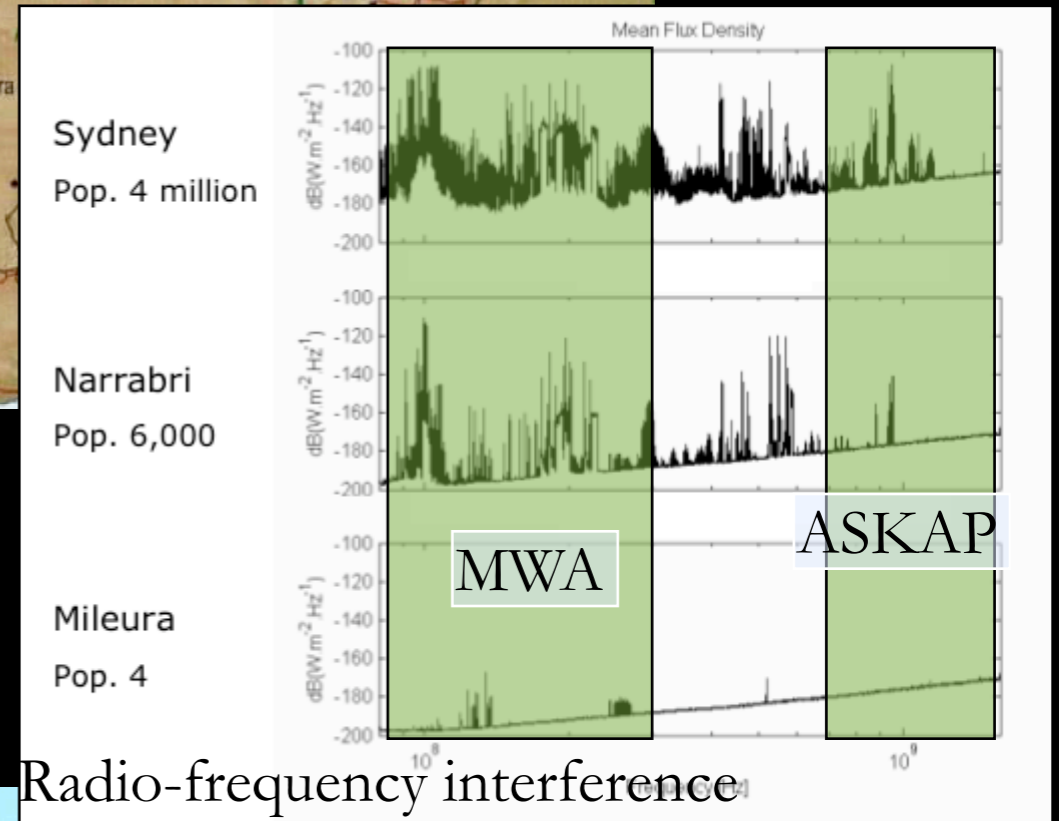
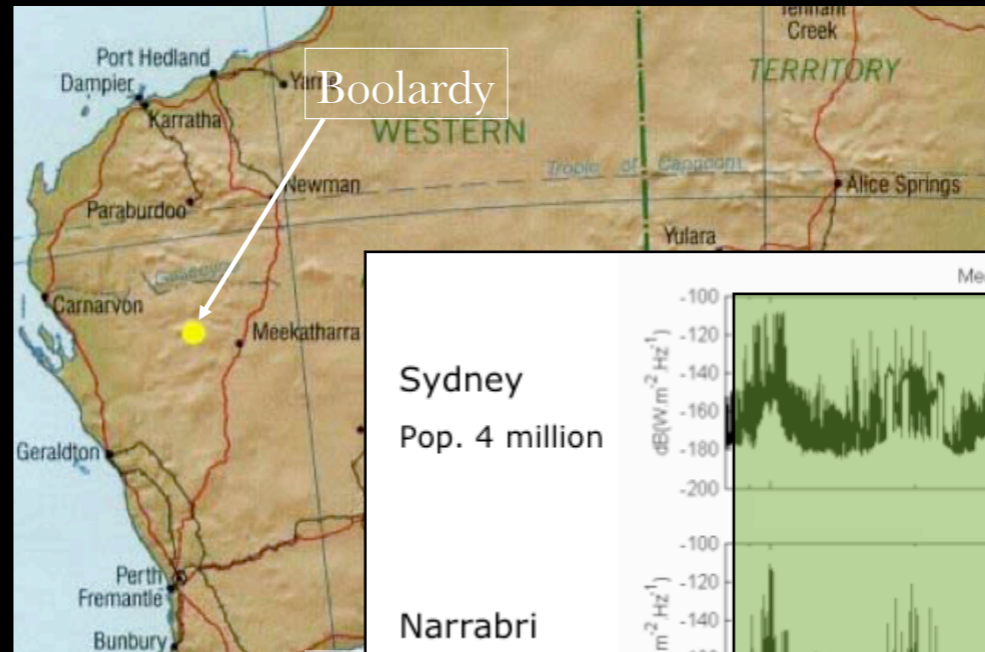


