

The Allen Telescope Array

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ASTRON



The ATA van Leeuwen

Collaboration

UC Berkeley Radio Lab

Bower, Croft, Welch, Backer, Heiles, Blitz, Urry,
Engargiola, Fleming, Kraybill, Lugten, Wright

SETI Institute

Tarter, Davis, Drake, Dreher, Ackerman, Deboer,
Harp

CASPER/BWRC

Werthimer, Cheng, Nagpal, Wawrzynek, Parsons

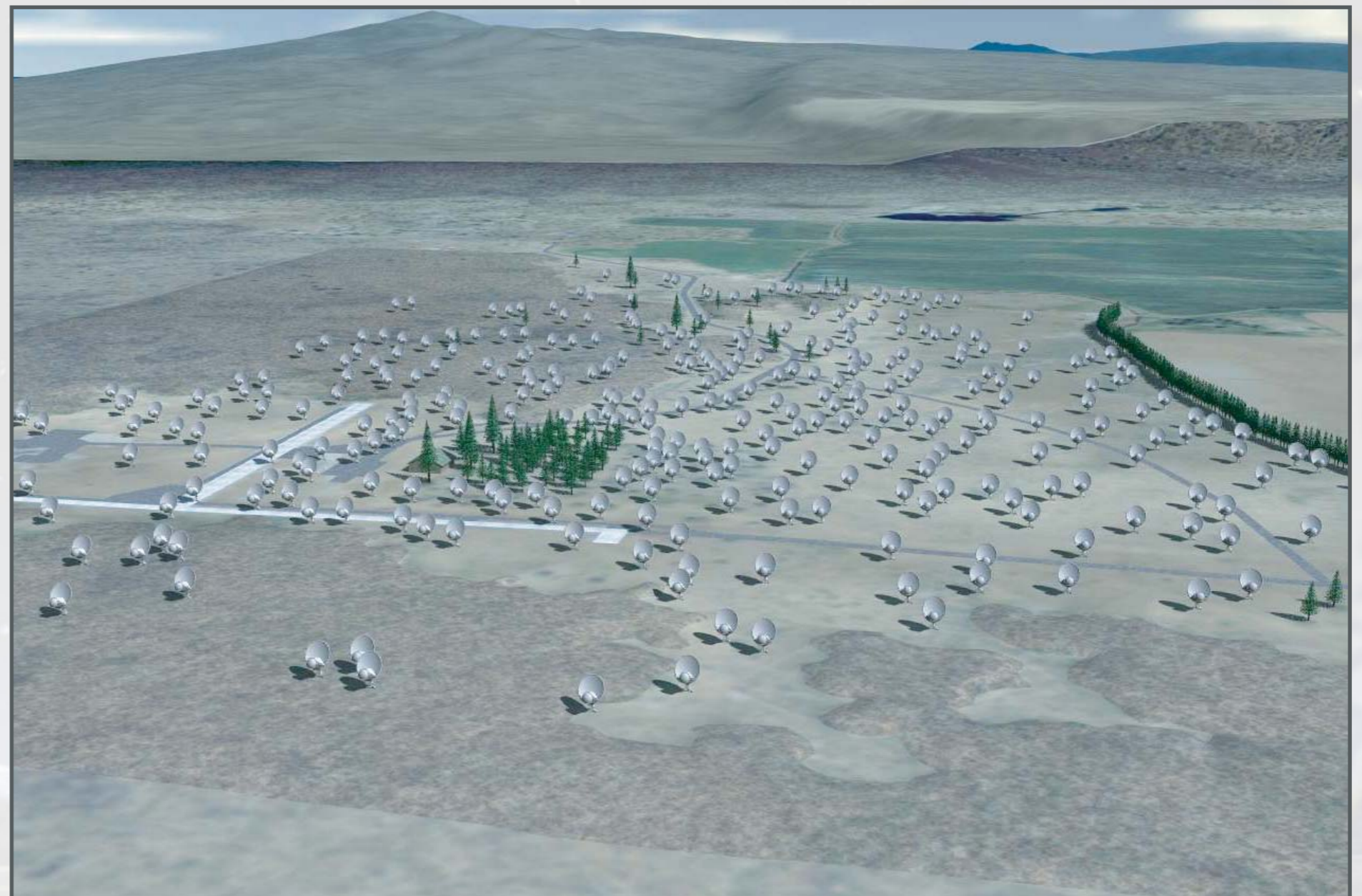


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Telescope concept

A survey telescope — exploit decreasing back-end electronics and satellite-dish costs.

