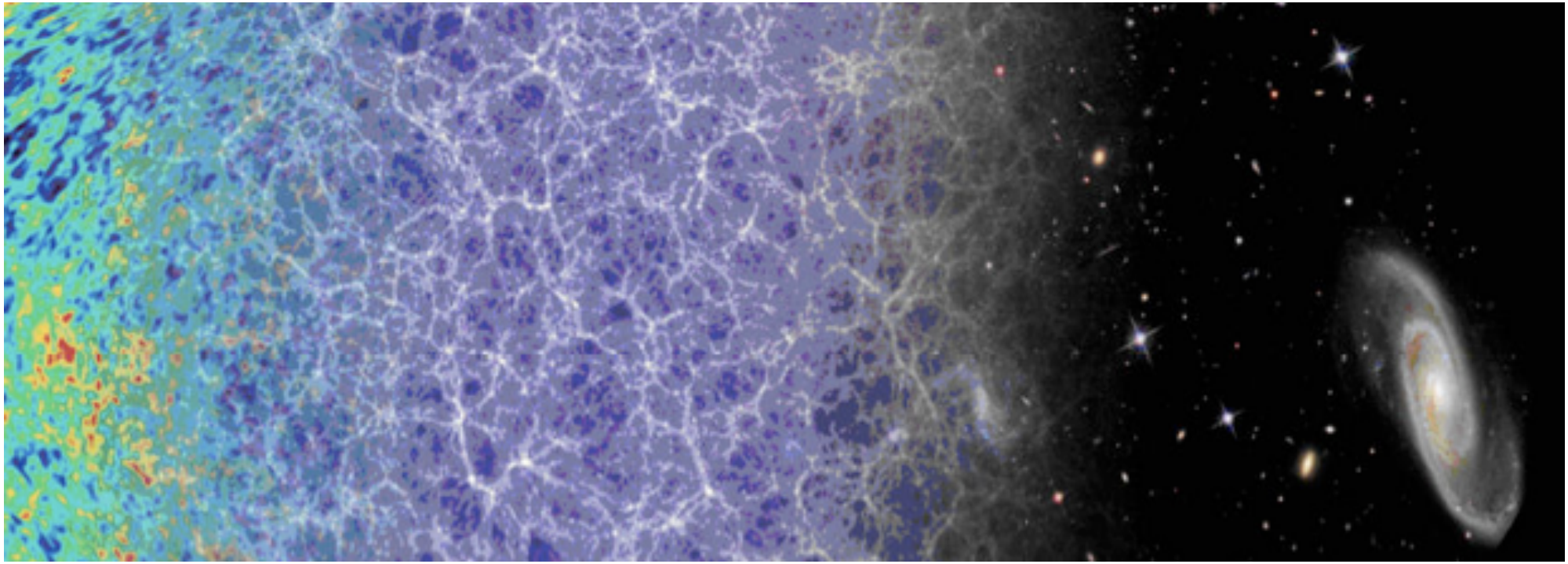
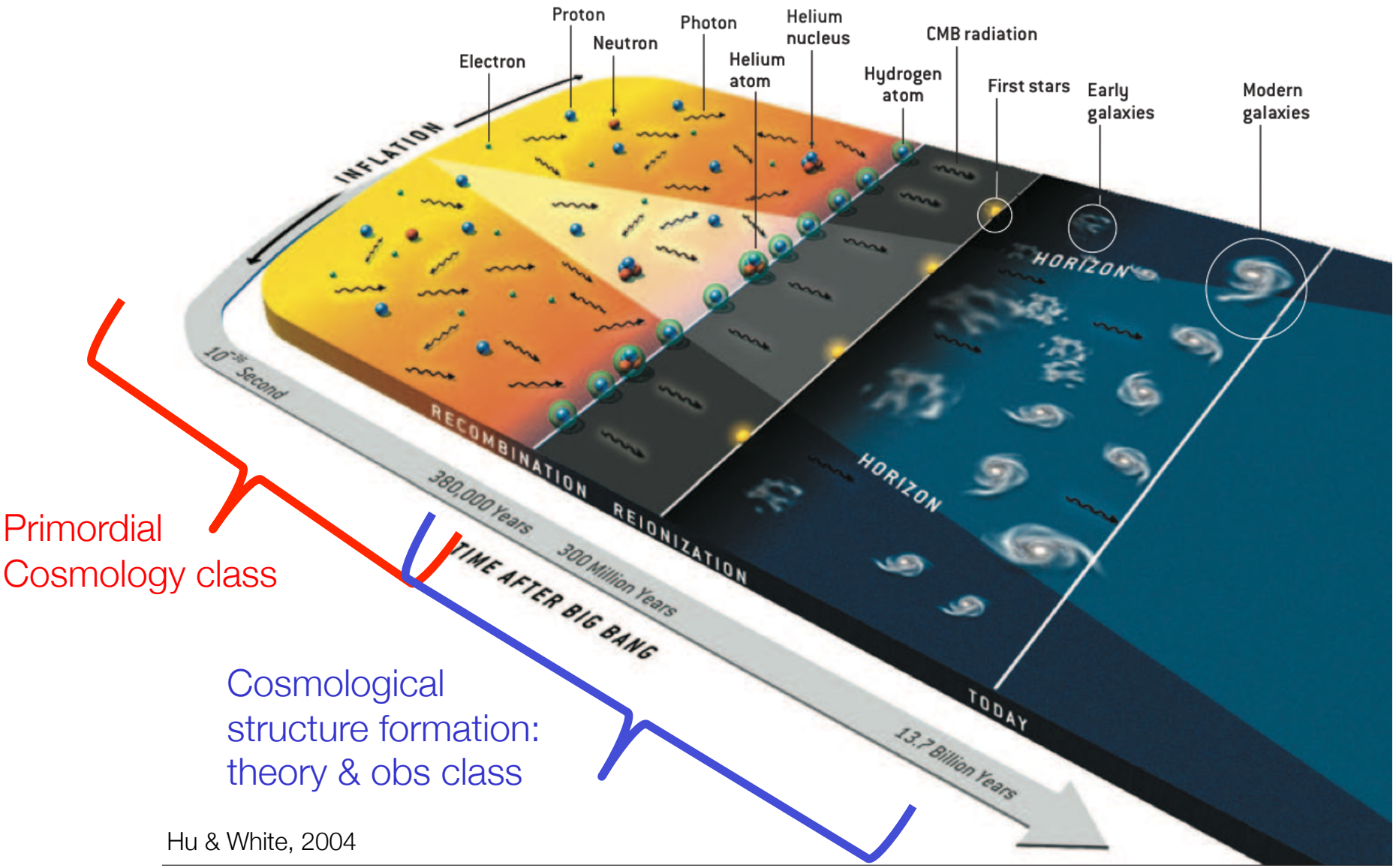
introduction:
how the Universe gets structured ?



