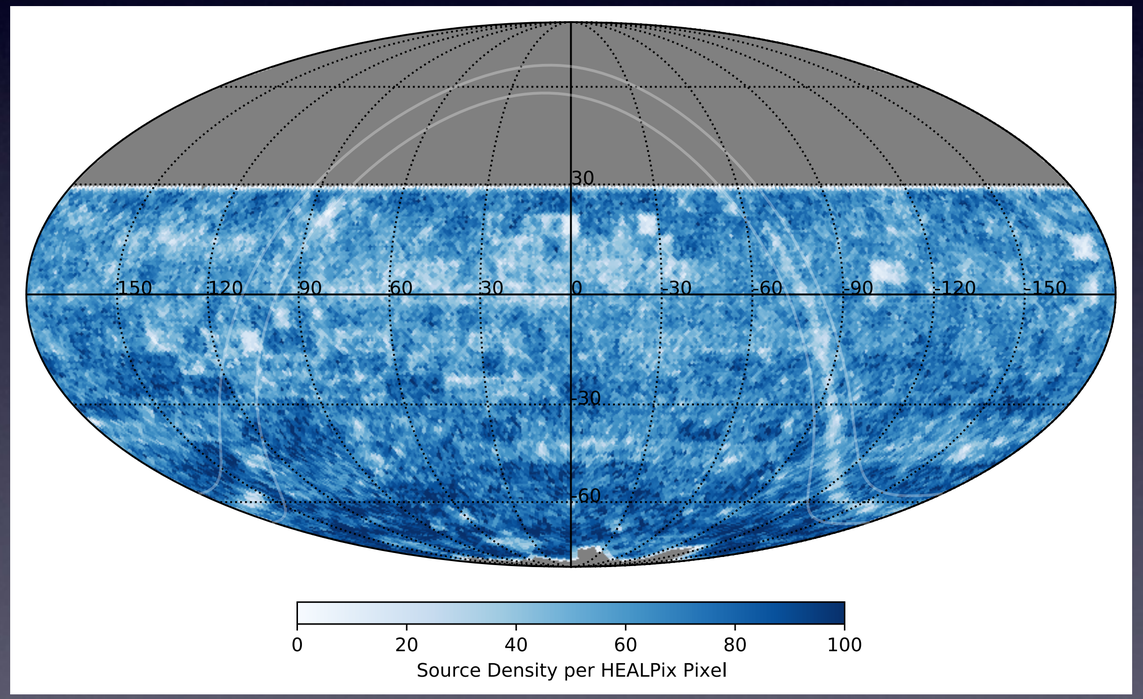
Continuum surveys

- Continuum surveys measure intensity of total radio emission, across waveband
- Emission dominated by synchrotron, so spectrum (almost) featureless
- Measure RA and Dec of sources, but need other information for redshift
  - 2D rather than 3D map

RACS HEALPix map



Bahr-Kalus et al (2022)

