

Ultra Wide-bandwidth Low

Jane Kaczmarek | Postdoctoral Fellow
29 May 2018

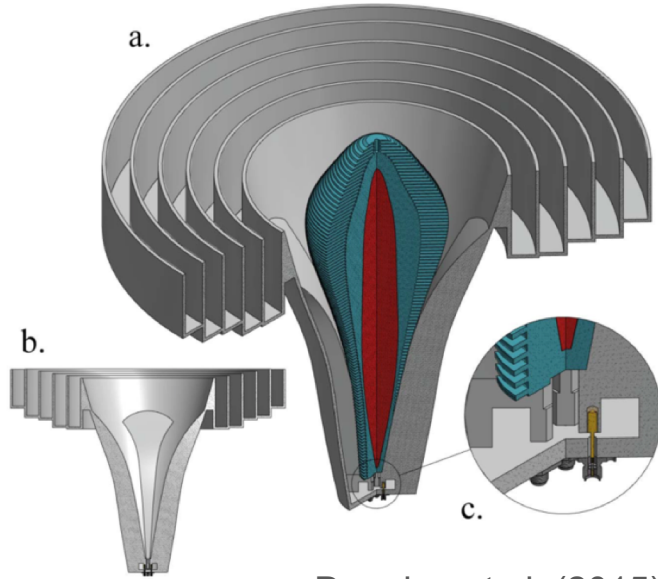
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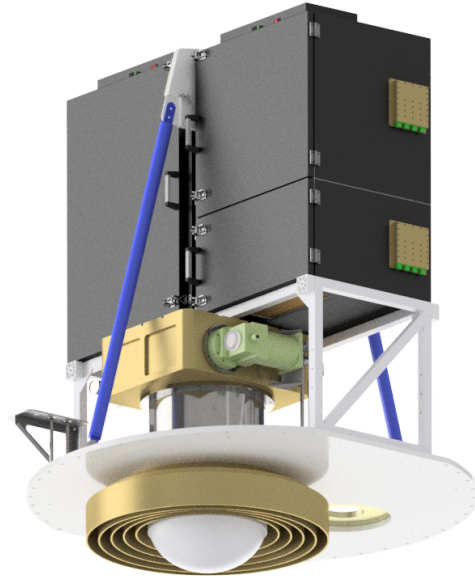
Acknowledgments:

Ahmed, Amy, Bailes, Beresford, Bhat, Bing, Broadhurst, Cameron, Carter, Carretti, Castillo, Chekkala, Chen, Chung, Craig, Dai, Dempsey, Doherty, Dunning, Gaensler, George, Green, Han, Hayman, Hobbs, Hoyle, Jameson, Jeganathan, Johnston, Kaczmarek, Kanoniuk, Kesteven, Kosyamin, Kramer, Krco, Leach, Levin, Ludbey, Mader, Macquarding, Manchester, Melatos, Moss, Nuer, Osowski, Phillips, Preisig, Price, Reilly, Reynolds, Roberts, Robishaw, Roush, Sadler, Severs, Shannon, Shaw, Smart, Smith, Toomey, Troop, Tzioumis, van Straten, Wang, Wen, Wyithe, Xuyang ...