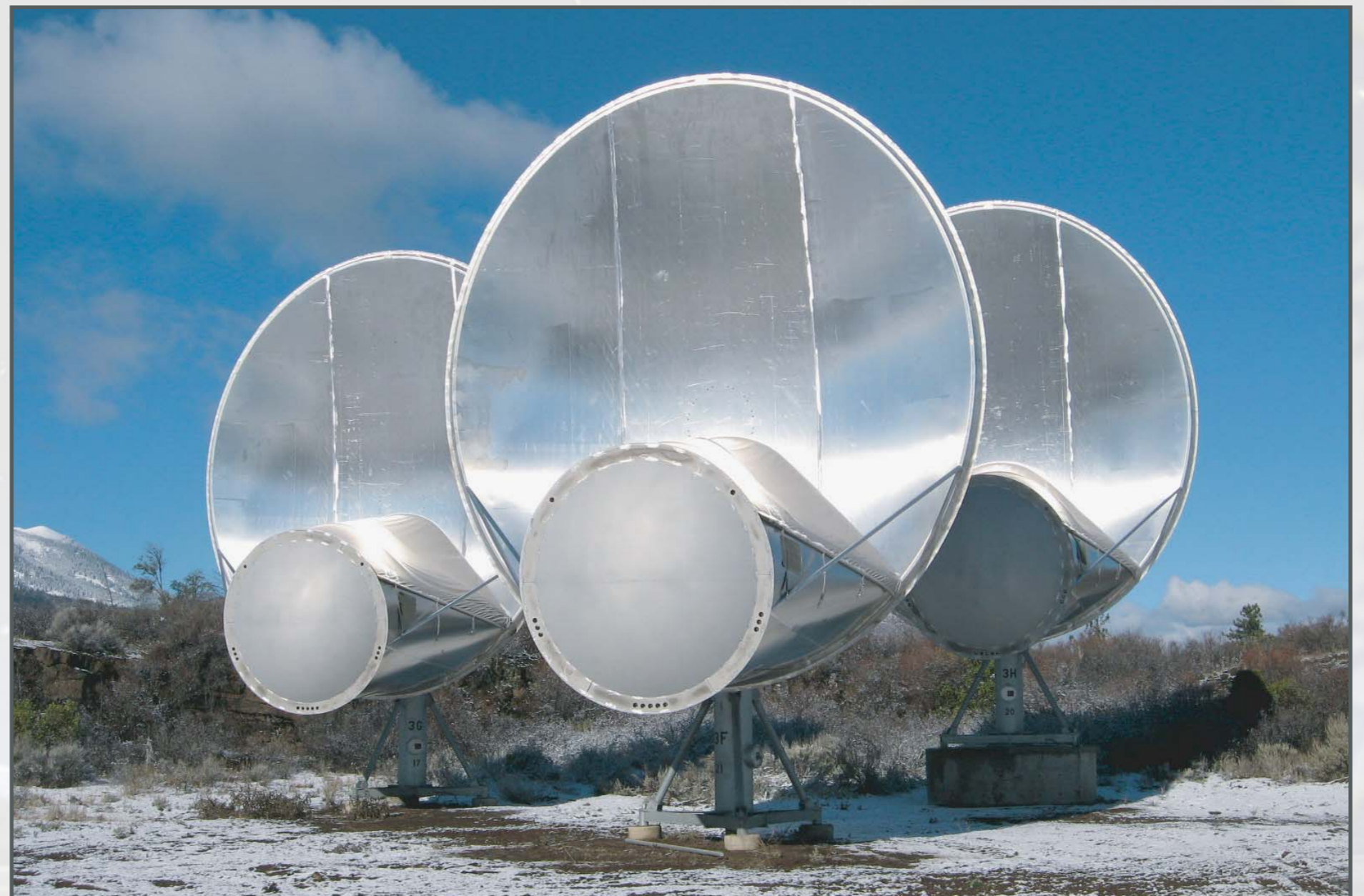
cf. Seti 2020 (1997)



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Telescope design – Dish

Dishes are 6.1m primary/2.4m secondary offset Gregorian, for a 2.5 degree FoV.



