The background of the slide features a Cosmic Microwave Background (CMB) fluctuation map. The map is a color-coded representation of temperature variations, with warmer regions in shades of orange and red, and cooler regions in shades of blue and cyan. Overlaid on this map is a vector field, where each point is represented by a small grey line segment. The orientation and length of these segments indicate the direction and magnitude of the local velocity field, showing a complex, swirling pattern of motion across the sky.

# **CMB research at KICC: from the early universe to galaxy evolution**

**Anthony Challinor on behalf of the CMBers**



# CMB people



Anthony Challinor



George Efstathiou



James Fergusson



Anthony Lasenby



Paul Shellard



Blake Sherwin



Steven Gratton



Will Handley



Naomi Robertson



Inigo Zubeldia



Niall MacCrann



Boris Bolliet



Dongwon (DW) Han



Aleksandr Bowkis



Emilie Hertig



Erik Rosenberg



Zucheng Gao



Irene Cabezas



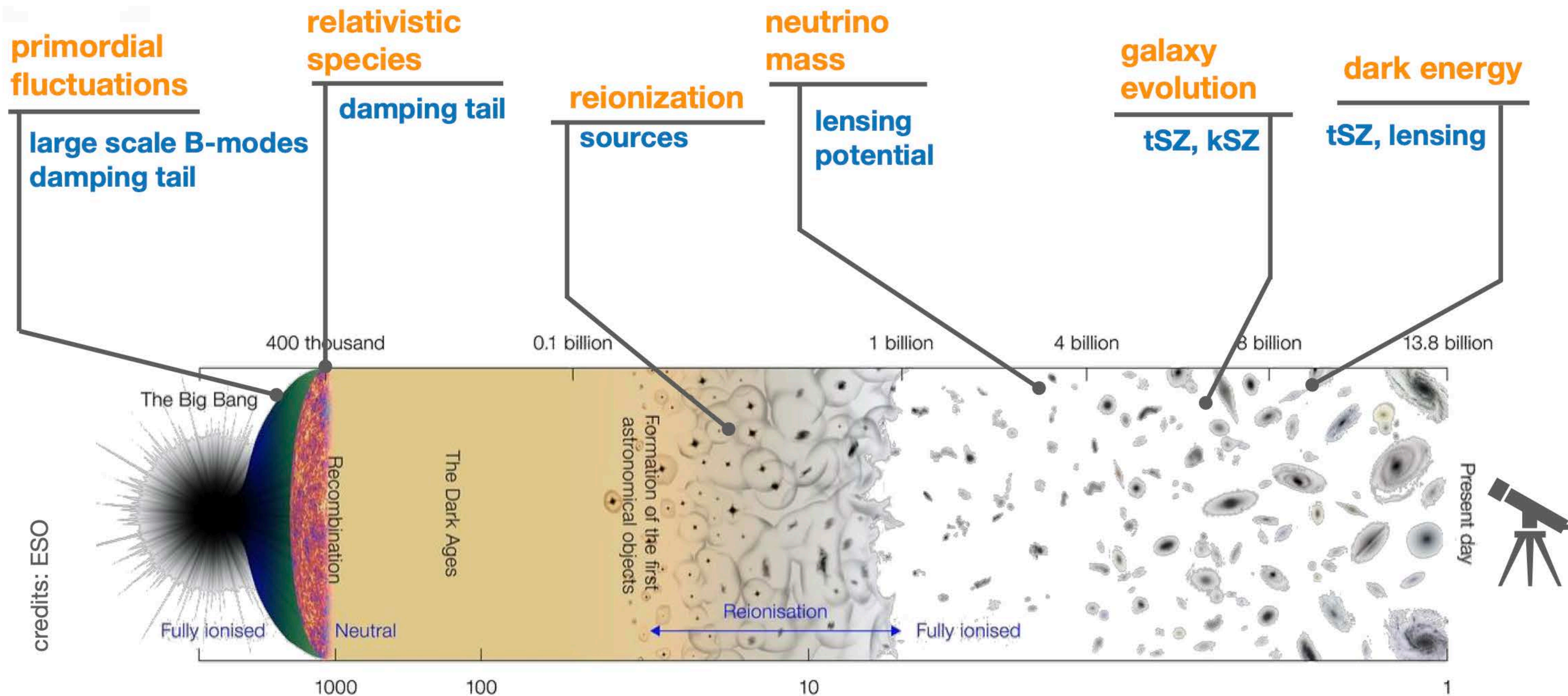
Gerrit Farren



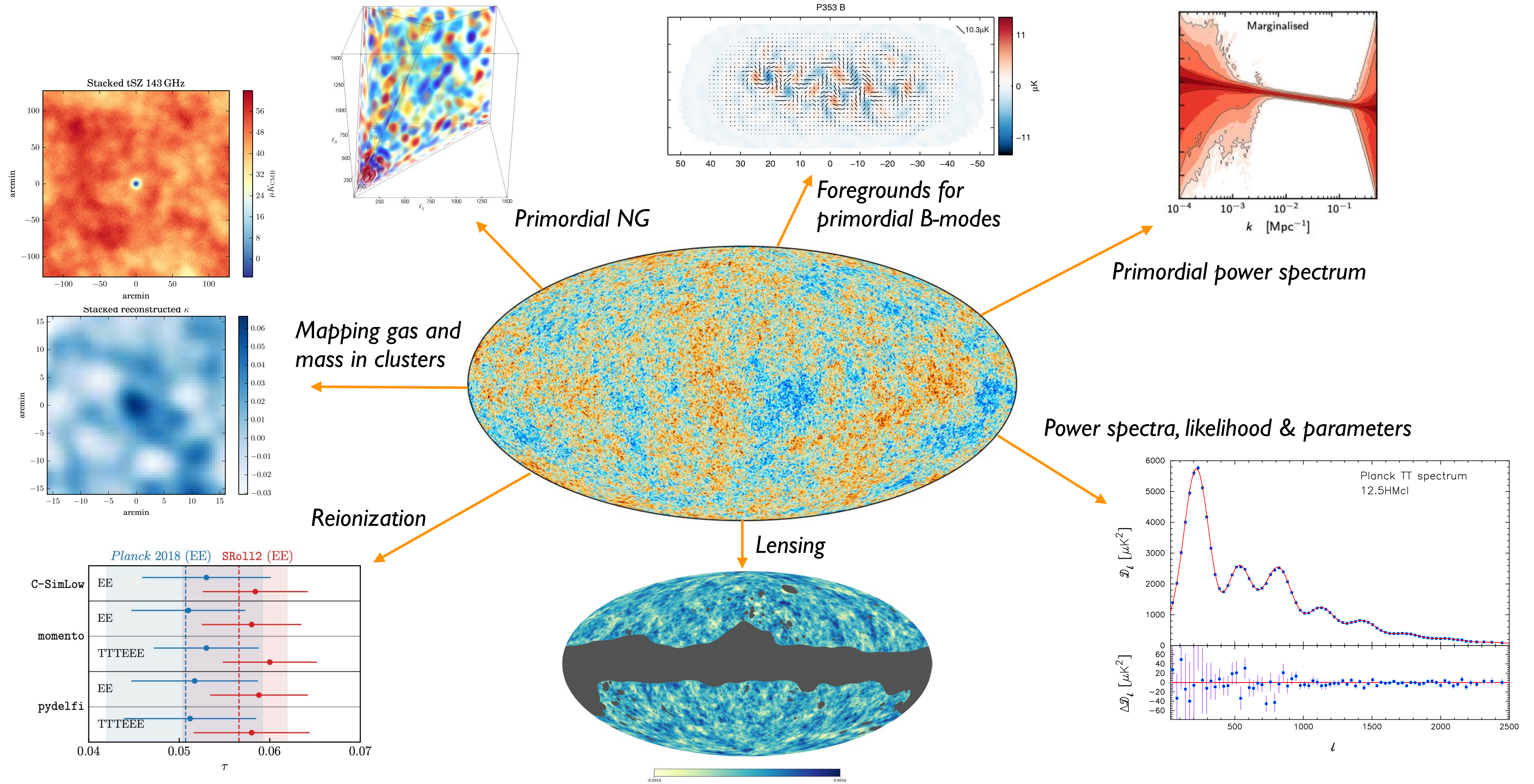
Frank Qu



# CMB science: from the early universe to galaxy evolution

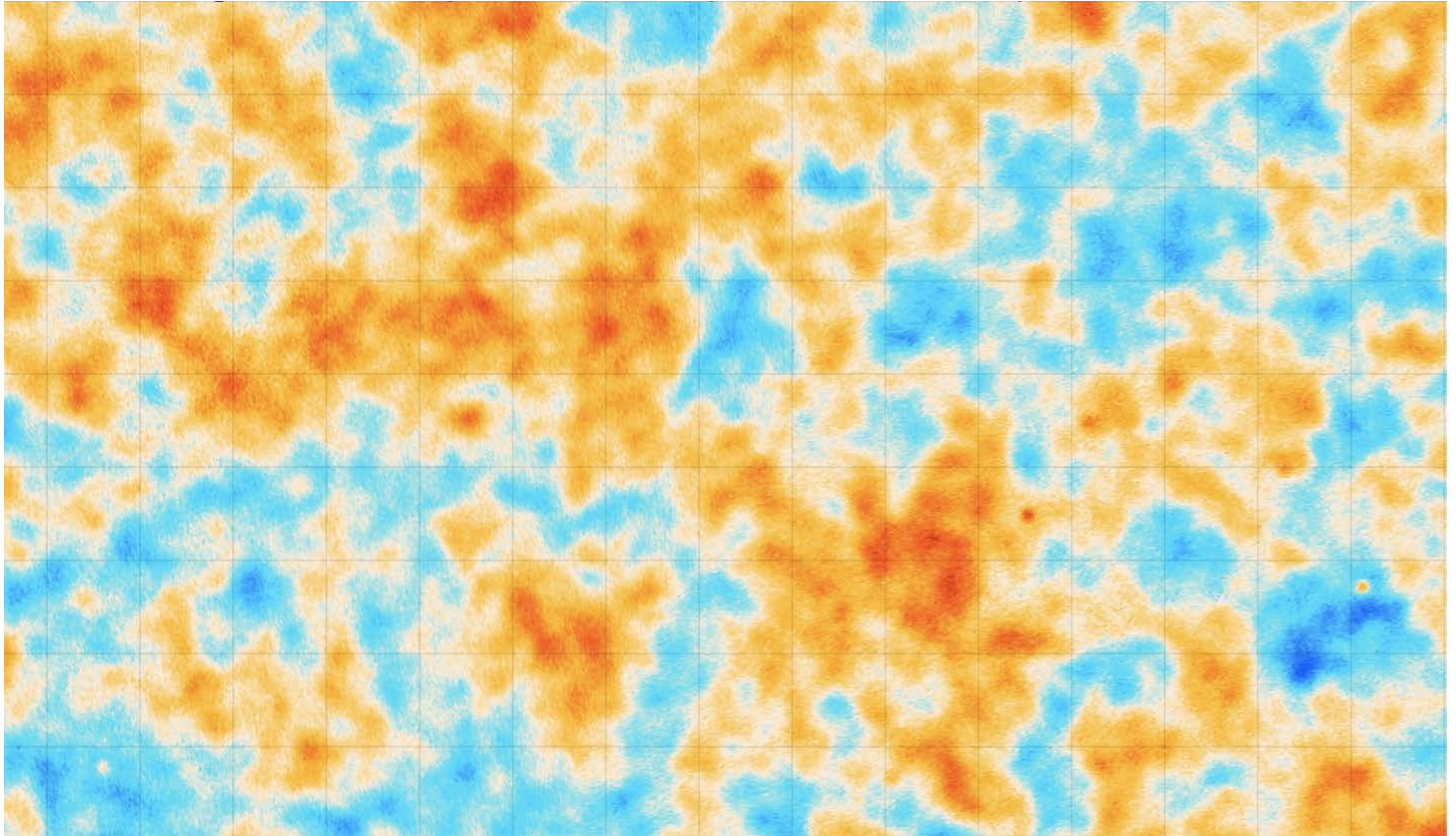






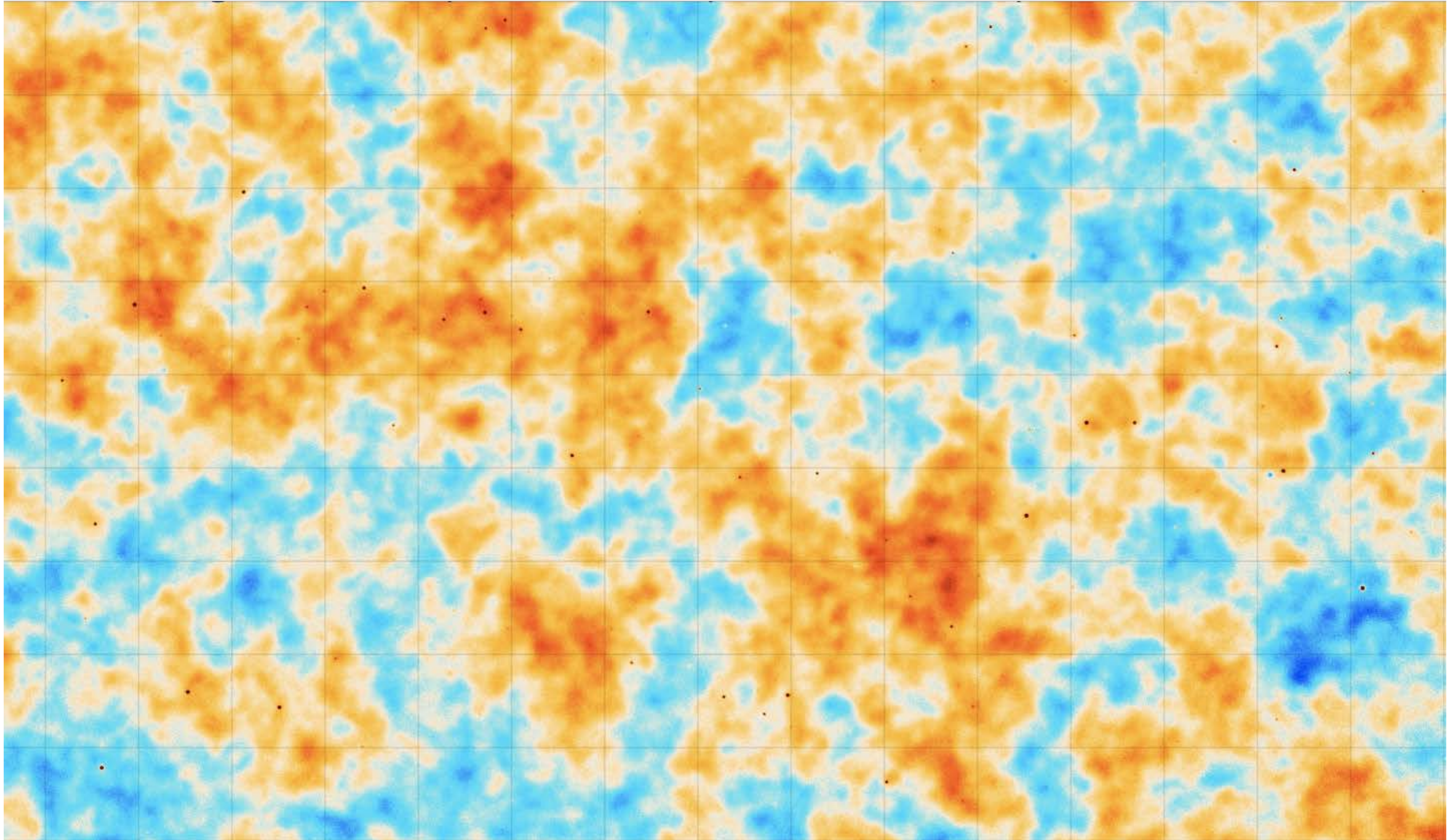