The UWL Frontend

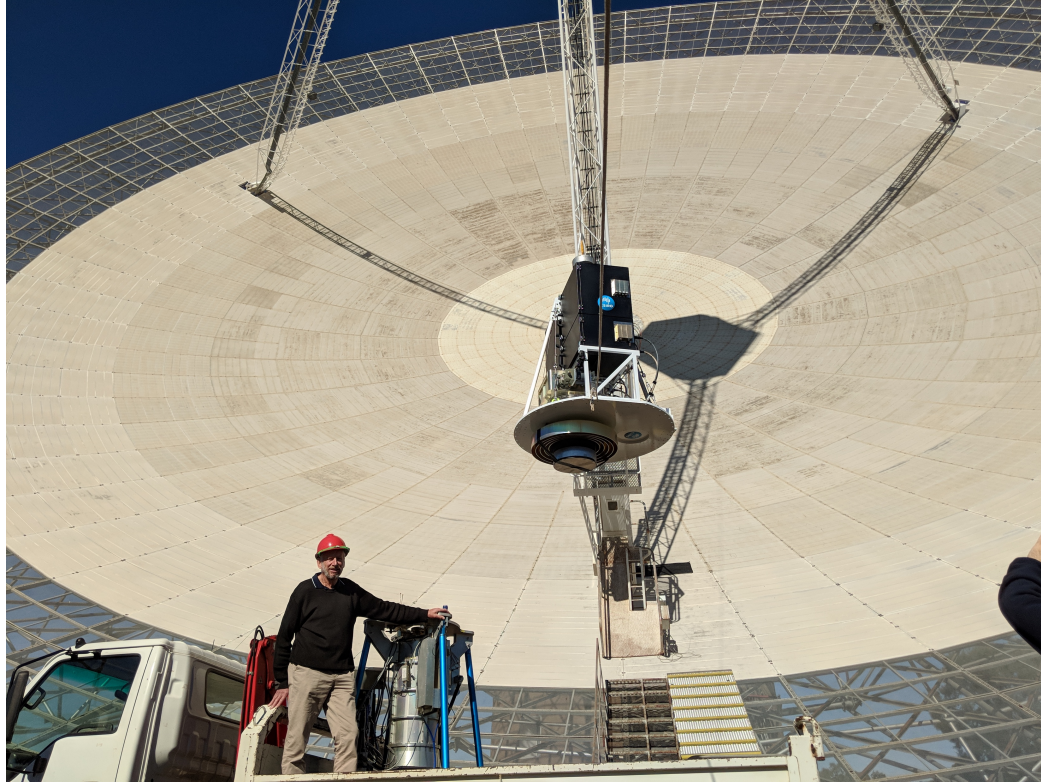


Dunning et al. (2015)

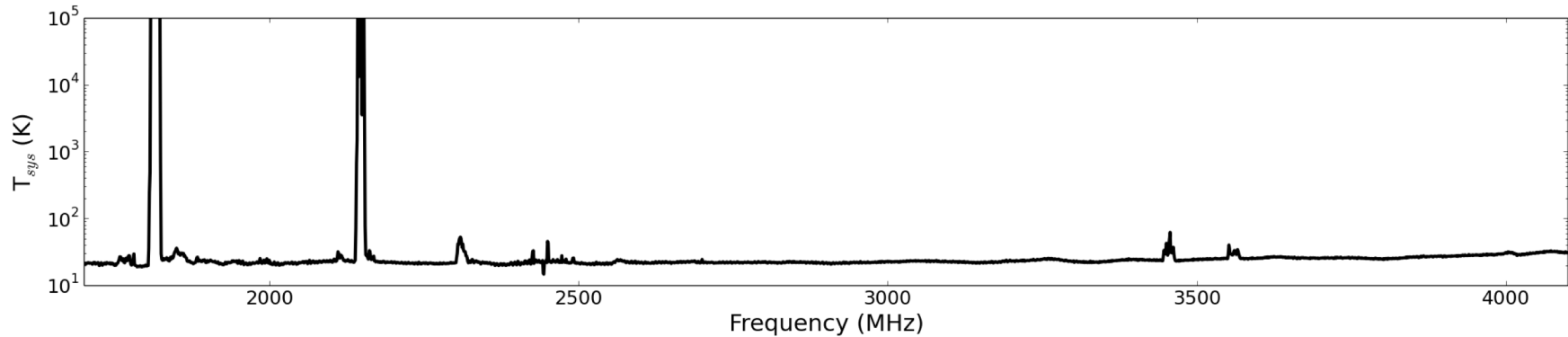
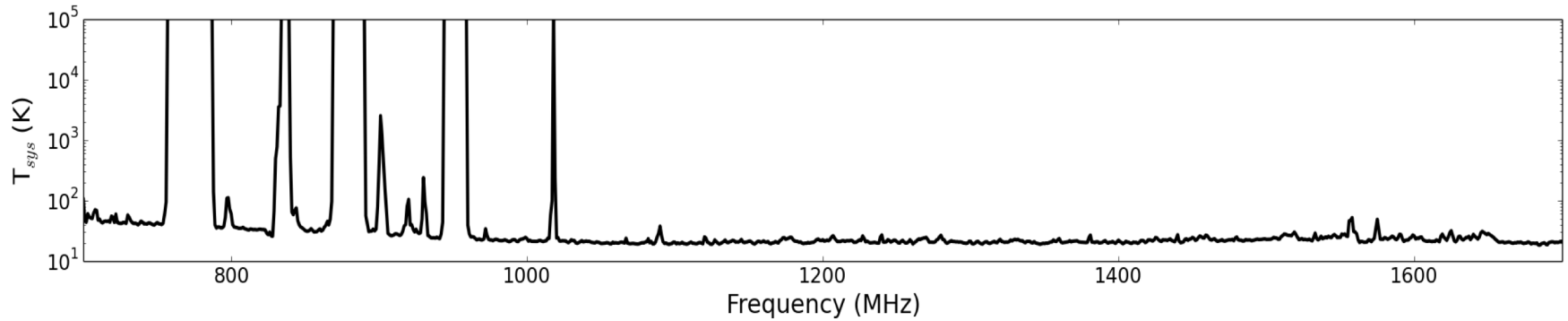