Hervé Dole, IAS
Michael Joyce, LPNHE

Montage: CMB, LSS, galaxies: SPACE

Context

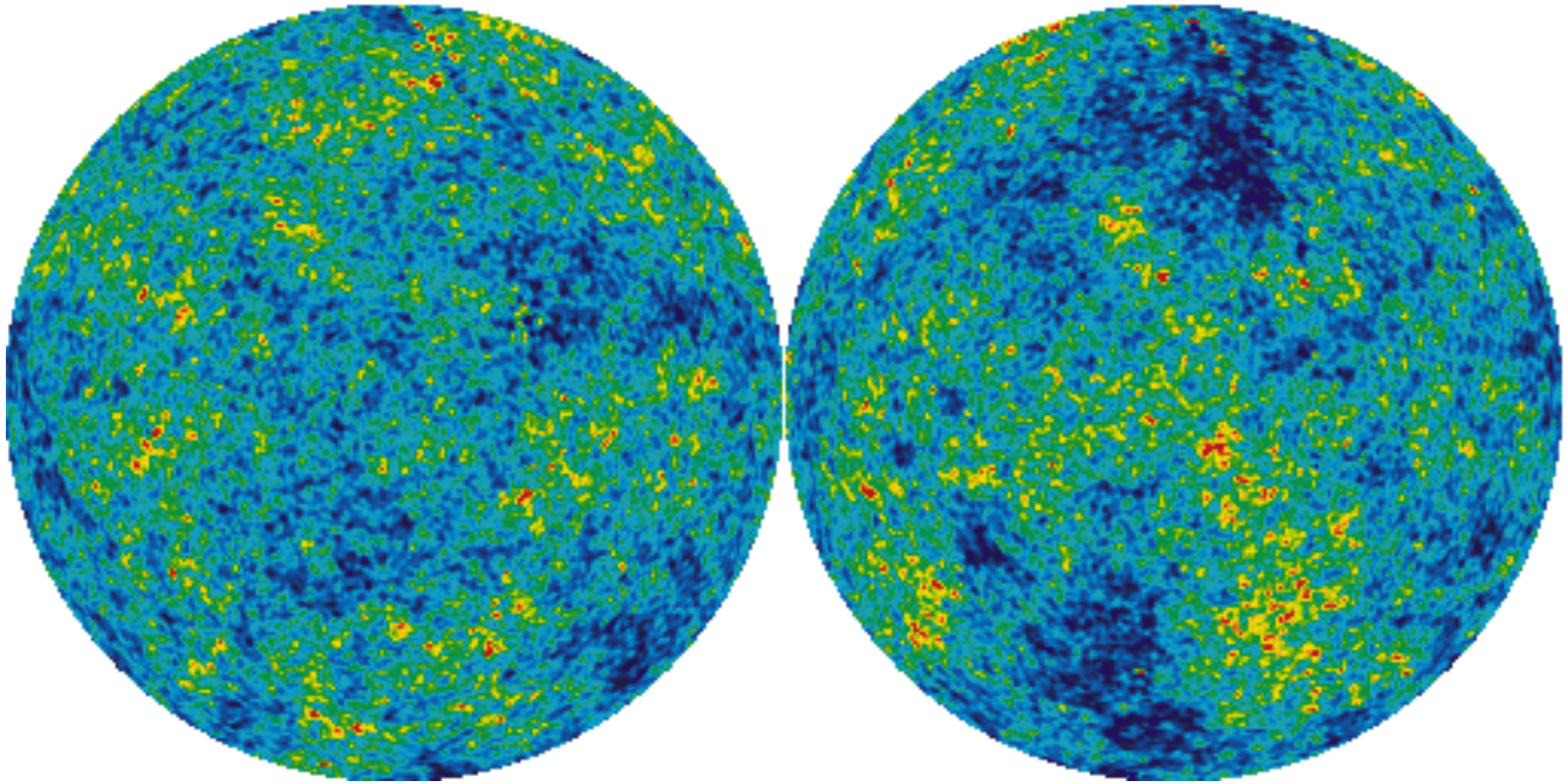


Primordial Cosmology class