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Telescope design — Layout

Currently 42 dishes (ATA-42).
Gaussian baseline distribution

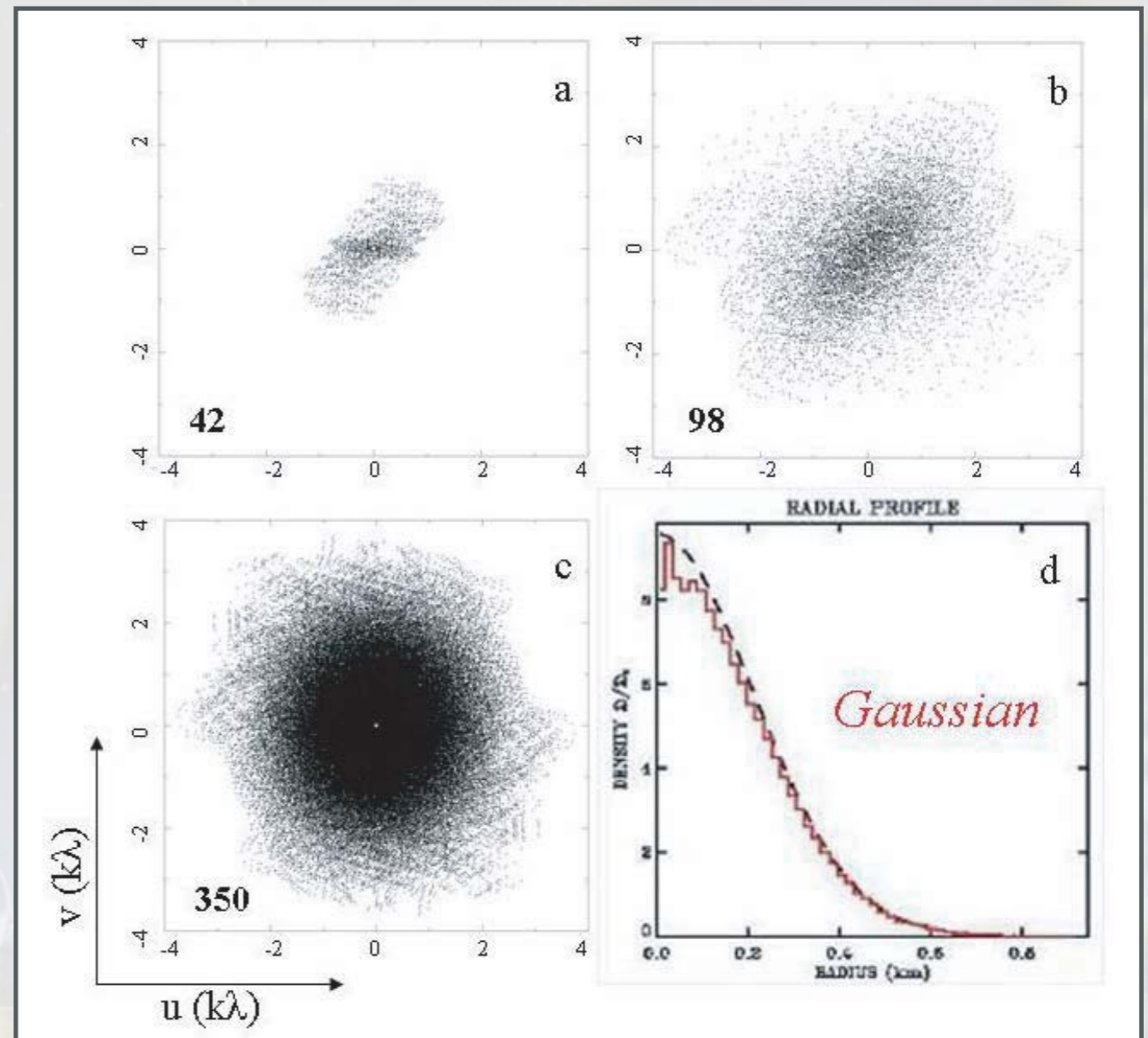


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Telescope design — Layout

Currently 42 dishes (ATA-42).
Good snapshot uv coverage

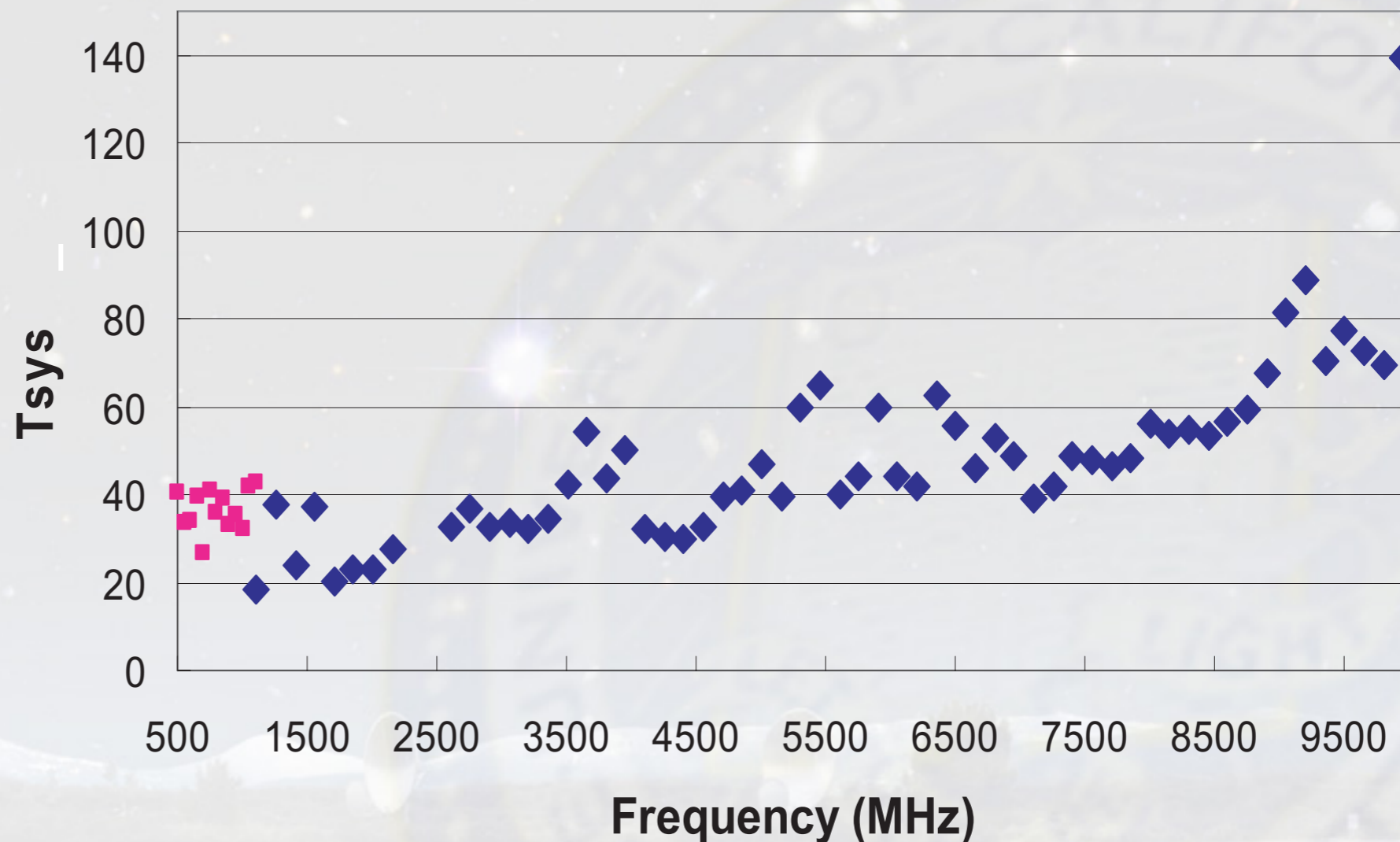
(Welch et al. 2009)