Credit: N. Carter

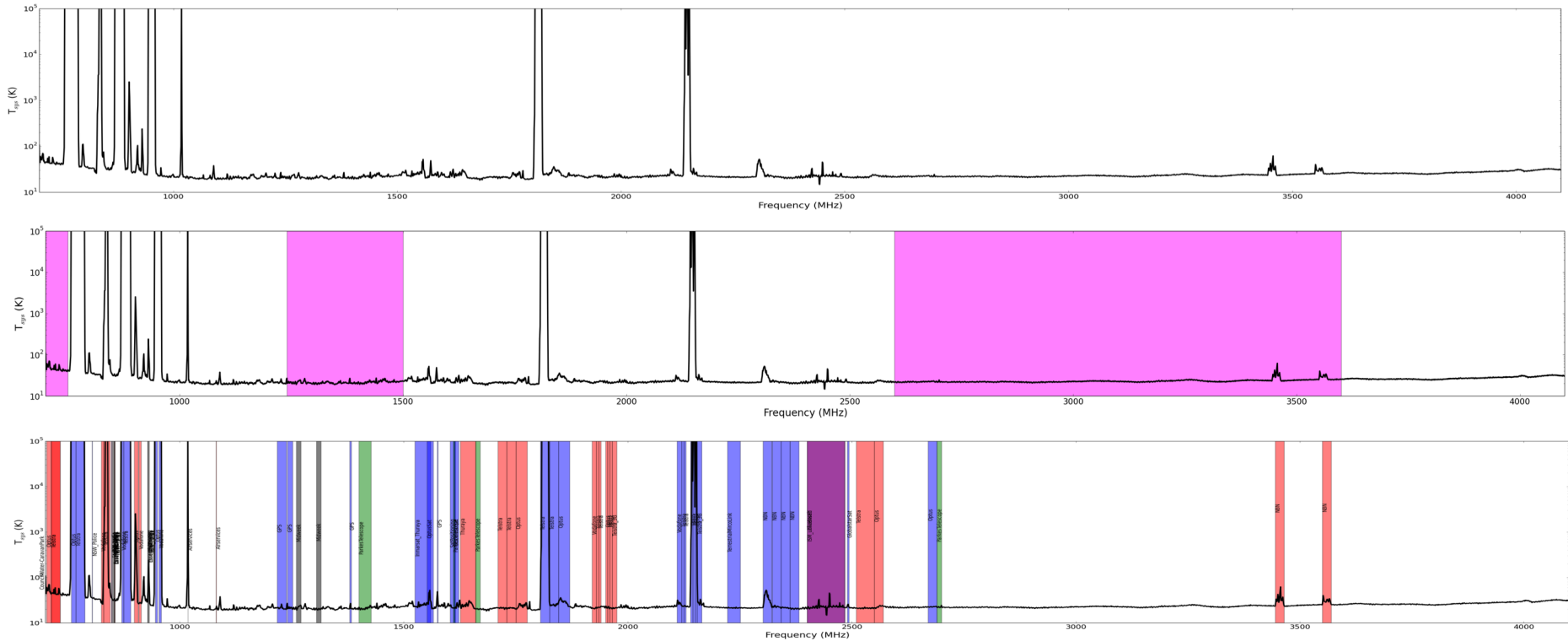
Installation Day – 15 May 2018



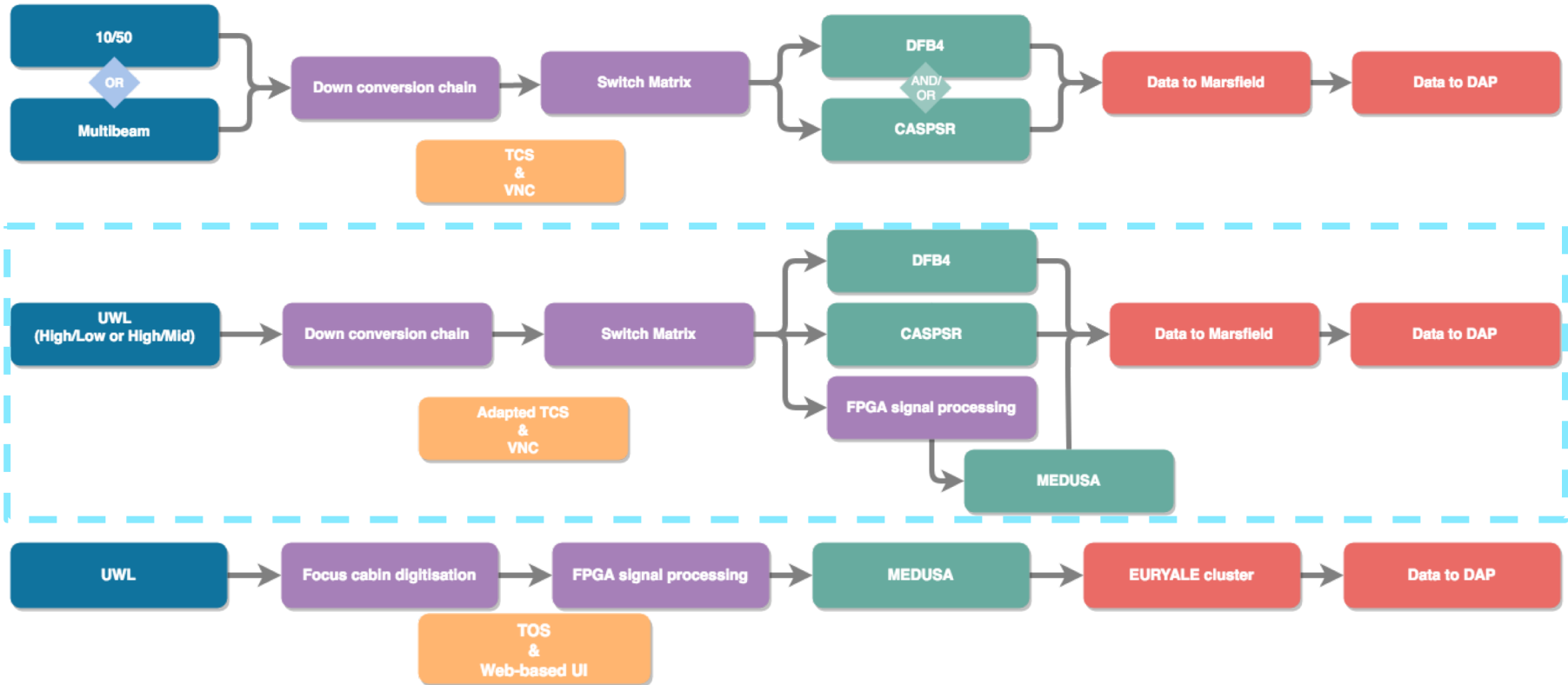
First light



...in a different light



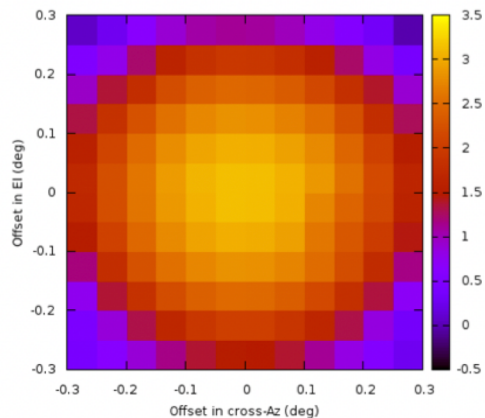
Out with the old and...