Cosmological structure formation: theory & obs class

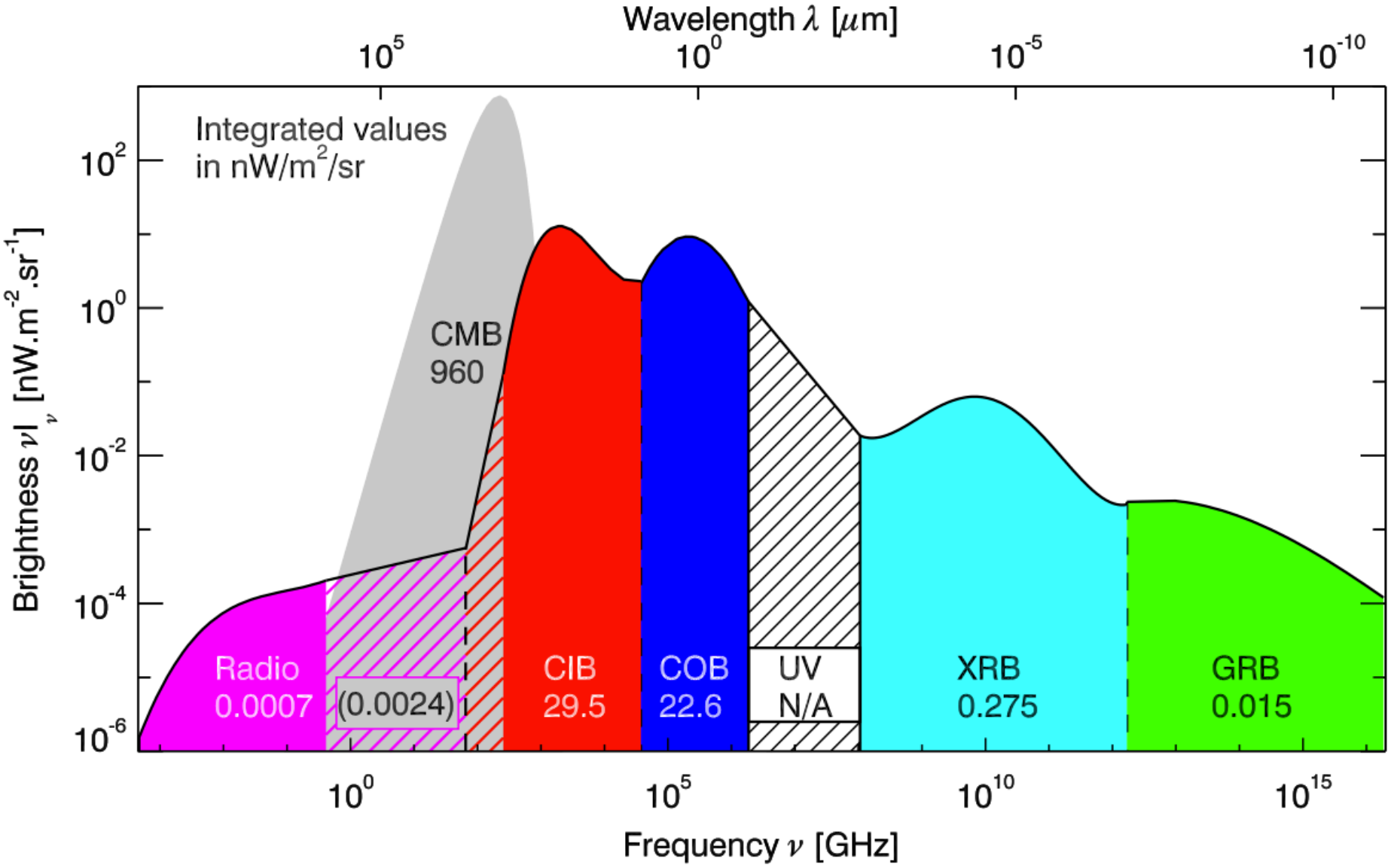
Hu & White, 2004

cosmological background



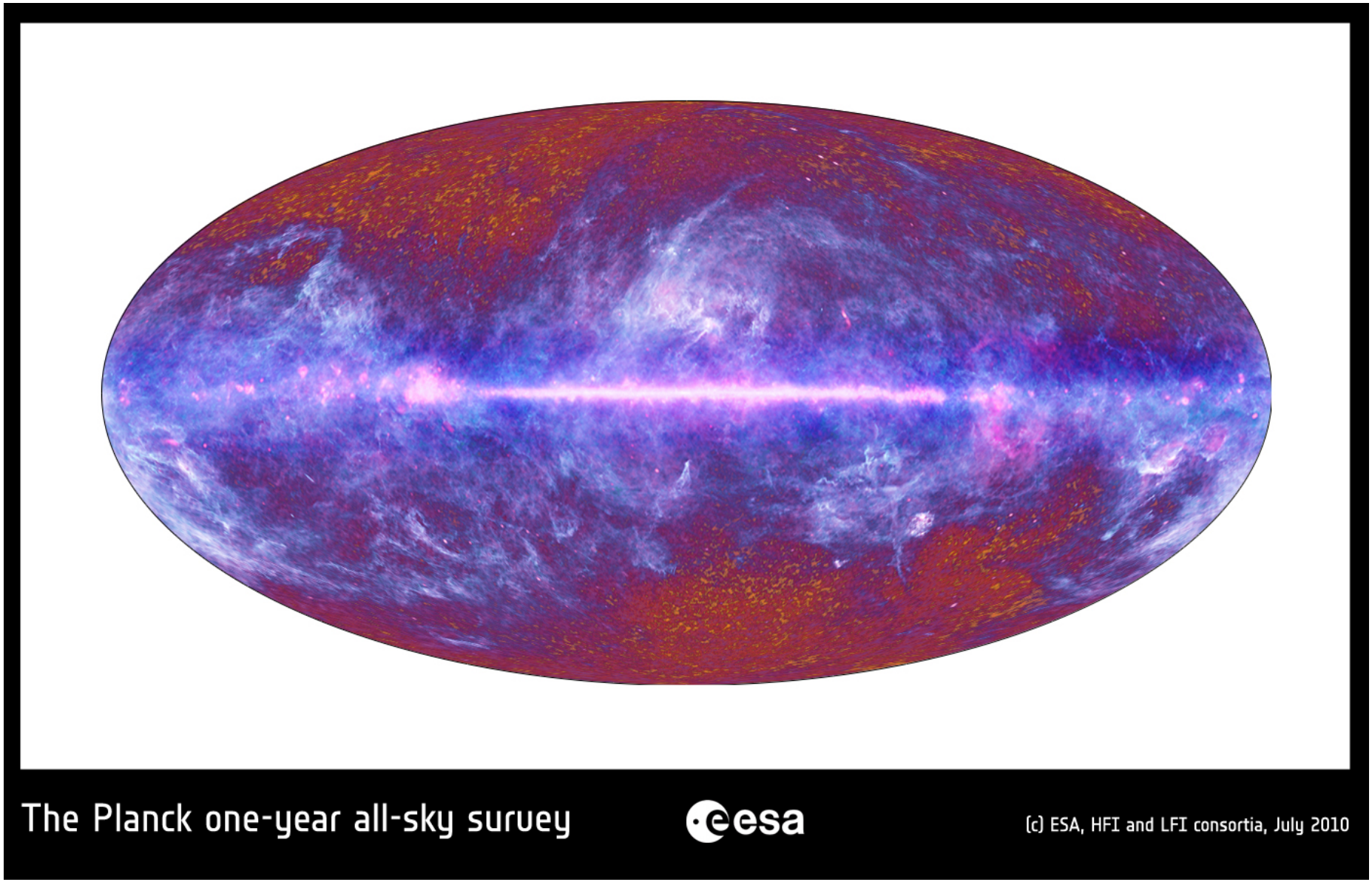
