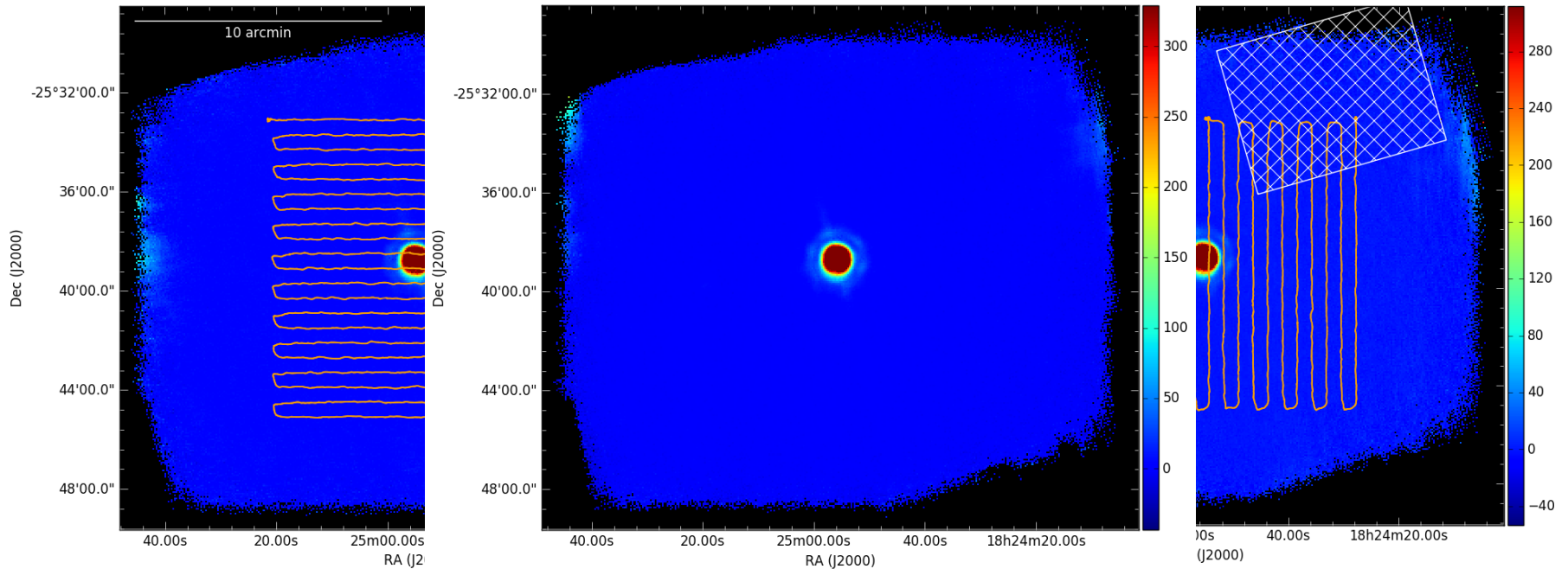
HAWC+ observing modes

- **OTFMAP – Box (a.k.a. raster, waffle)**
 - Recommended scan mode for imaging large sources
 - Works very well!
 - Mars (Band E) shown below



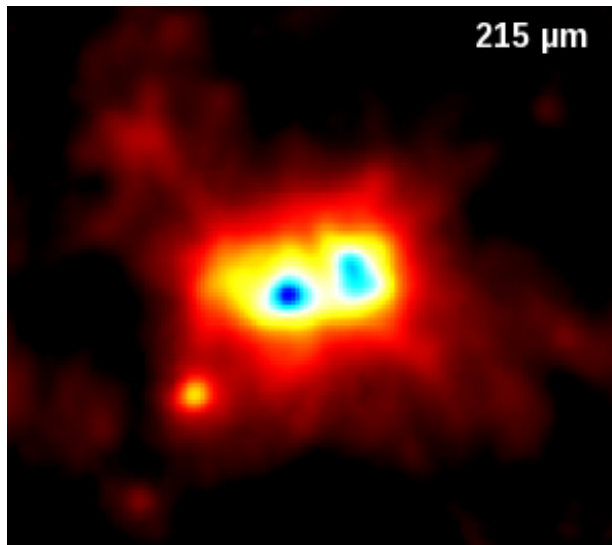
HAWC+ observing modes

- **OTFMAP – Box (a.k.a. raster, waffle)**
 - Recommended scan mode for imaging large sources
 - Works very well!
 - Mars (Band E) shown below