# *Planck temperature*



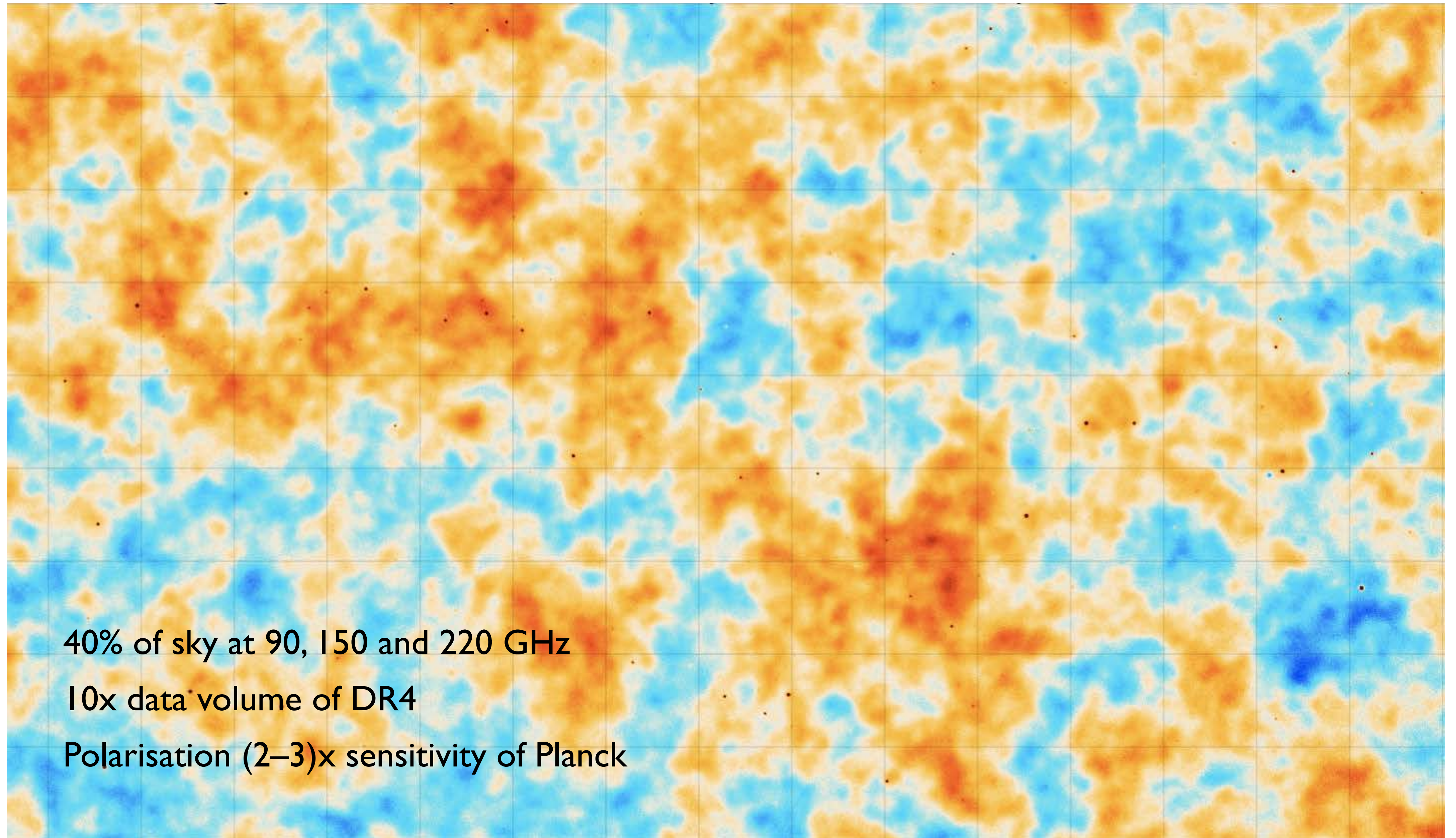


# *Forthcoming ACT DR6 temperature*



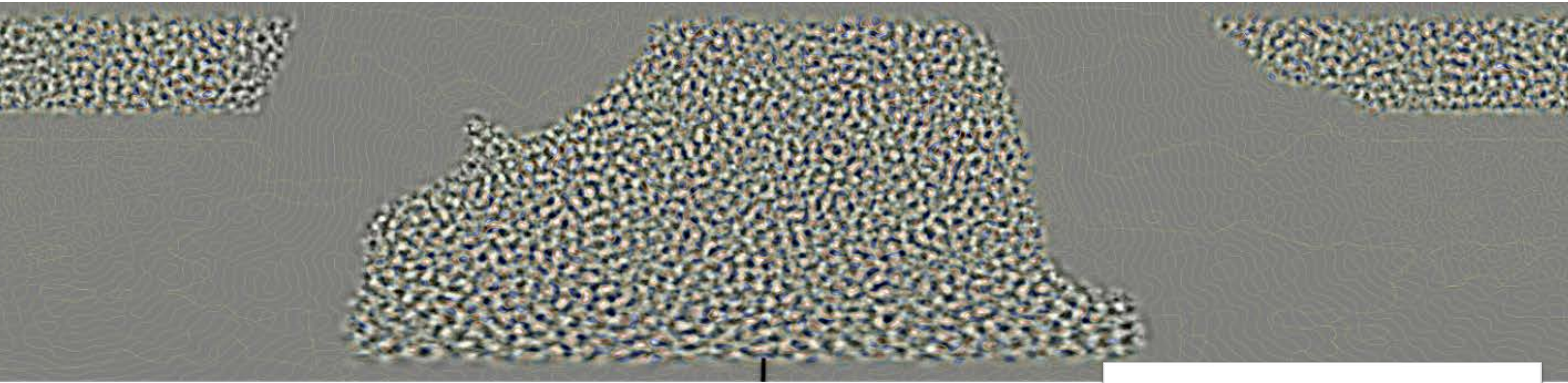


# Forthcoming ACT DR6 maps



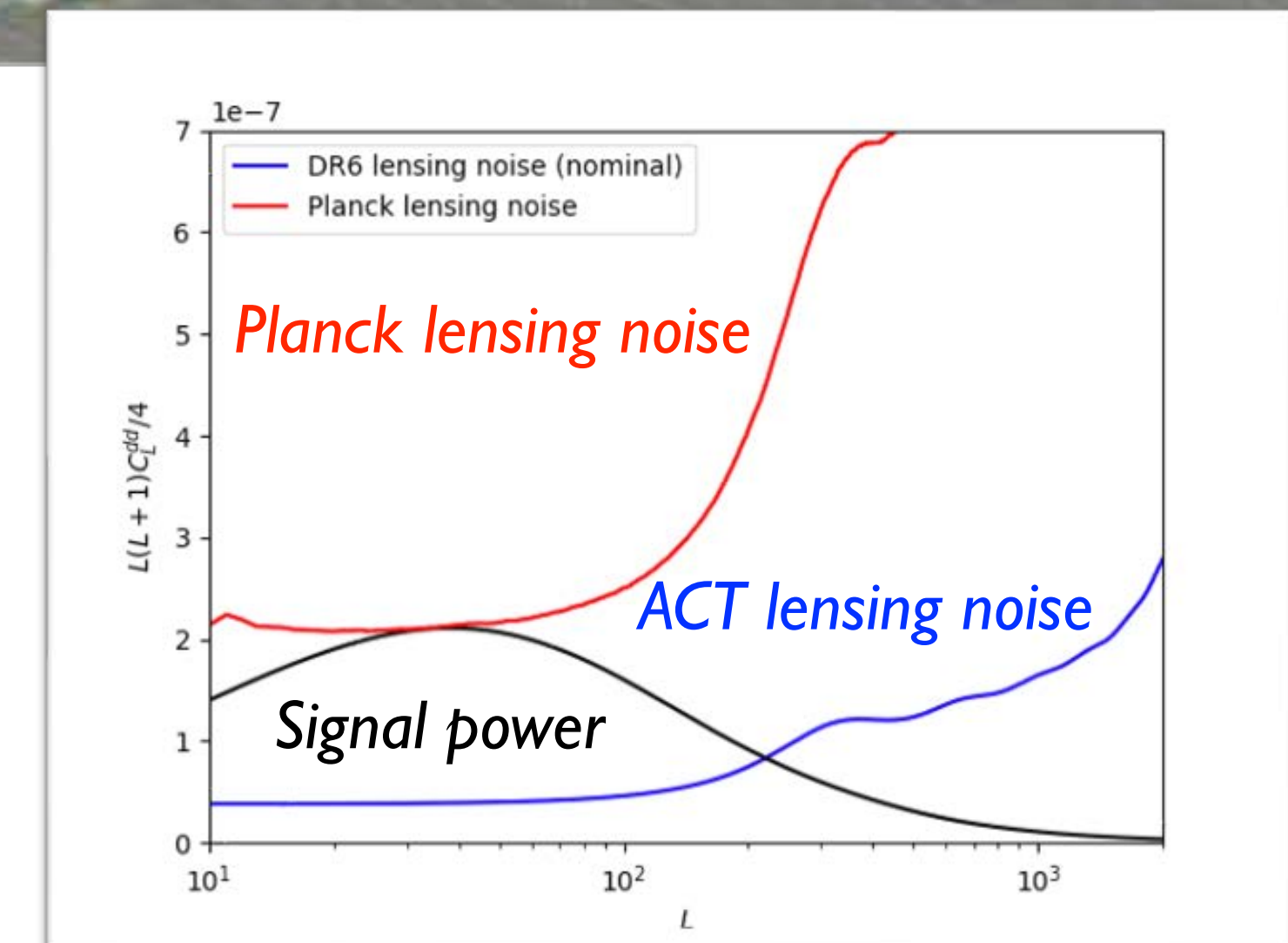


# CMB lensing maps from ACT DR6



- 2x lower reconstruction noise than Planck
  - New cross-split estimator to mitigate noise complications
- 10,000 deg<sup>2</sup>
- Comparable constraining power to Planck
  - State-of-the-art  $S_8$  and  $\sum m_\nu$  constraints from combination (+BAO)

Led by Blake's ERC group





# Simons Observatory

- 3 US SATs + 2 UK SATs + 1 JPN SAT for *B*-mode science
- 40 % of sky with arcmin-resolution LAT survey overlapping DES, DESI, Rubin and LSST
- Six frequencies: 27–280 GHz
- First data in 2023!



SO:UK (£18M UKRI infrastructure fund + STFC)

- 2x SATs
- 1x UHF optics tube for LAT
- UK data centre serving science-ready data products
- @CAM: LAT simulations and product readiness for lensing science