WMAP 5 yr – Hinshaw et al., 2009

cosmological backgrounds

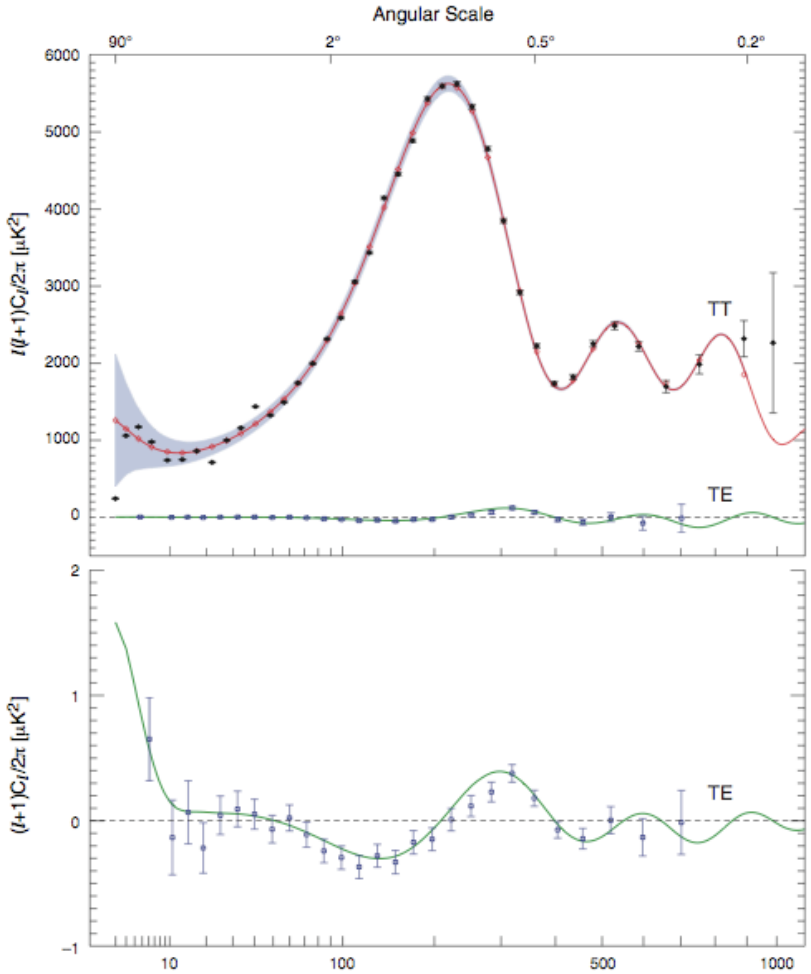


Dole et al., 2006 ; Dole 2010 HDR
Dole & Béthermin in prep