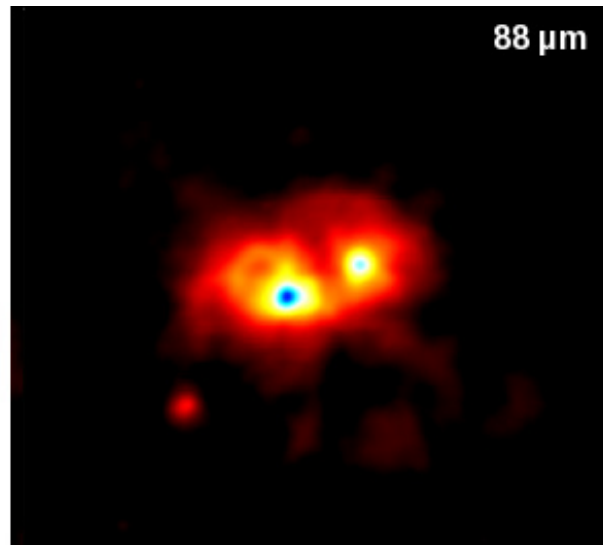


Imaging (Raster & Lissajous modes)

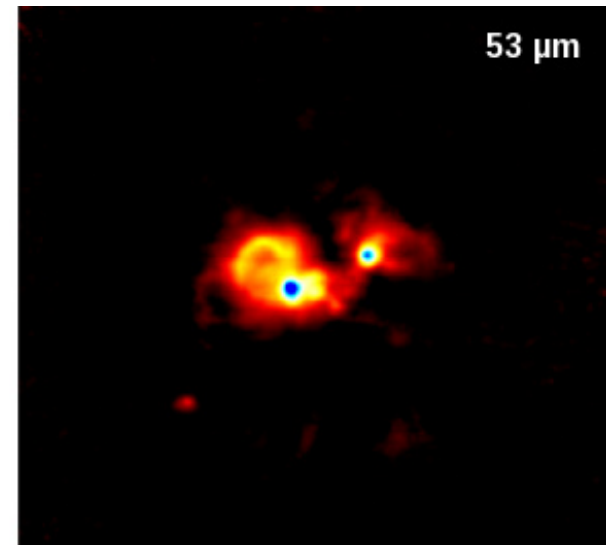
- Preliminary HAWC+ images of W3 are shown below:



2.2 min. (elapsed time)