Telescope design — Feed

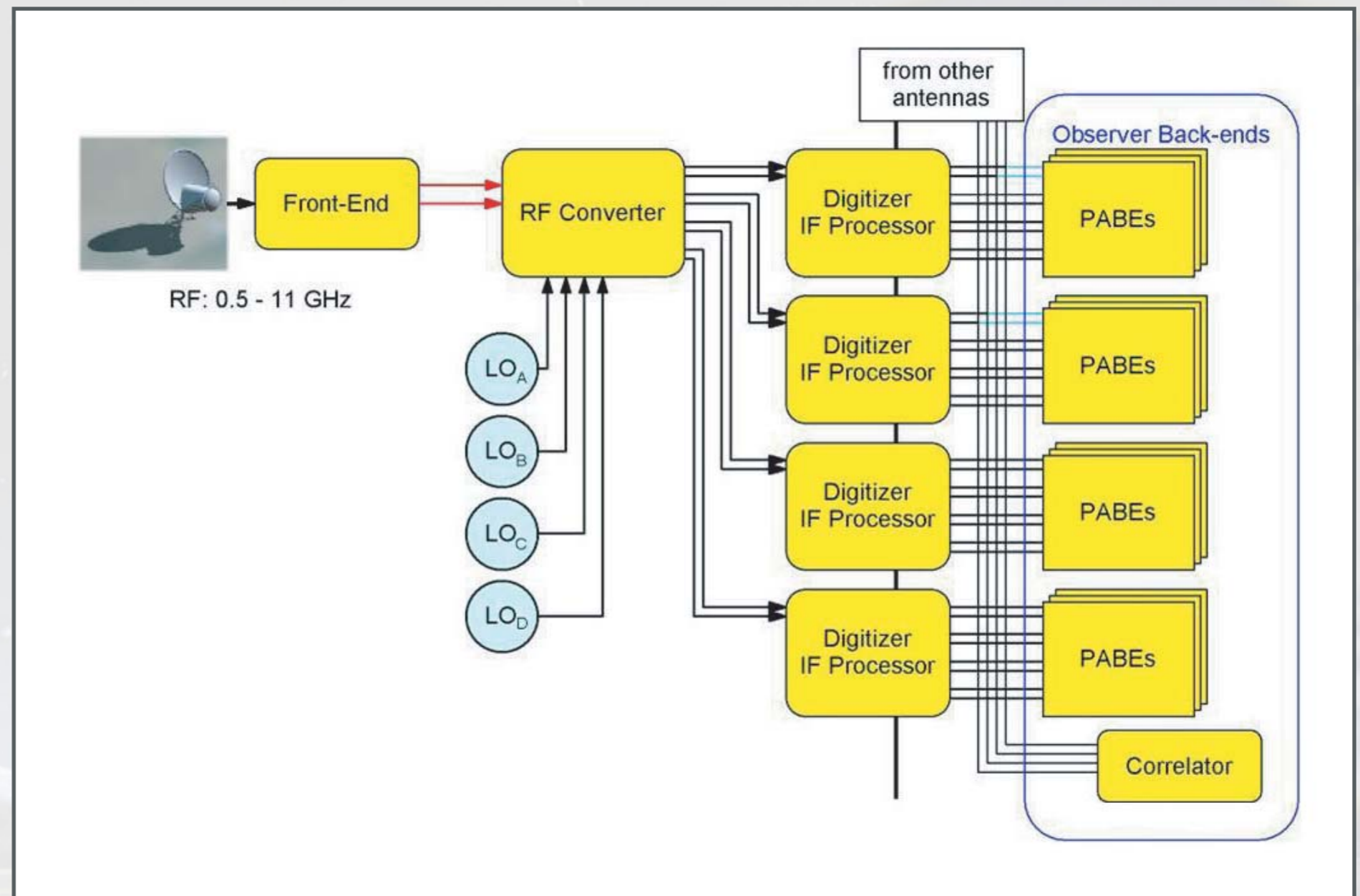
Log-periodic feed, for 4 octaves 0.5–10 GHz