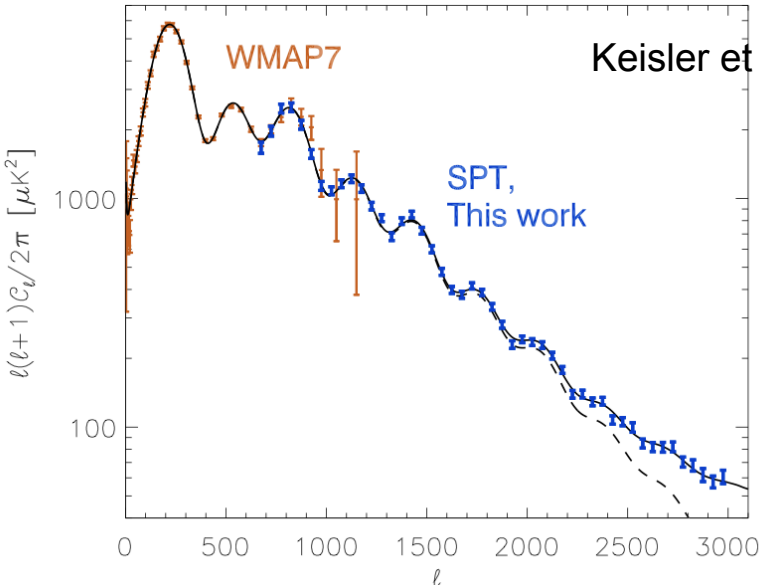
cosmological backgrounds



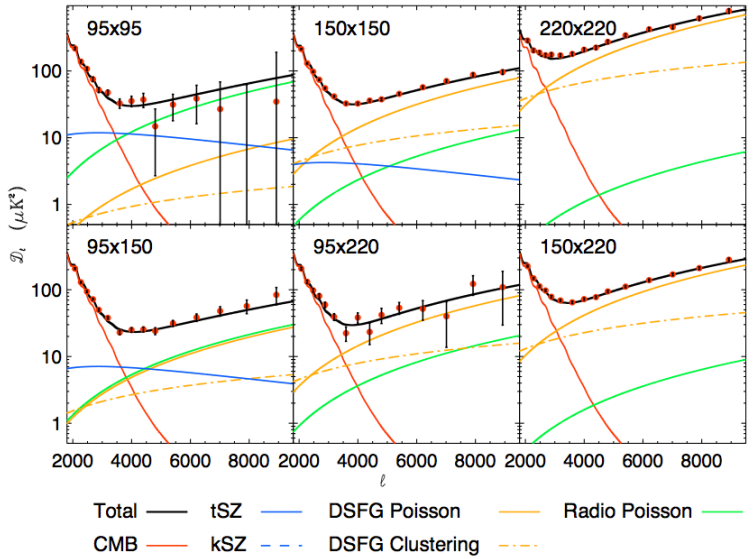
cosmological backgrounds



Hinshaw et al., 2007