Motivation

- Explorations of dynamic optical, high-energy skies progressing well
 - Much coming from new optical surveys
- Dynamic radio sky largely unexplored systematically
- EM/GW sources:
 - GW has poor localization
 - Optical limited by time of day/year

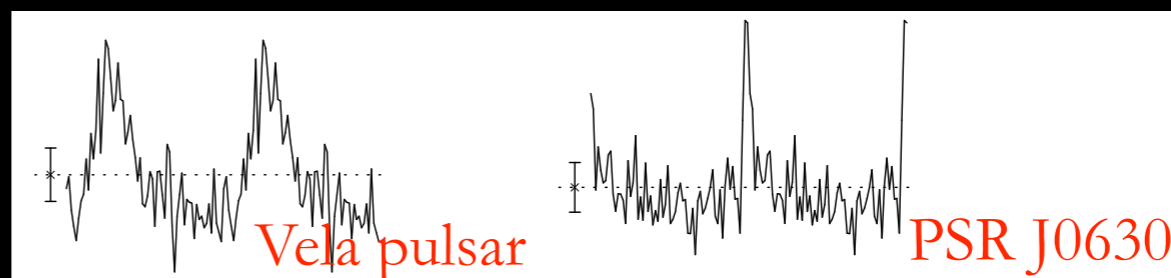
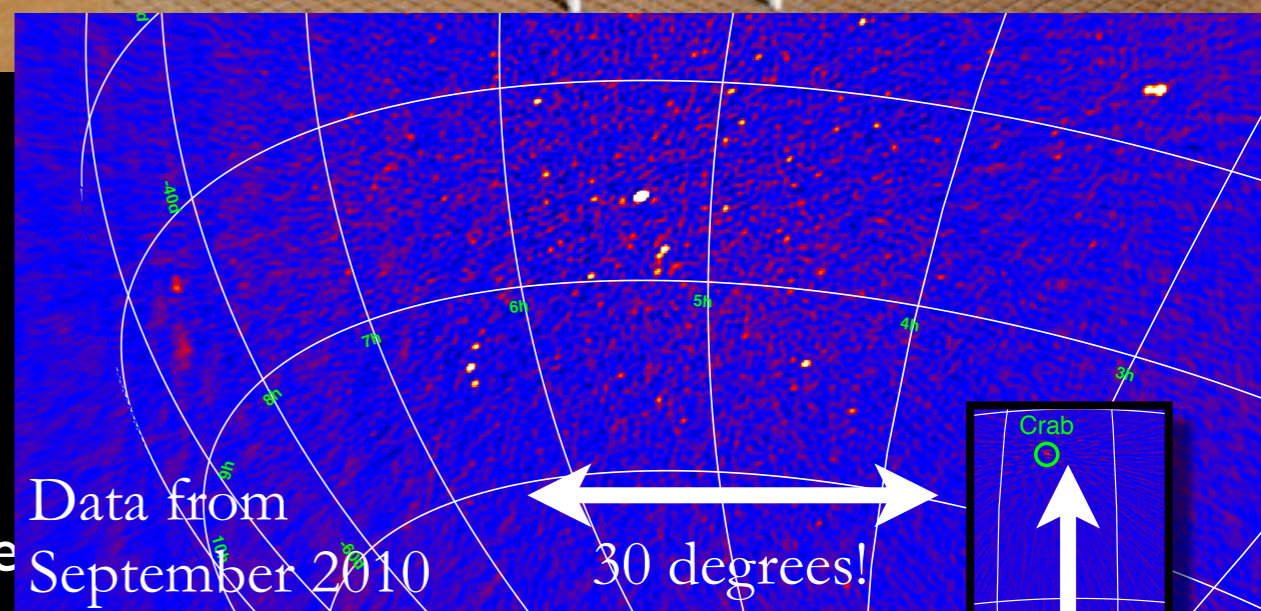
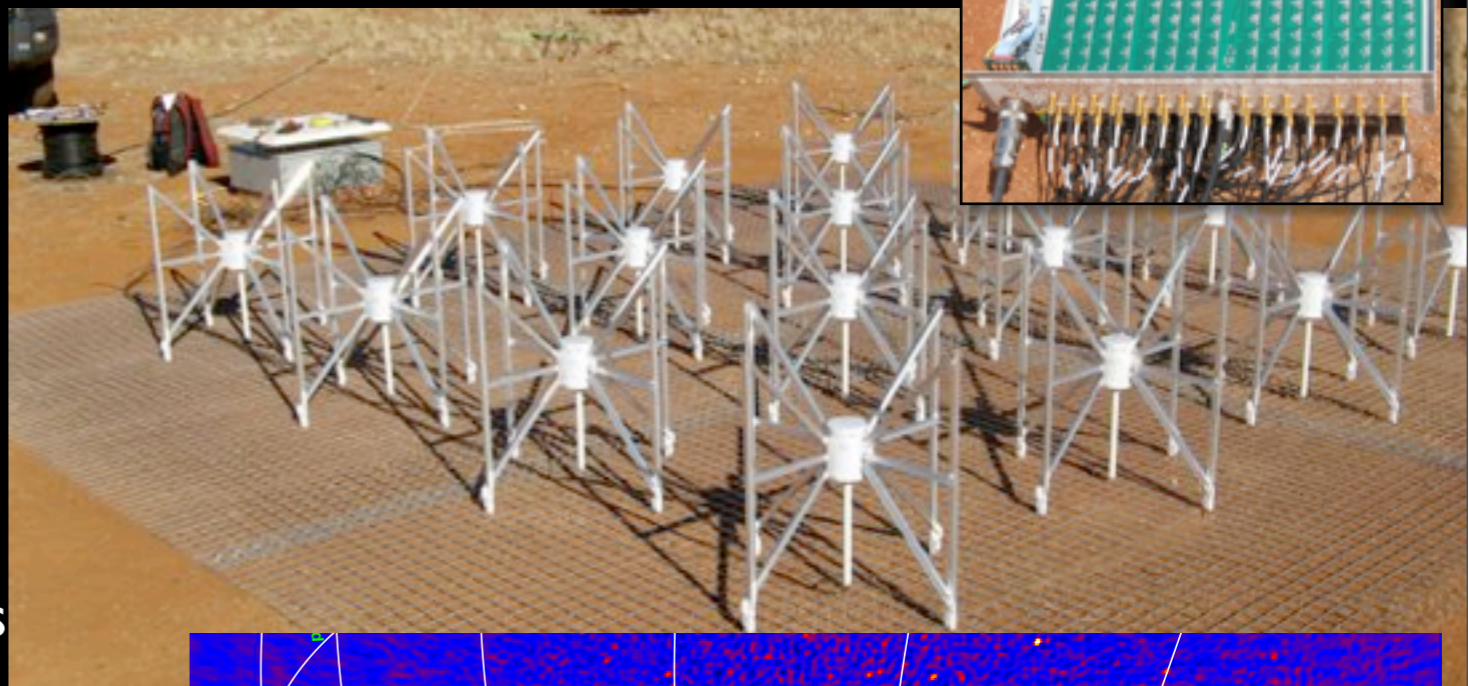
New Facilities @ New Site