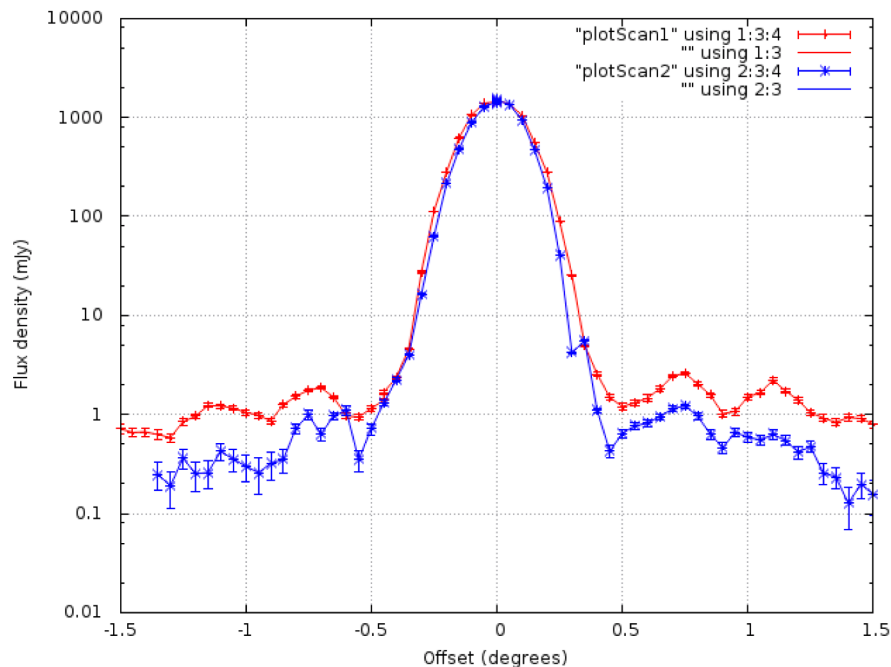
State of Play

- **Low band:**
 - $\nu_0 \sim 900$ MHz, $\Delta\nu \leq 256$ MHz
- **Mid band:**
 - $\nu_0 \sim 1400$ MHz, $\Delta\nu \leq 1024$ MHz
- **High band:**
 - $\nu_0 \sim 2800$ MHz, $\Delta\nu \leq 1024$ MHz
- Standard pulsar *fold & search* modes
- *Continuum / Spectral line* modes
- “Legacy system” observing
 - 10/50-like data through legacy backends (DFB4 & CASPSR)
- **High & Mid or High & Low**
 - **High** band through DFB4 or Medusa
 - **Mid** or **Low** band through Medusa or DFB4
- **High-High** or **Mid-Mid**
 - Same signal going to Medusa and DFB4