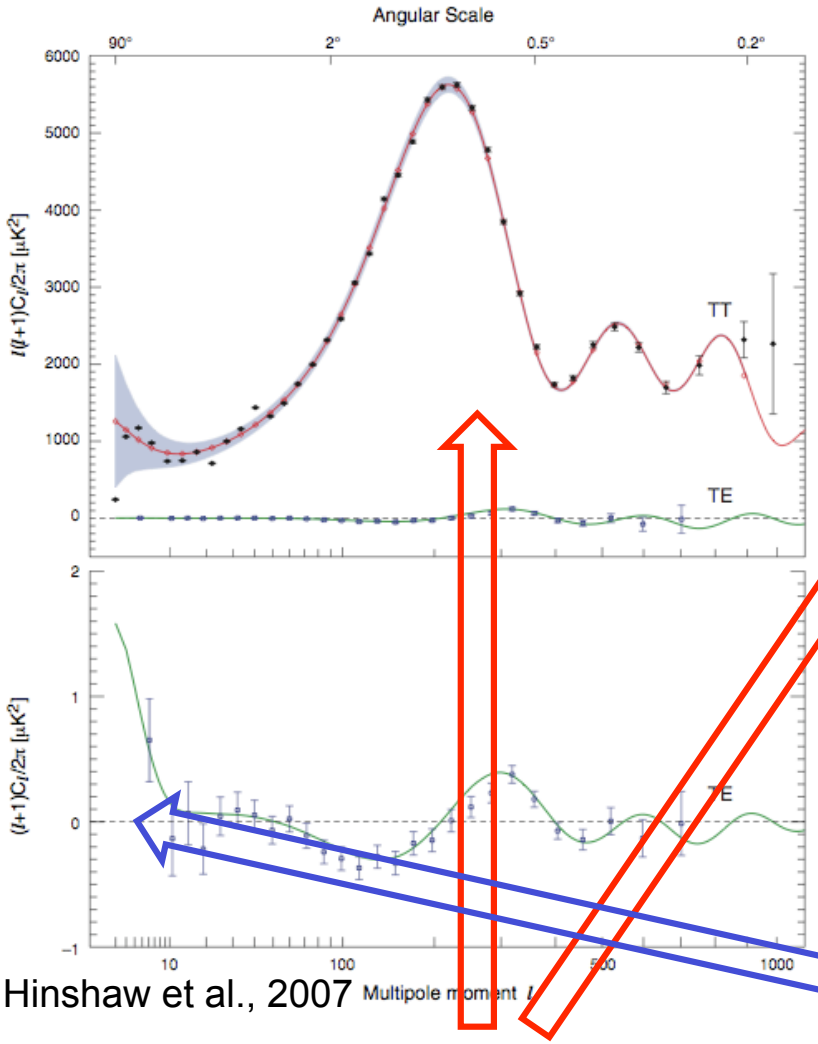


Keisler et al., 2011

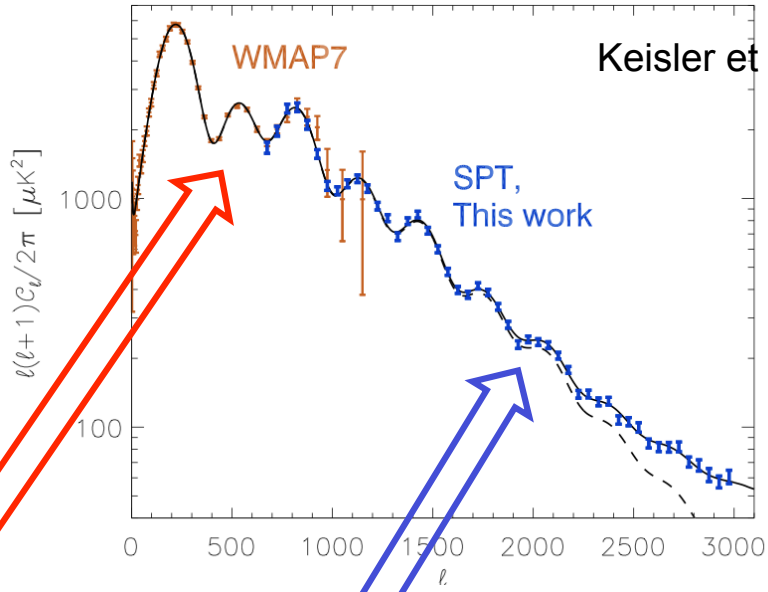


Reichardt et al., 2011

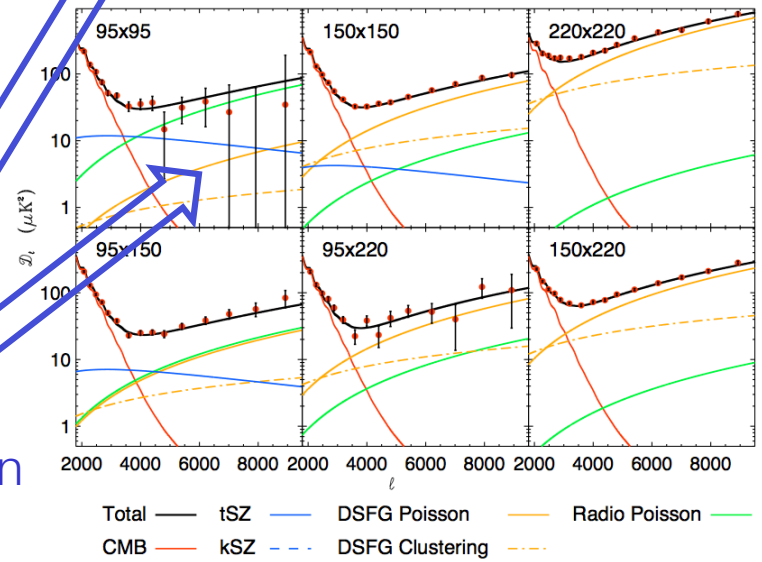