- Murchison Radio Observatory
 - Western Australia
 - Extremely radio quiet: 16,000 square miles (>Massachusetts) w/ ~100 people
 - Operations in FM, TV bands, so radio-quiet is crucial
- Site for Square Kilometer Array Low
- Infrastructure improving



MWA

- Murchison Widefield Array
- Low-frequency (80-300 MHz)
- Digital telescope: no moving parts
 - Tile has 16 dipoles
 - 32 tiles in place, 128 by 2012
 - Steered electronically with beamformers
- Can repoint in 8s
- Baselines up to several km
- 1000 sq. deg. instantaneous FOV, 5' resolution
- Transient & pulsar surveys along with other science (solar, EoR)
- Collaboration between select US, Australian, Indian institutions



ASKAP

- Australian Square Kilometre Array Pathfinder
- 36 antennas, 12m each
 - $T_{\text{sys}}=50$ K
 - 3-axis design to eliminate FoV rotation
- 0.7-1.8 GHz, 300 MHz bandwidth
- Baselines up to 6km
- 6-antenna prototype (BETA) operational soon
- Rest in 2013
- Optimized for survey speed:
 - 30 deg^2 instantaneous FoV
 - $220 \text{ deg}^2/\text{hr}$ continuum survey
 - $10''$ resolution, $100 \mu\text{Jy rms}$
- Focal plane arrays: 30 beams on the sky