Current Status: Beam Shape



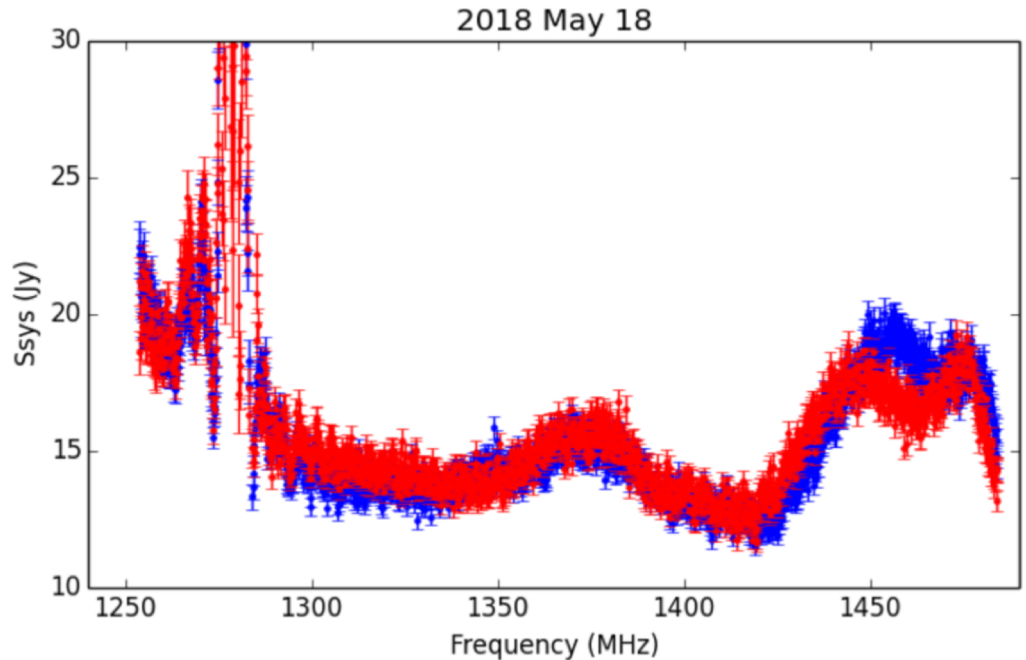
“I think the majority of the difference between az and el can be explained by the presence of the feed leg in the elevation plane.” – A. Dunning



20cm beam shape (in Az/El) obtained through observations of Vela

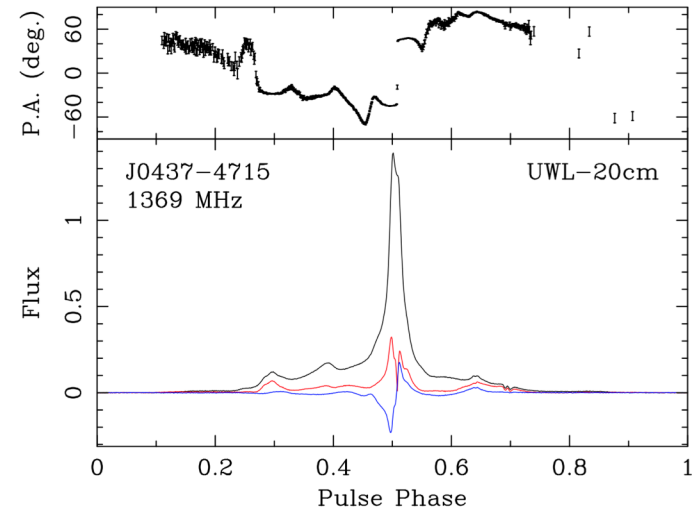
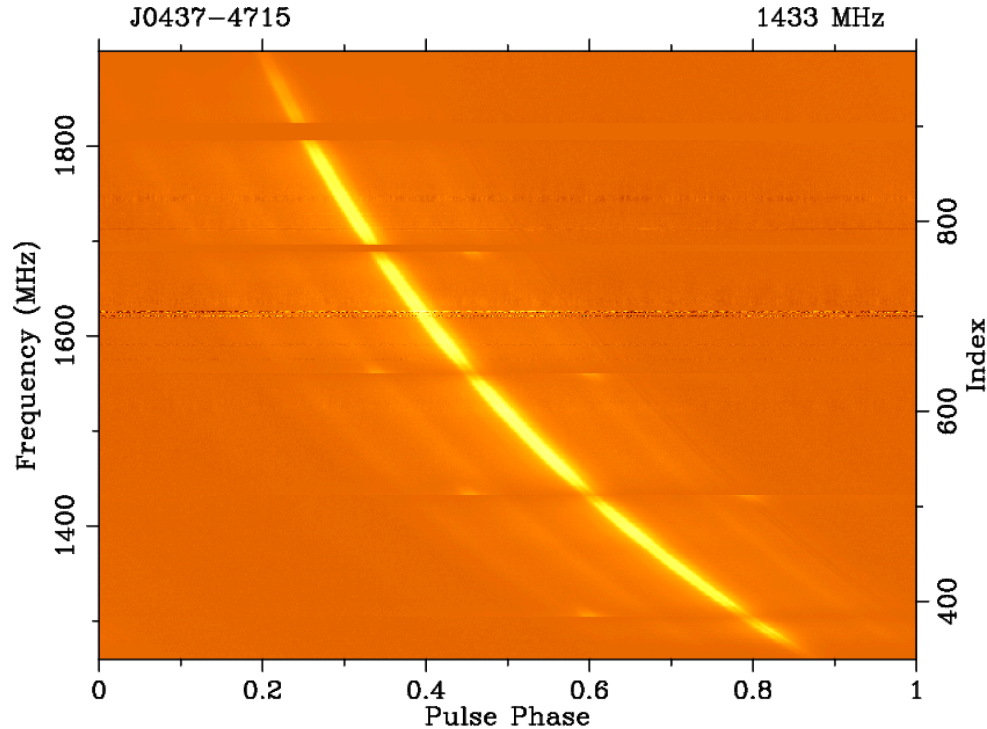
Current Status: System Response