cosmological backgrounds



Hinshaw et al., 2007



Keisler et al., 2011

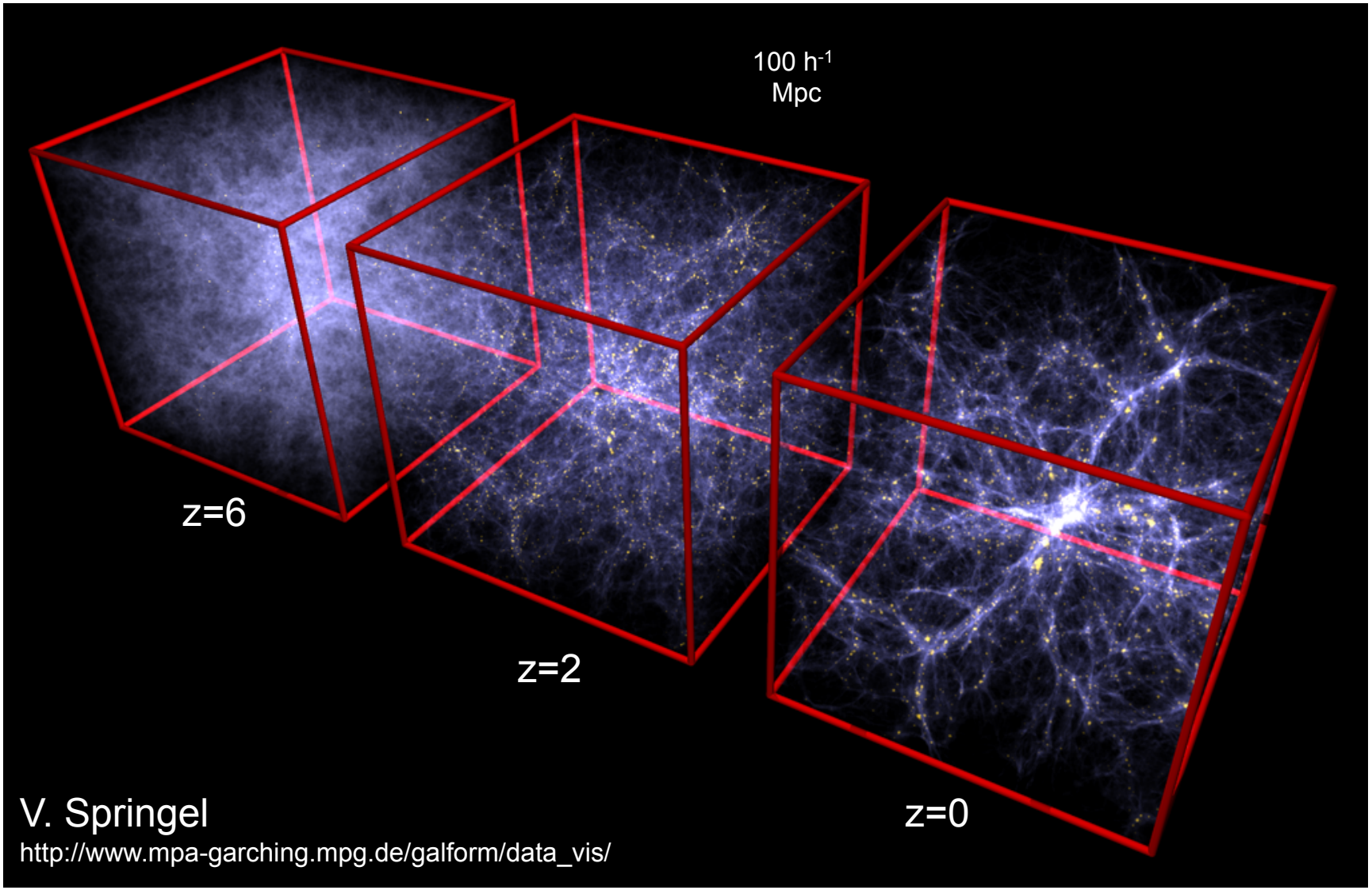


Reichardt et al., 2011

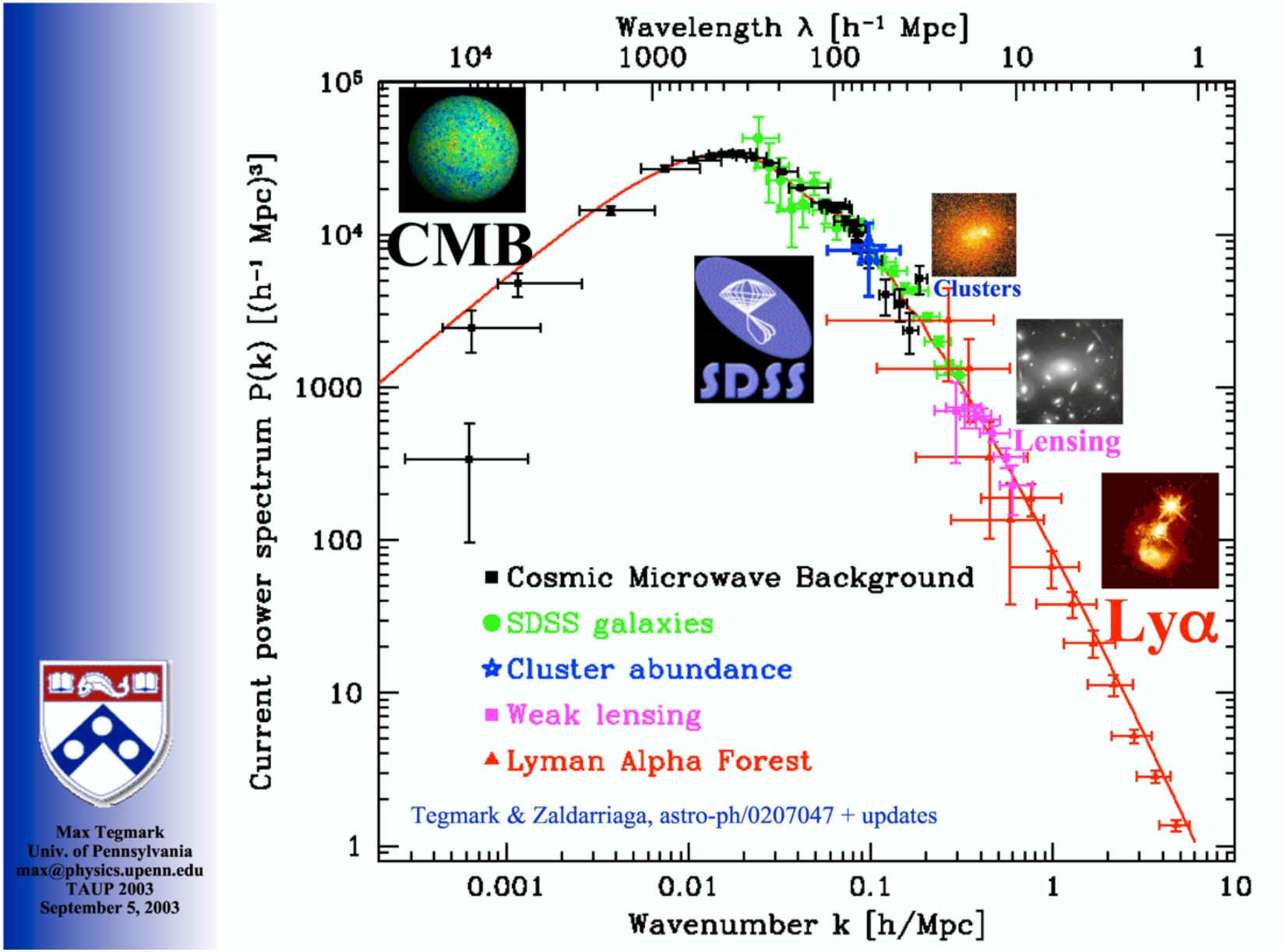