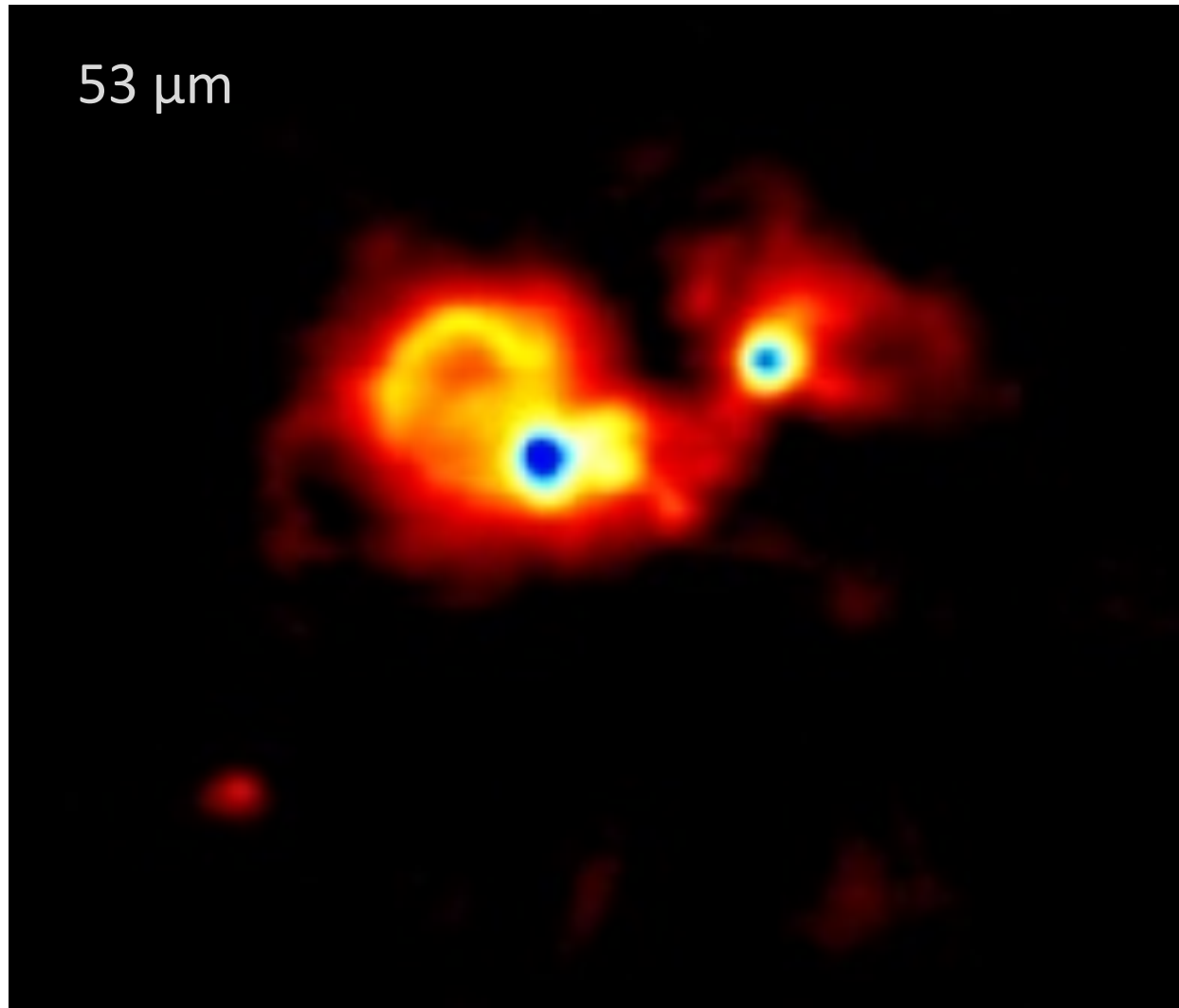
4.1 min. (elapsed time)



3.0 min. (elapsed time)

Imaging (Raster & Lissajous modes)

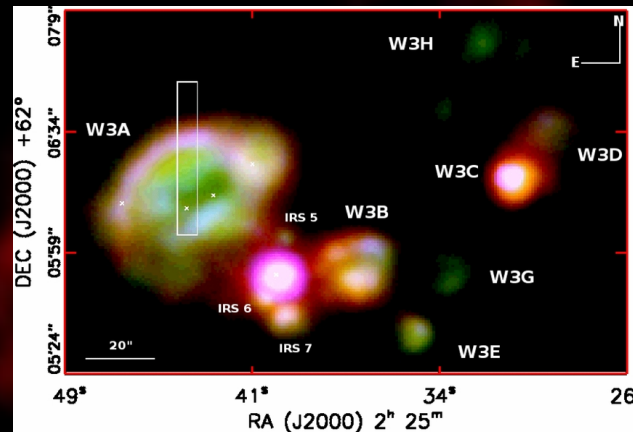
- Preliminary HAWC+ images of W3 are shown below:



Imaging (Raster & Lissajous modes)