Antenna 2K Tsys from Moon and CasA
Corrected for Defocus



Telescope design – IFs

4 Tunable IFs anywhere in the band



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Correlator

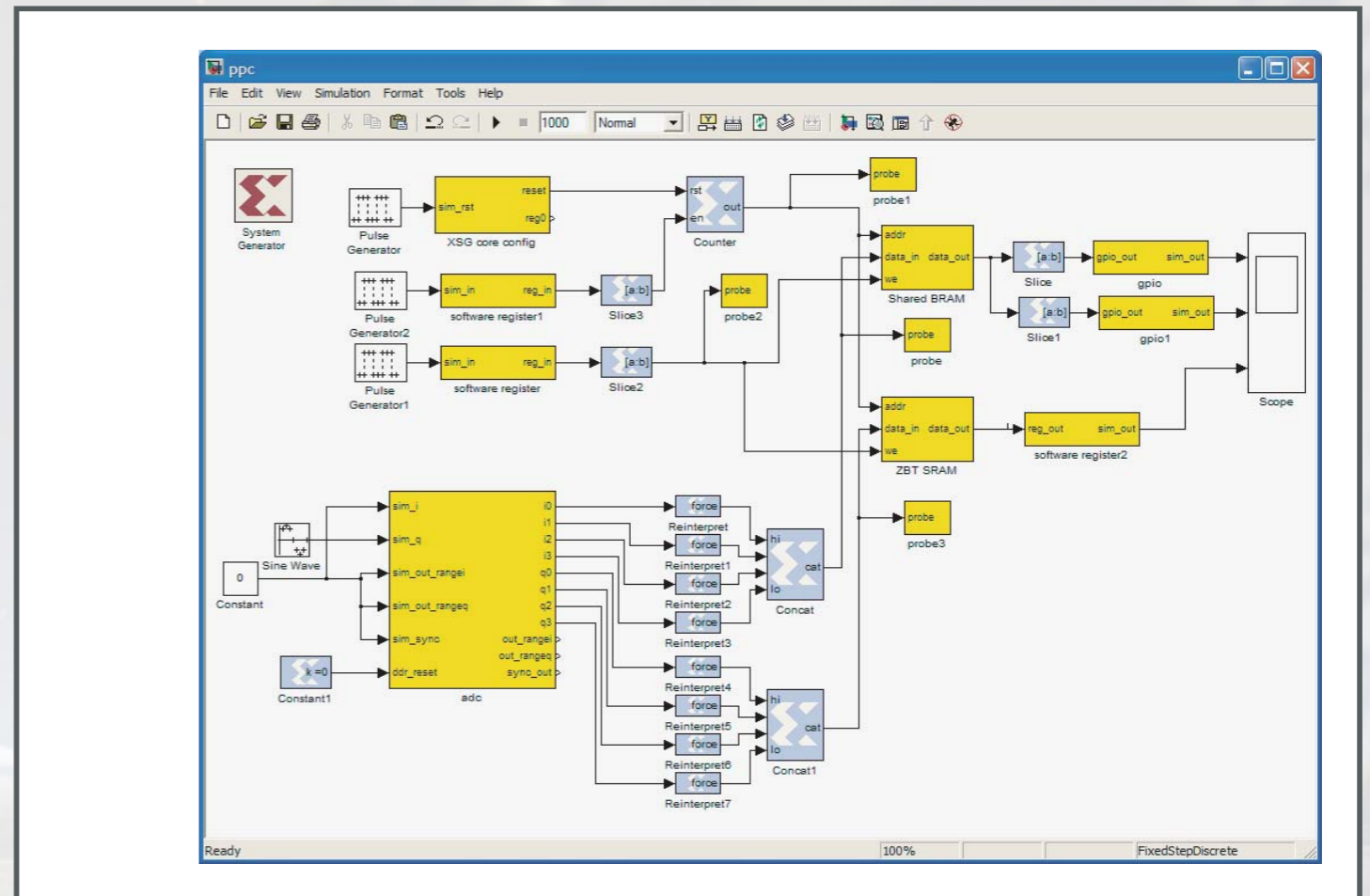
2 tunings x 32 ants x 4 Stokes x 1024 channels
Additional pair coming soon to produce 2 x 42
Narrowband mode developed and tested



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Beamformer

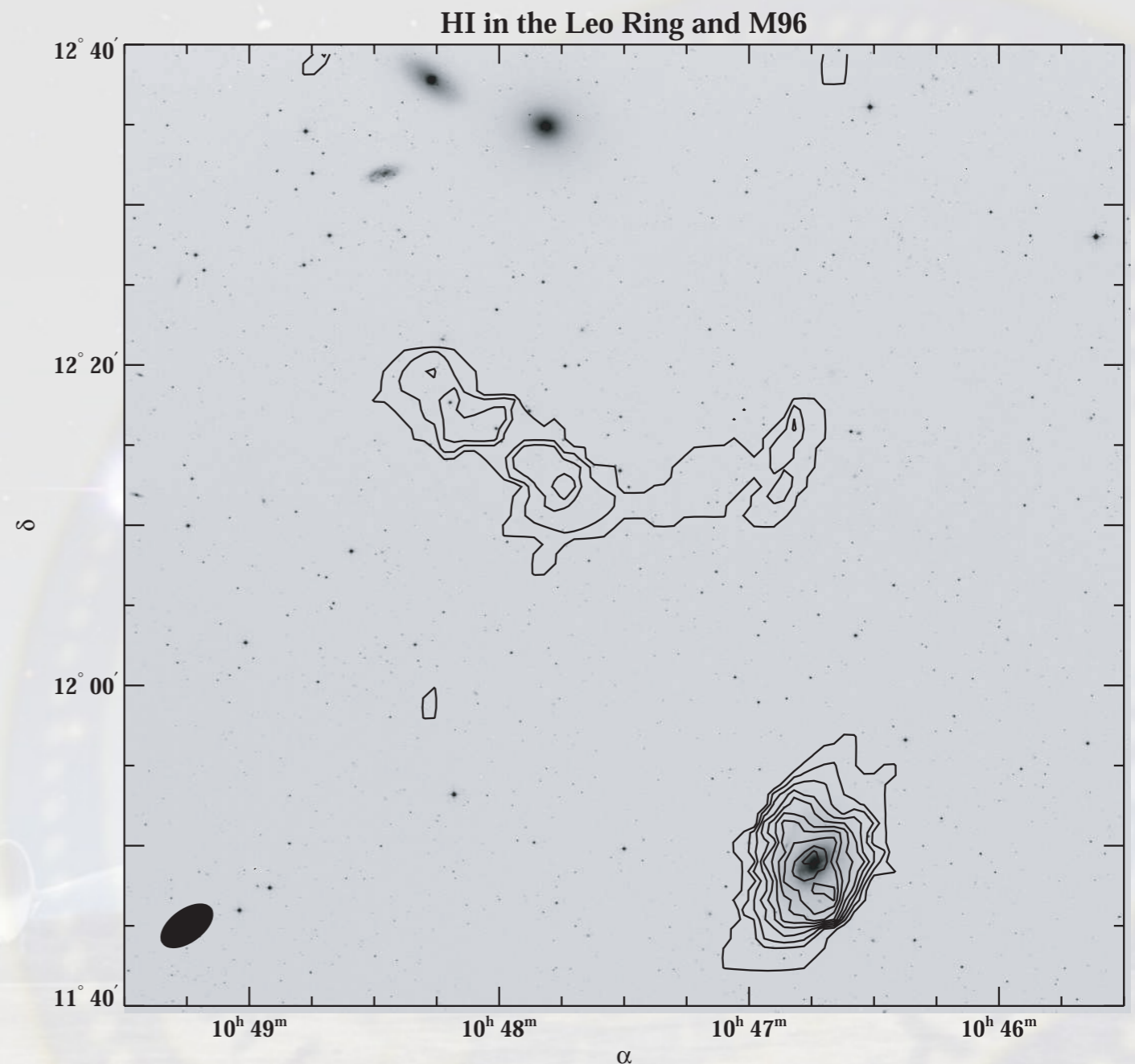
2 (soon: 3) tunings, 2 polarisations
CASPER: Low cost, fast, modular



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HI

Wide-field, resolution, fast imaging capabilities:
surveys of extragalactic HI in the local universe.