ASKAP/VAST

- Variables & Slow Transients survey
 - T. Murphy (Sydney) & S. Chatterjee (Cornell) are PIs
- Continuous commensal observations: piggyback with all surveys at ASKAP
- AND Dedicated surveys being designed
- Expected operation:
 - VAST Wide: 10,000 deg² observed daily (0.5 mJy rms); optimized for bright/rare events
 - VAST Deep: 10,000 deg² observed a few times (50 μJy rms); optimized for faint/common transients
 - VAST GP: 750 deg² in Galactic plane, observed several times per week (0.1 mJy rms); optimized for MW and Magellanic Clouds

Other New Facilities

EVLA



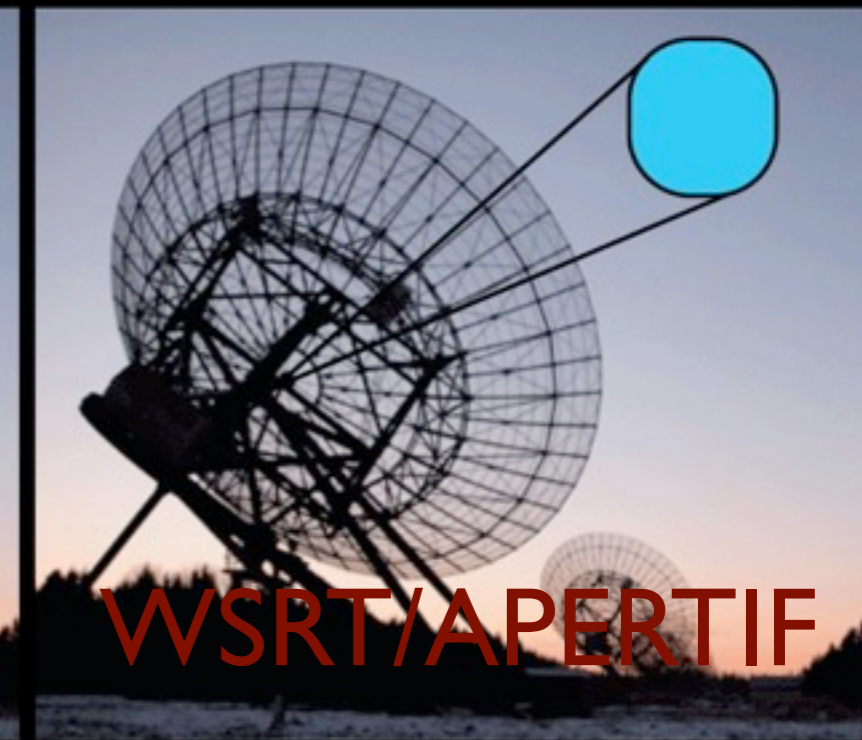
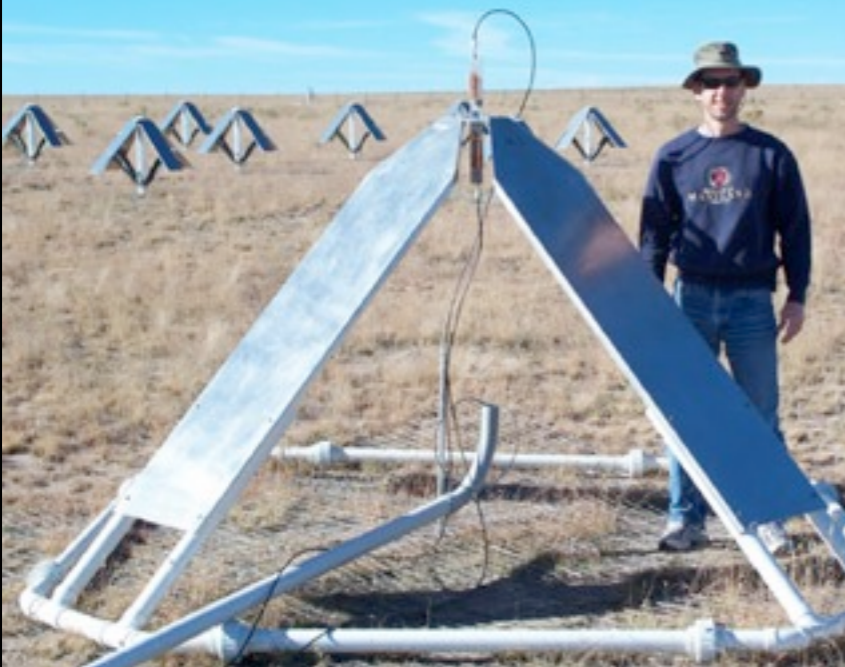
LOFAR