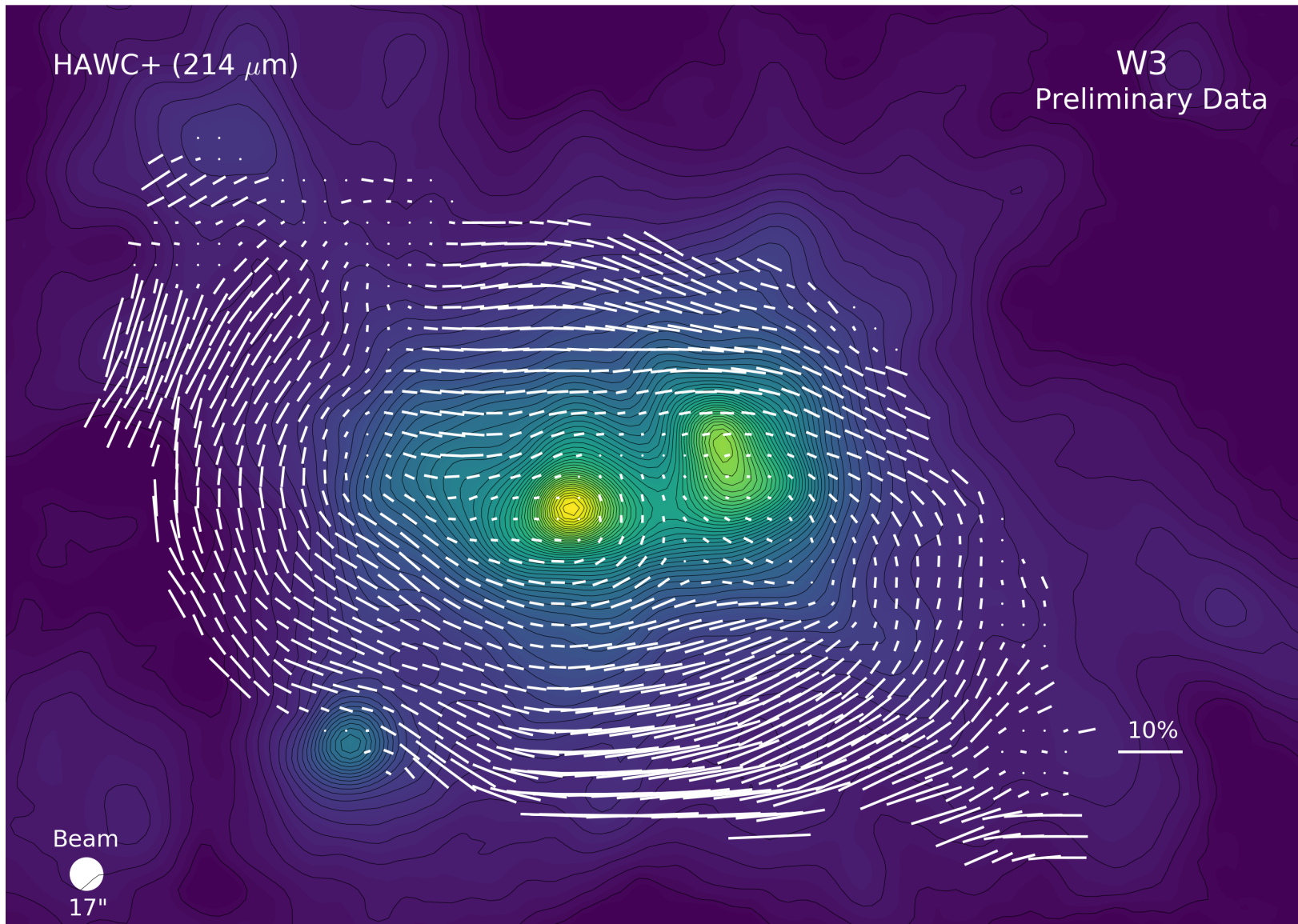
- Preliminary HAWC+ images of W3 are shown below:

53 μm

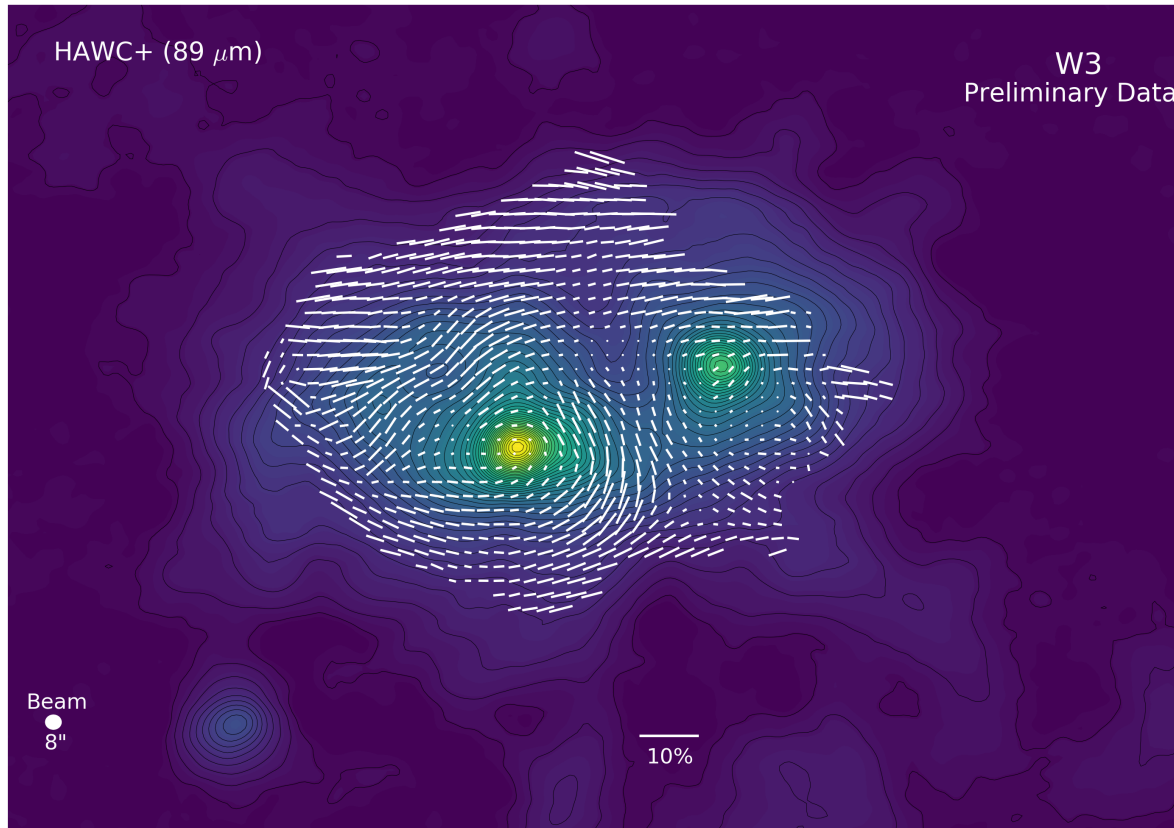


SOFIA/FORCAST 7.7/19.7/37.1 μm (Salgado+ 2012)