Cross-correlation

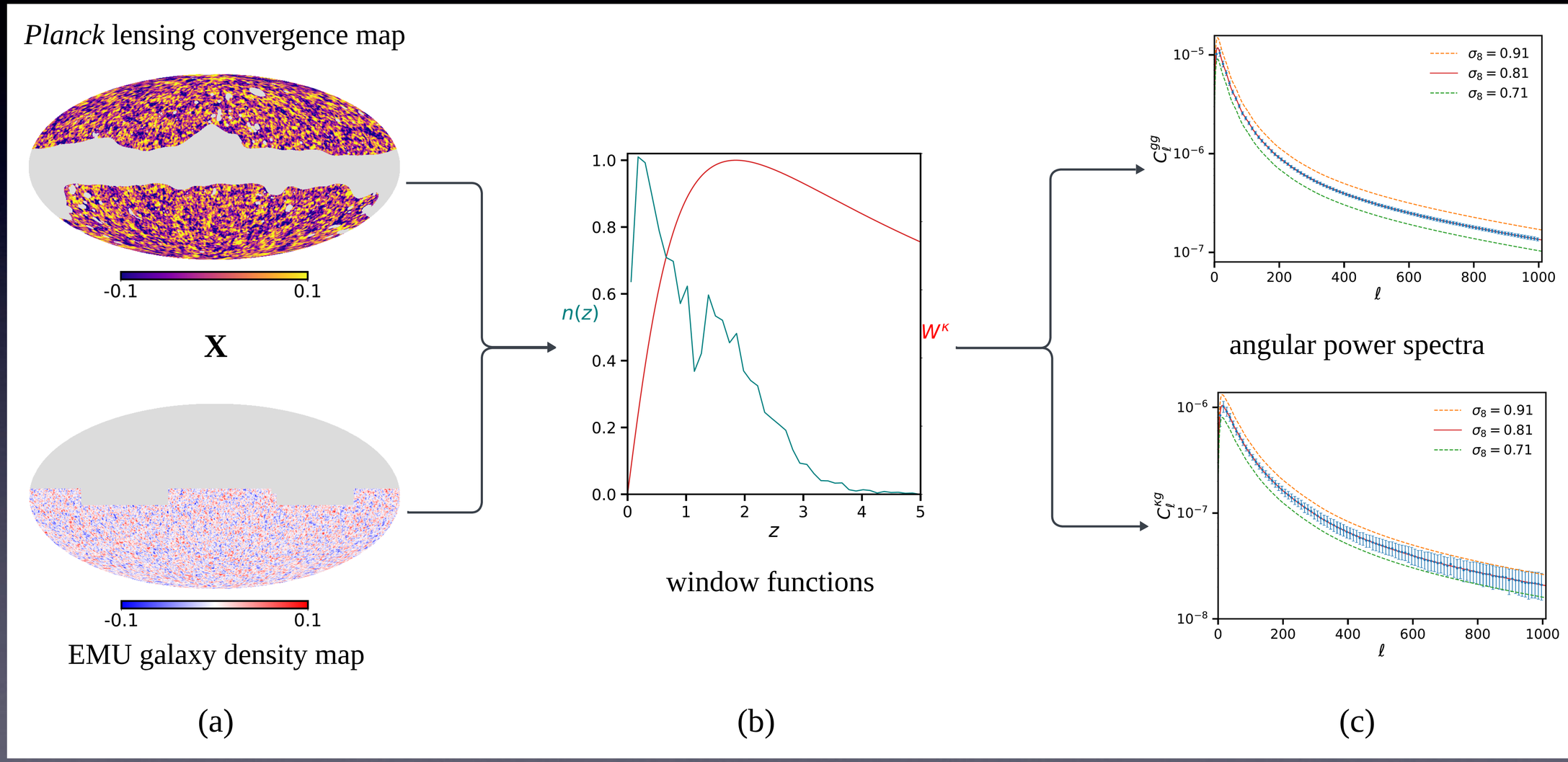
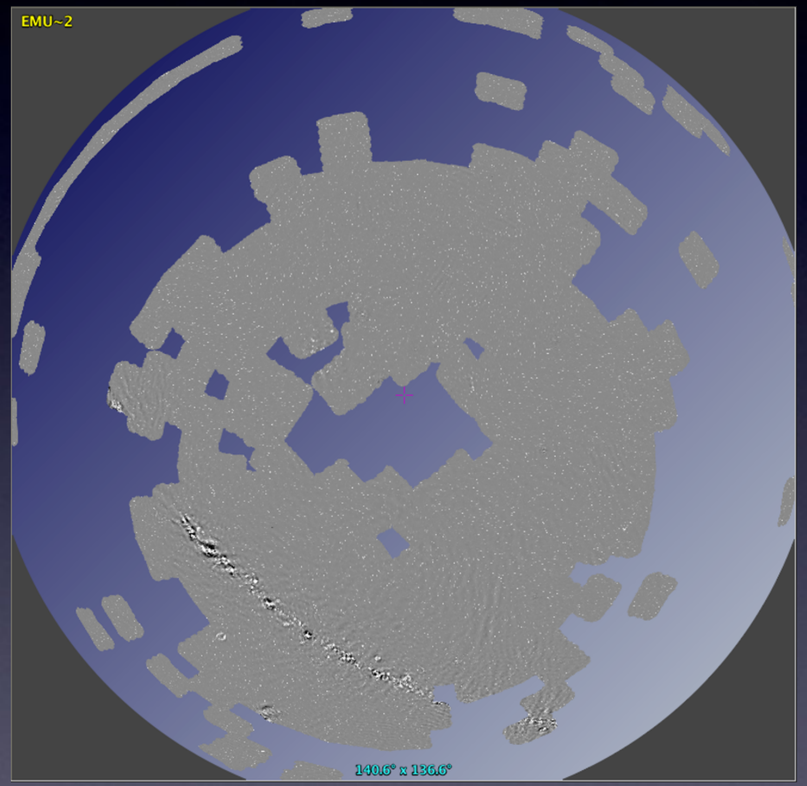


Figure by Chandra Shekhar Saraf

Current Surveys

- RACS
  - Rapid ASKAP Continuum Survey - ASKAP
  - 60% sky, 800-1400 GHz, released in three bands (Low, Mid High) - complete but shallow
- EMU
  - Evolutionary Map of the Universe Survey
  - Much deeper than RACS, but only half sky, 34% complete
- LoTSS
  - LOw-Frequency ARray (LOFAR) Two-metre Sky Survey
  - Northern sky, 120–168 MHz, DR2 released
- GLEAM-X
  - The Galactic and Extra-Galactic All-Sky MWA Extended Survey
  - MWA, 72 – 231 MHz, 1-2 mJy/beam, all southern sky (60%)
- MeerKLASS
  - See talk by Mario Santos



EMU Progress - June 2025

Theory development

- Talks by Catherine Hale, Benedict Bahr-Kalus, Mario Santos, Dominik Schwarz, Mohit Panwar, Jonah Wagenveld, Carlo Burigana
- Dipole
  - Simulations, and re-analysis of existing data
- Cross-correlation
  - CMB Lensing x EMU Pilot Survey continuum (Tanidis et al 2025)
  - DES x EMU Pilot Survey continuum for n(z) estimation (Saraf et al 2025)
  - Many more plans for EMU Souther Polar Orbital Zone (auto, DES cross, magnification, CMB cross)
  - (Also, from WL WG: *"Cosmology and Source Redshift Distributions from Combining Radio Weak Lensing with CMB Lensing"* by Kalaja, Harrison and Coulson)
- Population modelling
  - Some leveraging ML methods
  - Cross-over with extragalactic working group