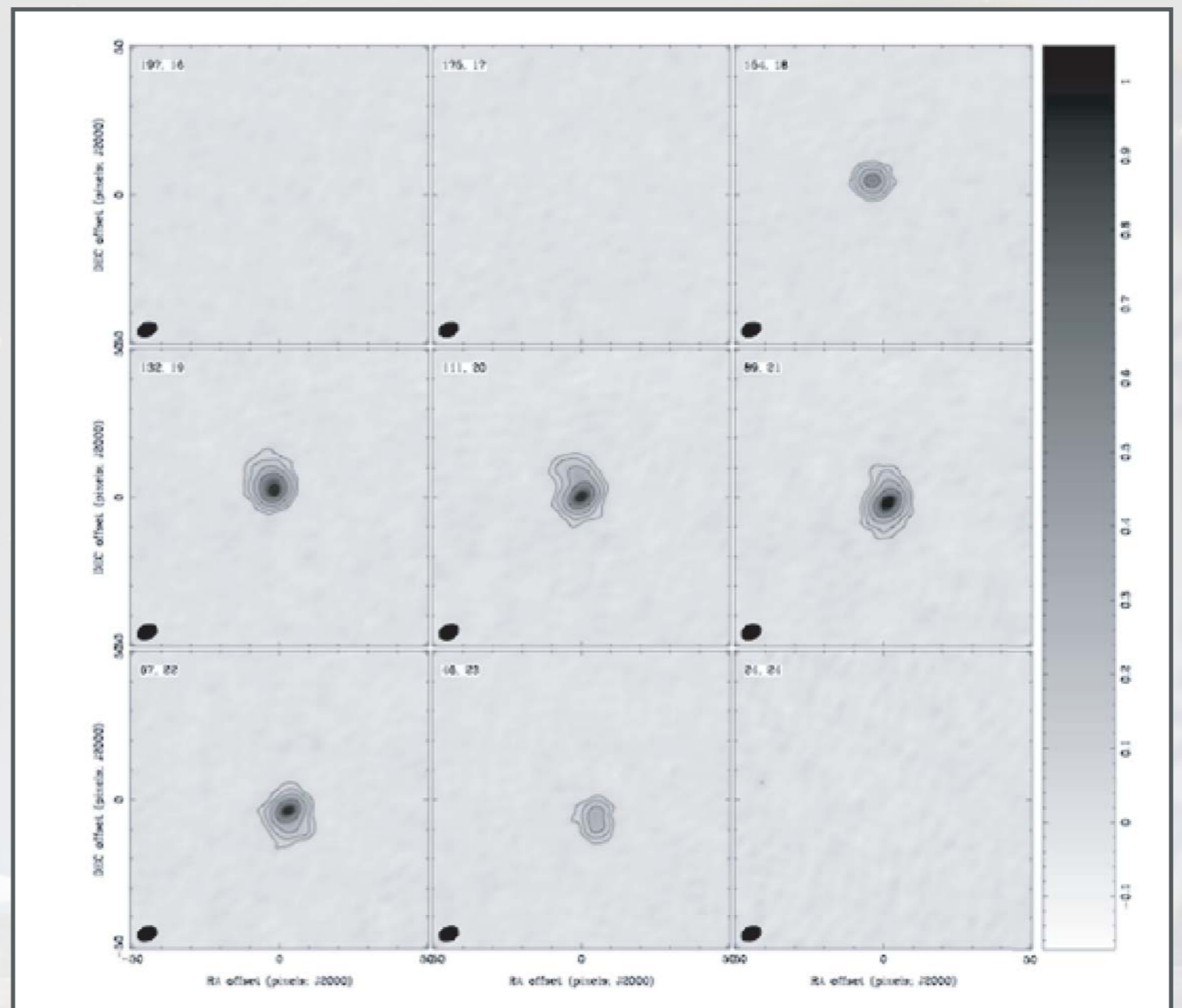


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HI

Imaging in nearby galaxies
NGC 236

(Bauermeister et al. 2009)