MeerKAT



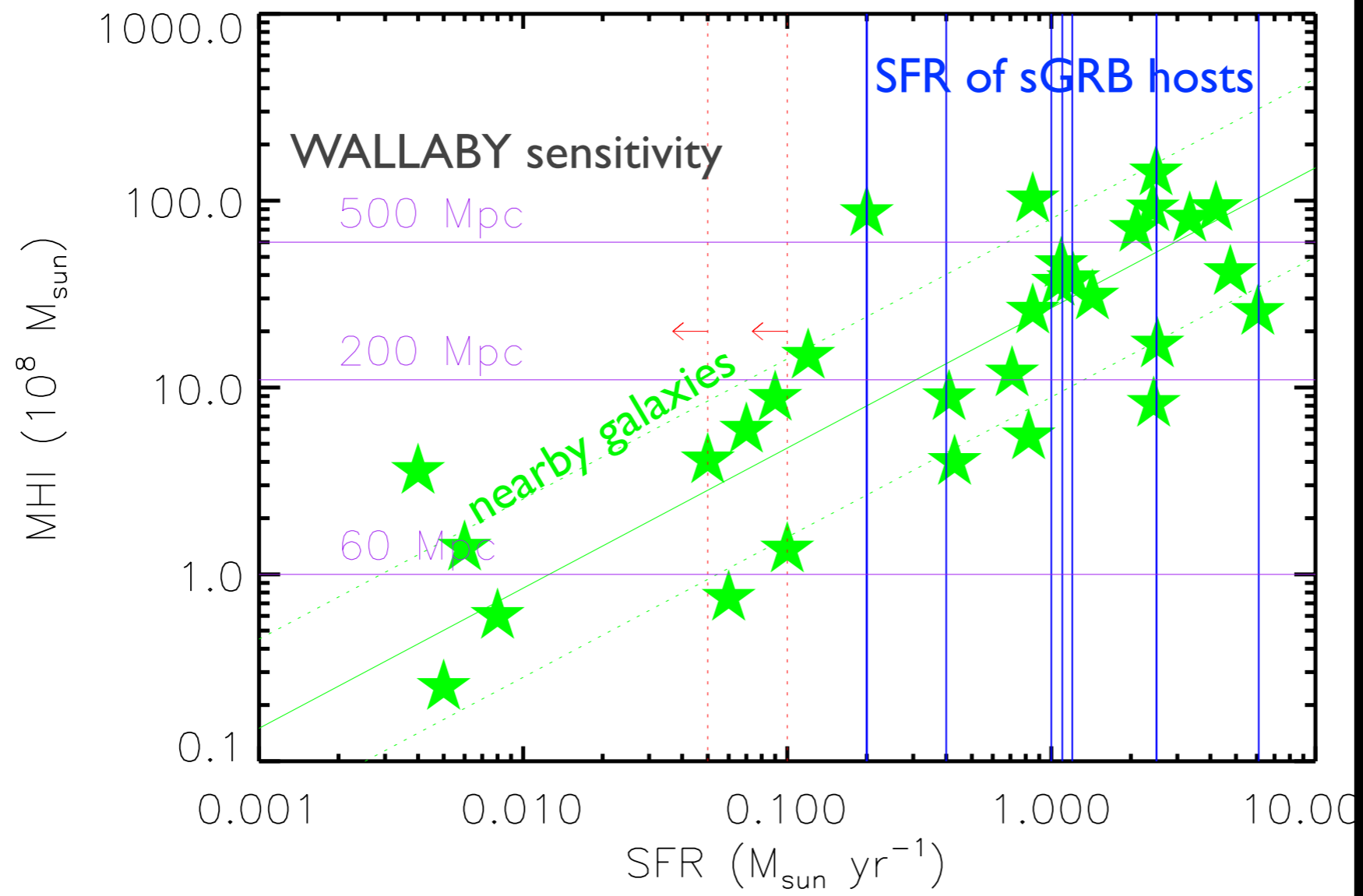
LWA



WSRT/APERTIF

Identifying GW Host Galaxies in Advance

- Current approach: H α (hot gas) surveys
- What about radio: HI (cold gas)
 - WALLABY is ASKAP HI survey
 - $M_{\text{HI}} = 10^8 M_{\odot}$ for < 60 Mpc
 - $M_{\text{HI}} = 6 \times 10^9 M_{\odot}$ for < 500 Mpc



~2/3 of hosts within 200 Mpc will be IDd by WALLABY

Metzger, Kaplan, Berger