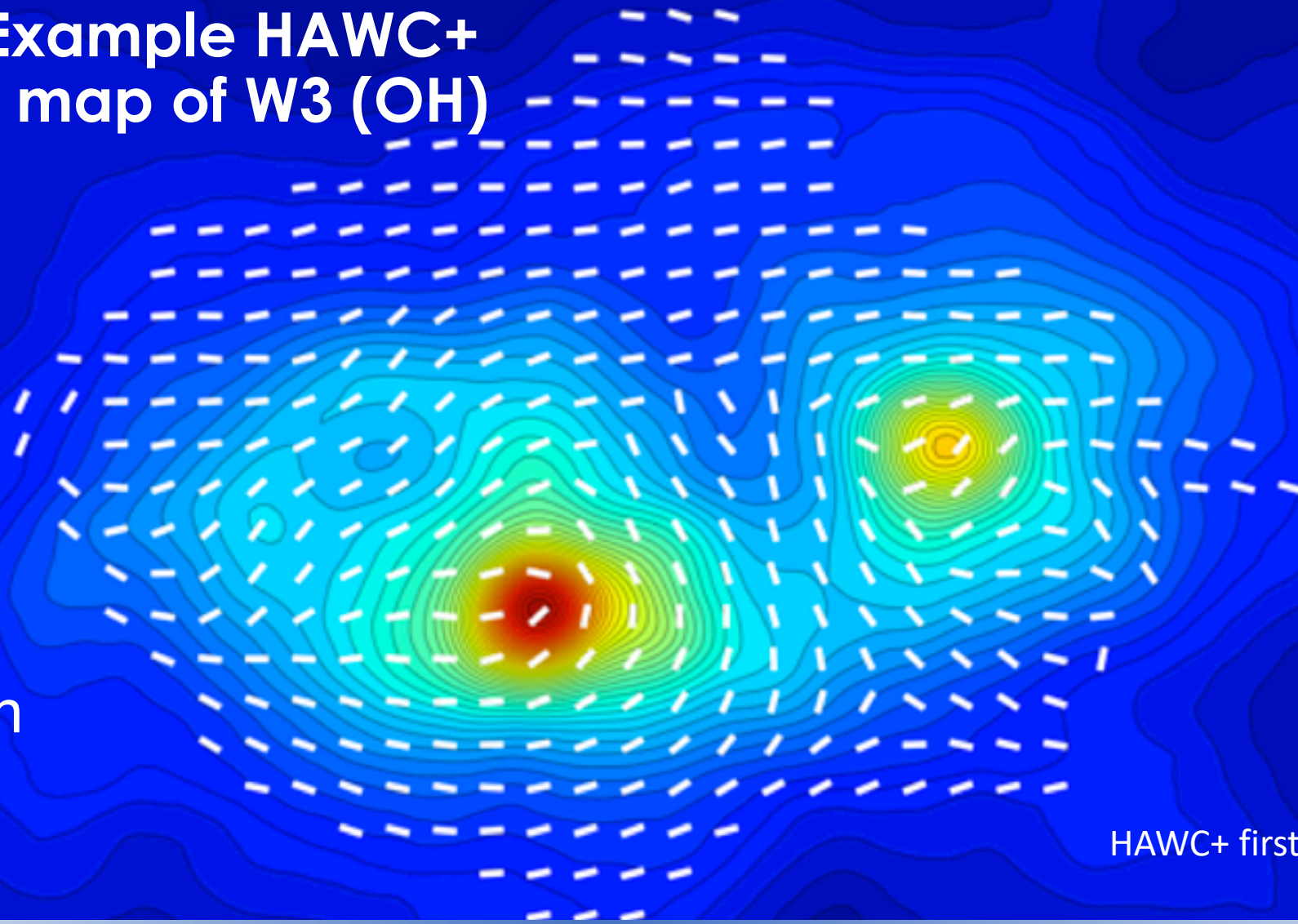


Observing Example HAWC+ Polarization map of W3 (OH)



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August 2019

HAWC+ first light image of W3 Main

Flux Estimates

- Get flux estimates from the literature or archives
[Herschel Archive](#) or [Herschel Catalog at IRSA](#) are very useful for FIR observations
- Or use literature as source for a reference flux:
A Herschel paper on W3: e.g. [Rivera-Ingraham et al. \(ApJ 2013, 766, 85\)](#) unfortunately does not quote fluxes
- Downloaded and cropped three Herschel images from the archive

Let's inspect them using USPOT or your favorite FITS viewer

Flux Estimates

- Herschel $70\mu\text{m}$:
Unit: Jy/pix, pixel size: $3.2'' \times 3.2''$:
 ~ 200 Jy/pix around peak (peak saturated), outskirts ~ 3 Jy/pix
→ Peak: 20 Jy/sq arcsec, outskirts: ~ 0.3 Jy/sq arcsec
- Herschel $160\mu\text{m}$ map, Unit Jy/pix, pixel size: $3.2'' \times 3.2''$:
 ~ 100 around peak (peak saturated), outskirts ~ 3 Jy/pix
→ Peak: 10 Jy/sq arcsec, outskirts ~ 0.3 Jy/sq arcsec
- Herschel $250\mu\text{m}$, Unit MJy/sr:
Peak $\sim 100,000$ MJy/sr → 2.4 Jy/sq arcsec
Outskirts $\sim 1,000$ MJy/sr → 0.024 Jy/sq arcsec

Time estimates

Use [SITE](#) to estimate on-source exposure time

- Band A $53\mu\text{m}$:
0.3 Jy/sq arcsec, 5% polarization, SNR=5 \rightarrow 427 sec
- Band C $89\mu\text{m}$:
0.1 Jy/sq arcsec, 5% polarization, SNR=5 \rightarrow 353 sec
- Band D $154\mu\text{m}$:
0.1 Jy/sq arcsec, 5% polarization, SNR=5 \rightarrow 34 sec
- Band E $214\mu\text{m}$:
0.03Jy/sq arcsec, 5% polarization, SNR=5 \rightarrow 127 sec

For Chandrasekar-Fermi, SNR > 8 required.

Create Phase I AORs in USPOT

Only entries with stars are required!

- How to break total integration time into repeats and nod patterns?
- Keep "Time per full nod pattern (ABBA) (sec)" at 40s, which is total integration time (on an off) → 20s on-source time
- Multiplies with dither positions and for polarimetry with the four polarizer angles.
→ Minimum "Total Exposure Time (sec)" on source is 80sec for total intensity, 320sec for polarimetry!
- If more time is needed, increase AOR repeats rather than dither positions. Between AORs internal calibration is possible thus improving accuracy.