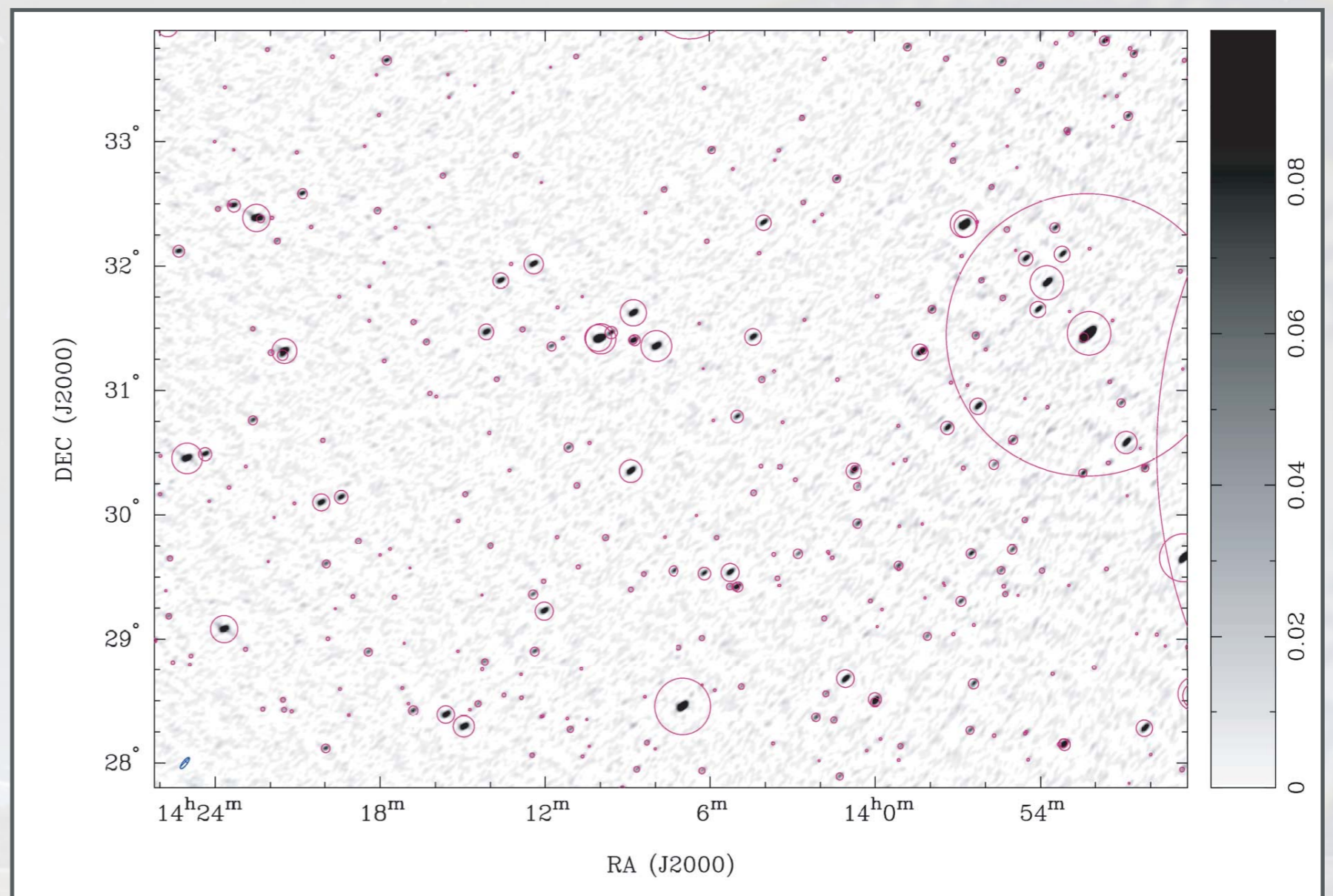


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ATATS

ATA 20-cm survey, 800 square degrees
350 pointings in 10 hours, >10 epochs

(Croft et al. 2009)



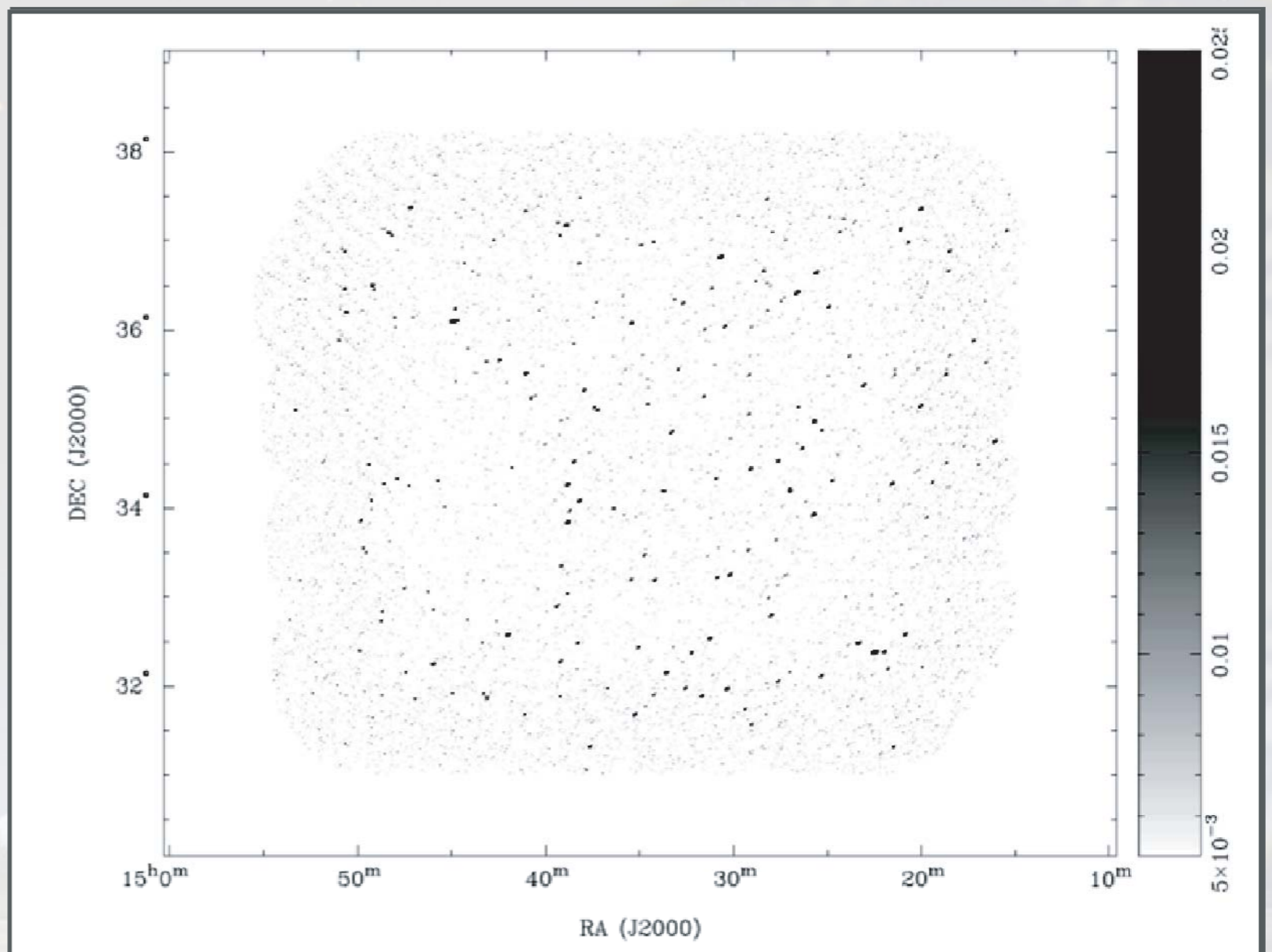
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Surveys