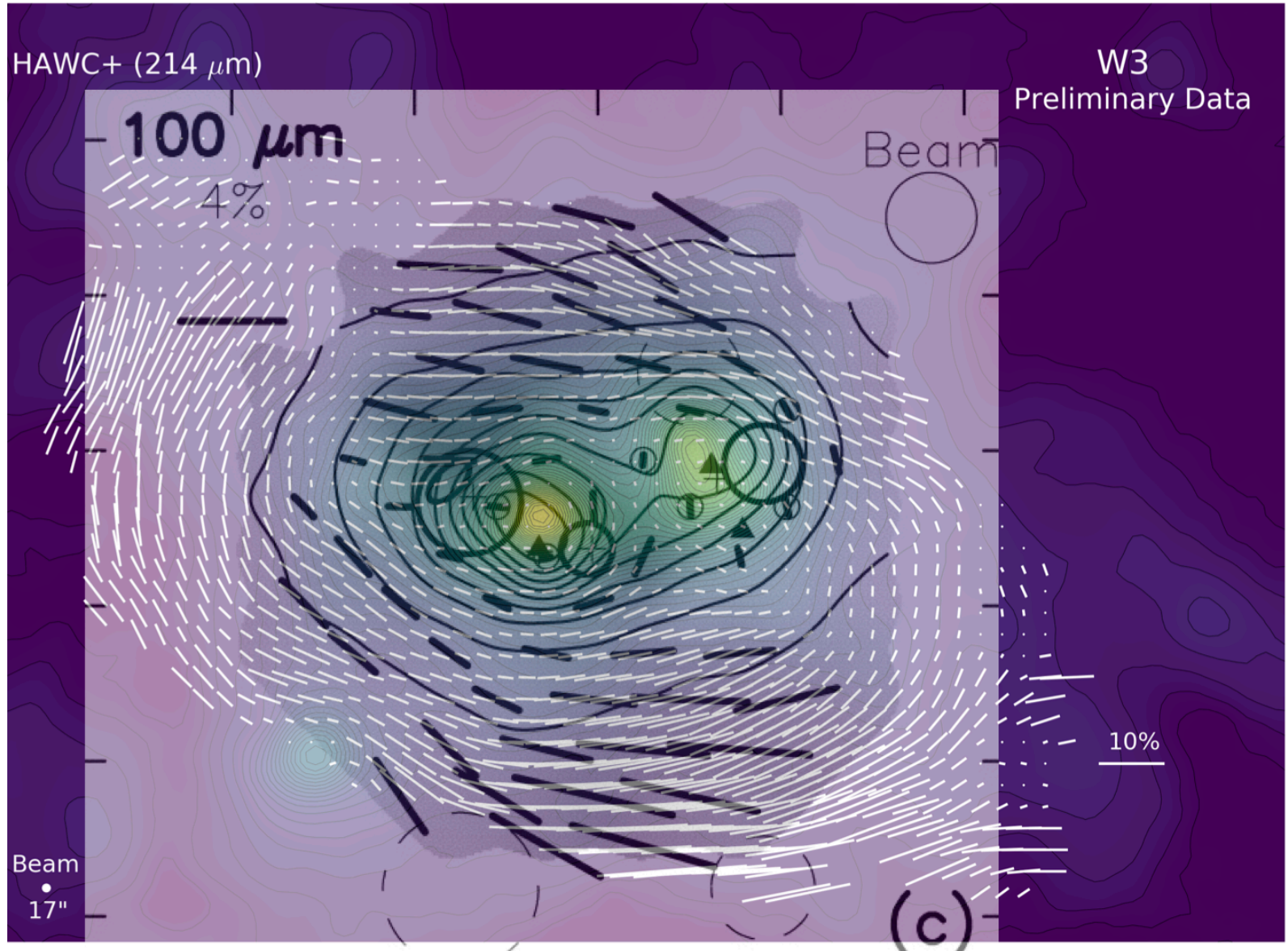
W3 FIR polarimetry comparisons



W3 FIR polarimetry comparisons

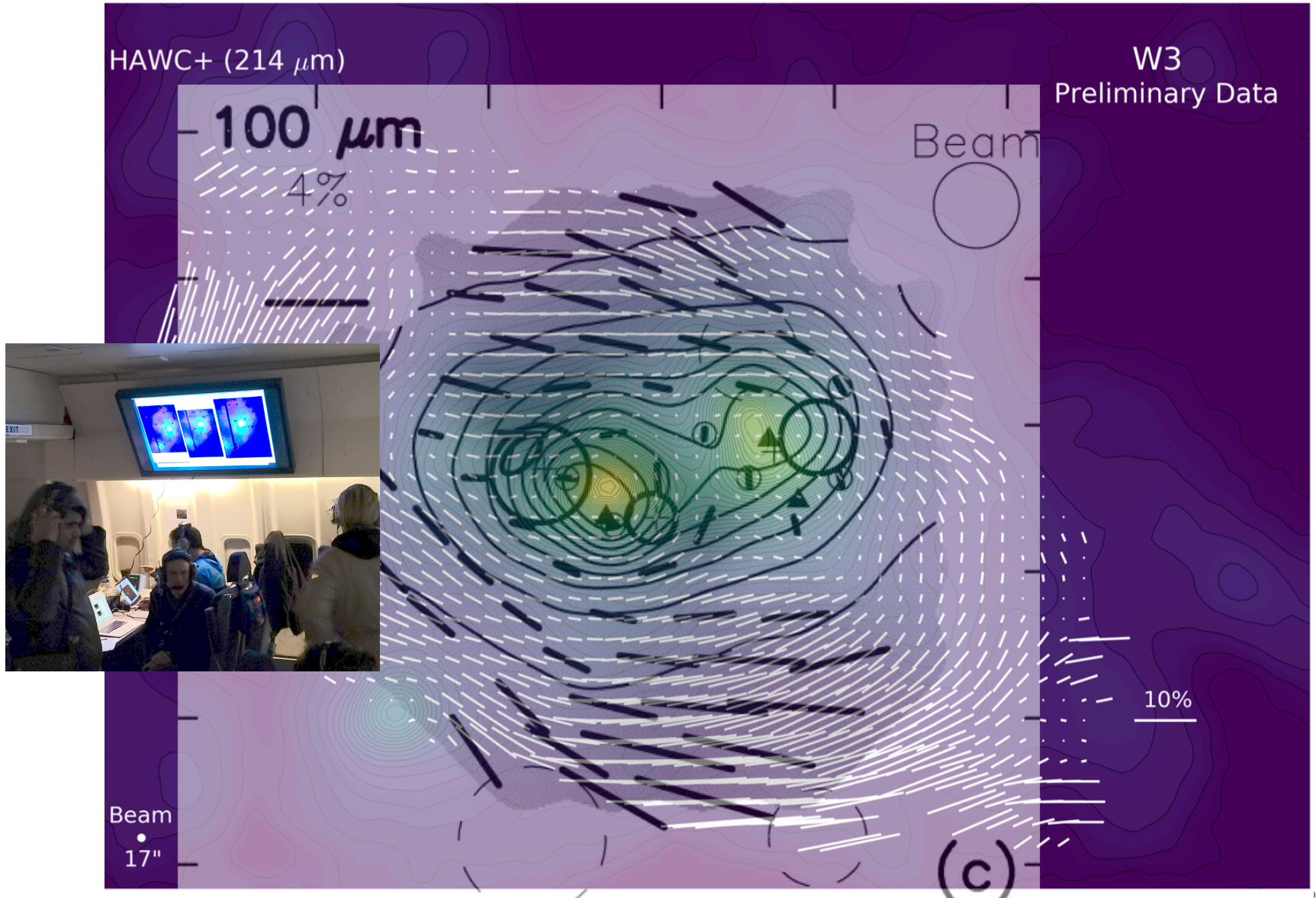


W3 FIR polarimetry comparisons



HAWC+ 214 μm vs. KAO 100 μm map (Schleuning+ 2000)

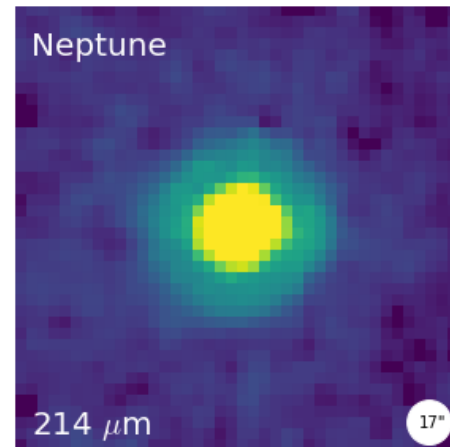
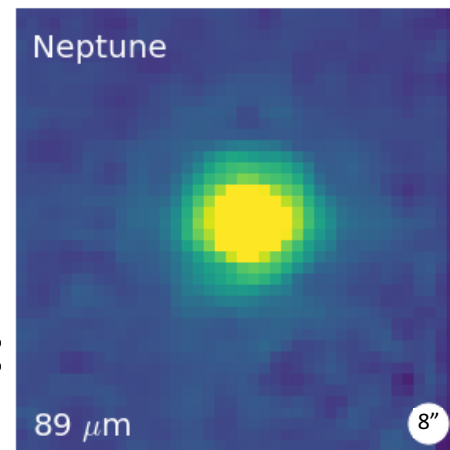
W3 FIR polarimetry comparisons



HAWC+ 214 μm vs. KAO 100 μm map (Schleuning+ 2000)

Instrumental Polarization

- Measured on Neptune, assumed unpolarized:
 - Band C (89 μm):
 - **i.p. = $2.1\% \pm 0.1\%$ (statistical) $\pm 0.3\%$? (systematic)**
 - Band E (214 μm):
 - **i.p. = $1.7\% \pm 0.2\%$ (statistical) $\pm 0.3\%$? (systematic)**
- Appears consistent with SOFIA tertiary & HAWC+ window
- This i.p. has been subtracted from W3 maps, but measurement ongoing
 - Will also be measured with W3 data itself using sky rotation



HAWC+ status and plans

- October performance was judged good enough to proceed with commissioning and first science observations in December.
 - Imaging in bands A, C, D, E (53, 89, 154, 214 μm)
 - Polarimetry in same bands
 - 7.5(ish) hour flights as in October
- Achieving desired hold time in ADR cooler will require future work on internal instrument hardware (in 2017)
- There is still a lot to learn from commissioning & lab data