- S_{sys} as measured using Hydra A in the 20cm band
 - $\langle AA \rangle = 14.63 \text{ Jy}$
 - $\langle BB \rangle = 14.96 \text{ Jy}$
- Not converted to efficiency yet



Courtesy of S. Dai

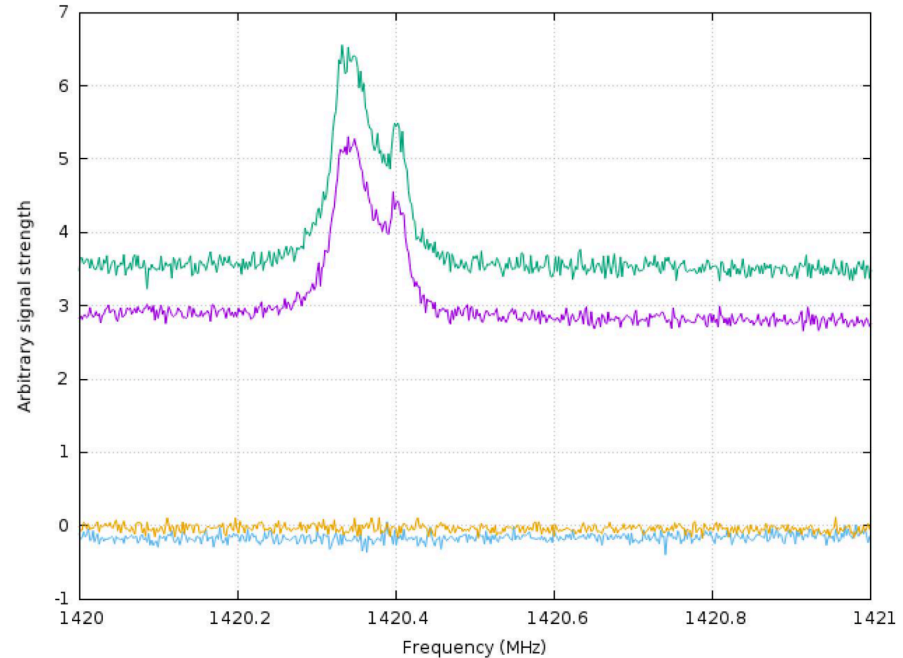
Current Status: Pulsar Fold Mode



Courtesy of W. van Straten

Current Status: Spectral Lines

- Will be able to record 0.5 kHz channels across the entire band.
- Also modes will be available for 0.1 kHz across 10 MHz bands.
- Observing OH masers tomorrow!



Courtesy of G. Hobbs

We have so much time and so little to do...

- Digitize full RF signal in the focus cabin (TOMORROW!)
 - The FULL 700 MHz – 4 GHz bandwidth at your fingertips!
 - This makes the current band limitations irrelevant to any keen observer
- Install data staging server to produce final astronomy data products (purchased)
- Study long term timing stability (in progress...)
- Correct phase delay between polarisations (in progress...)
- Tone injection for frequency sanity-check (in progress...)
- Update from a critically-sampled to over-sampled filterbank (near future)
- PRBS cal for commensal observing (slightly further, near future)

**Aim for national facility
capability next semester**

Thank you

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