3 and 5GHz (PiGSS, FiGSS) surveys started
1000 square degrees, 3 times

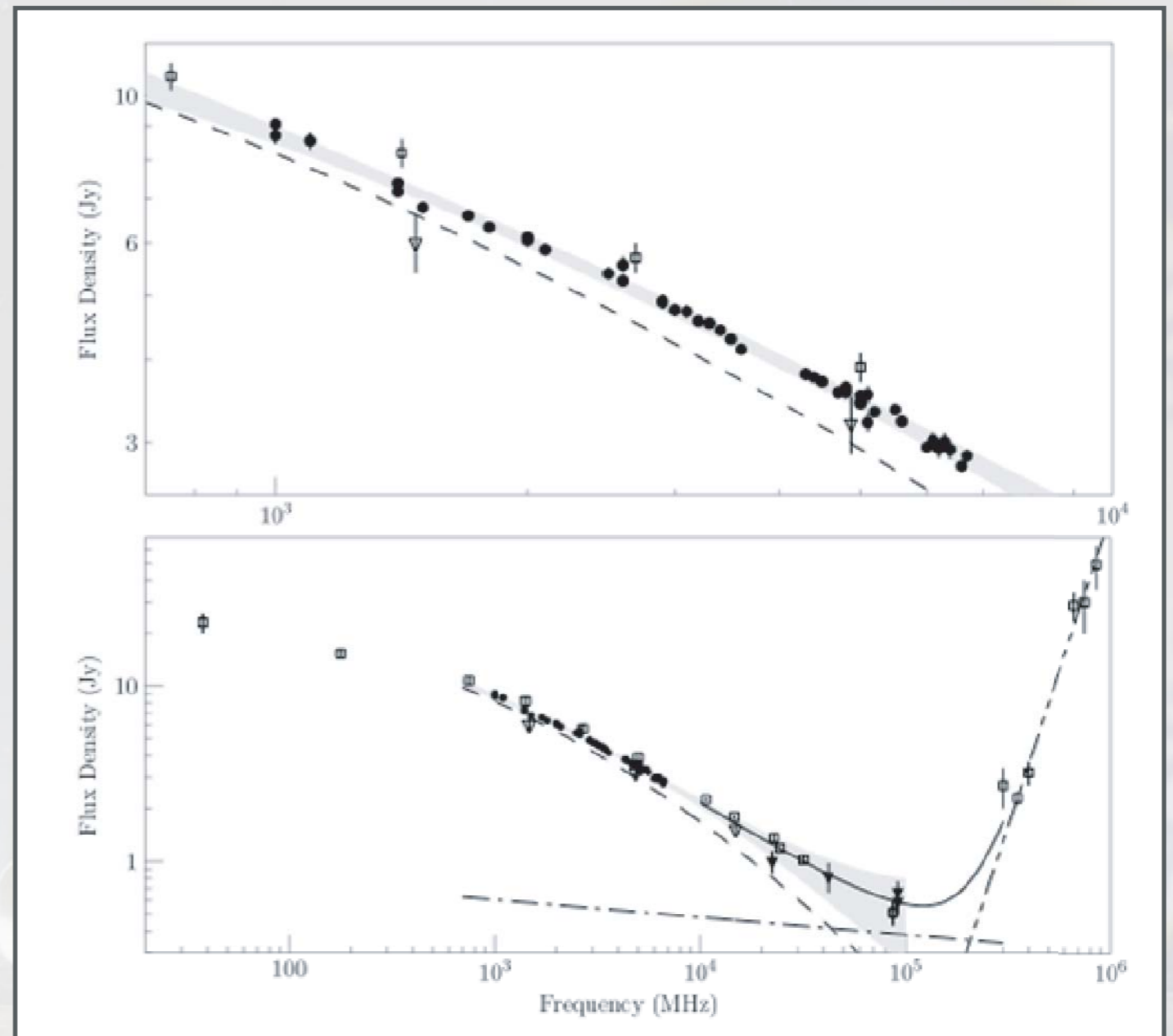
(Bower et al. 2009)



Spectra

Continuous spectra of star-forming galaxies:
M82

(Williams & Bower 2009)



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Conclusions

Wide-field, resolution & fast imaging capabilities:
well suited for
surveys of extragalactic HI in the local universe.