primordial Universe & recombination

structure formation & evolution & recombination

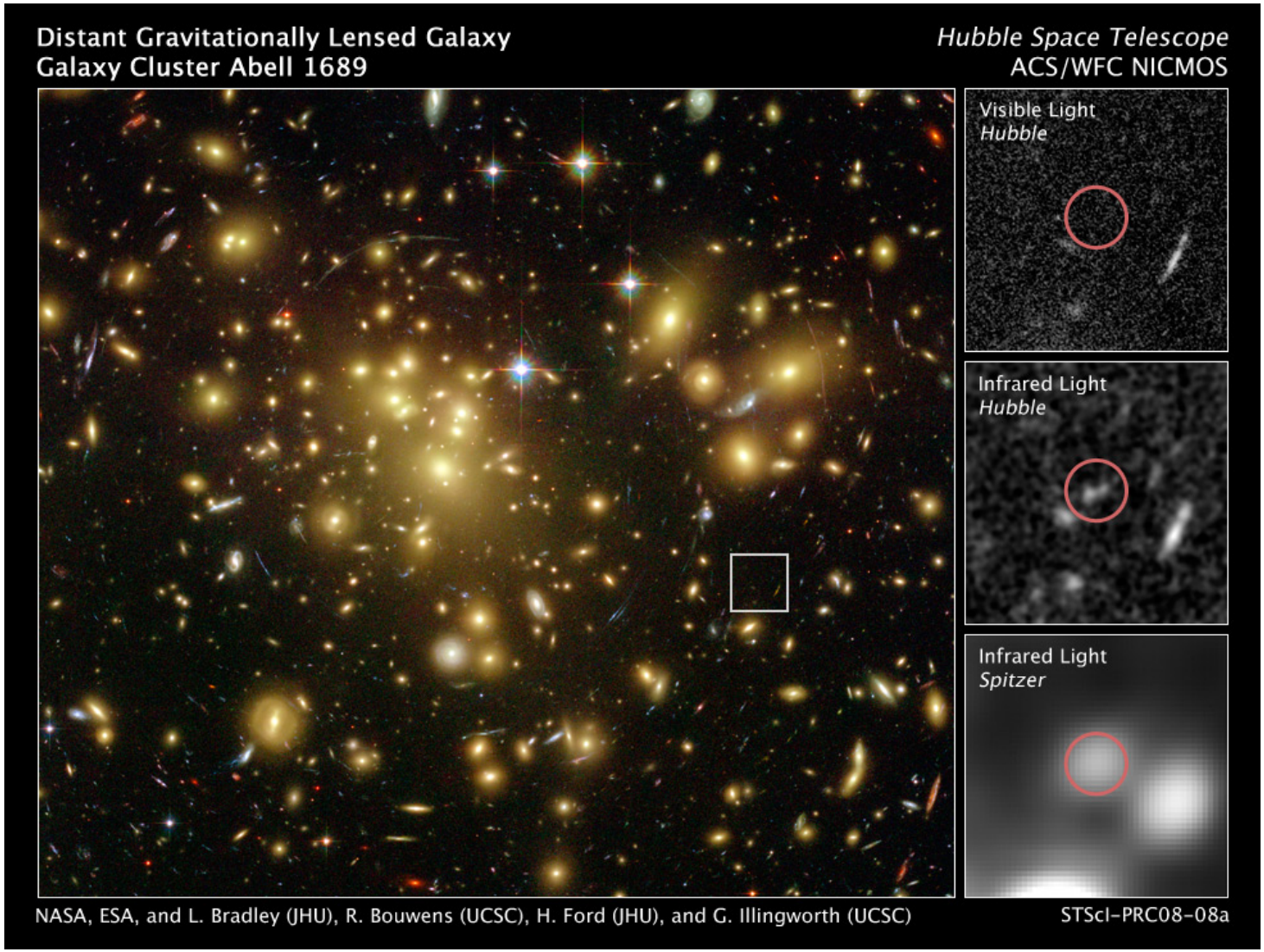
structuration of matter



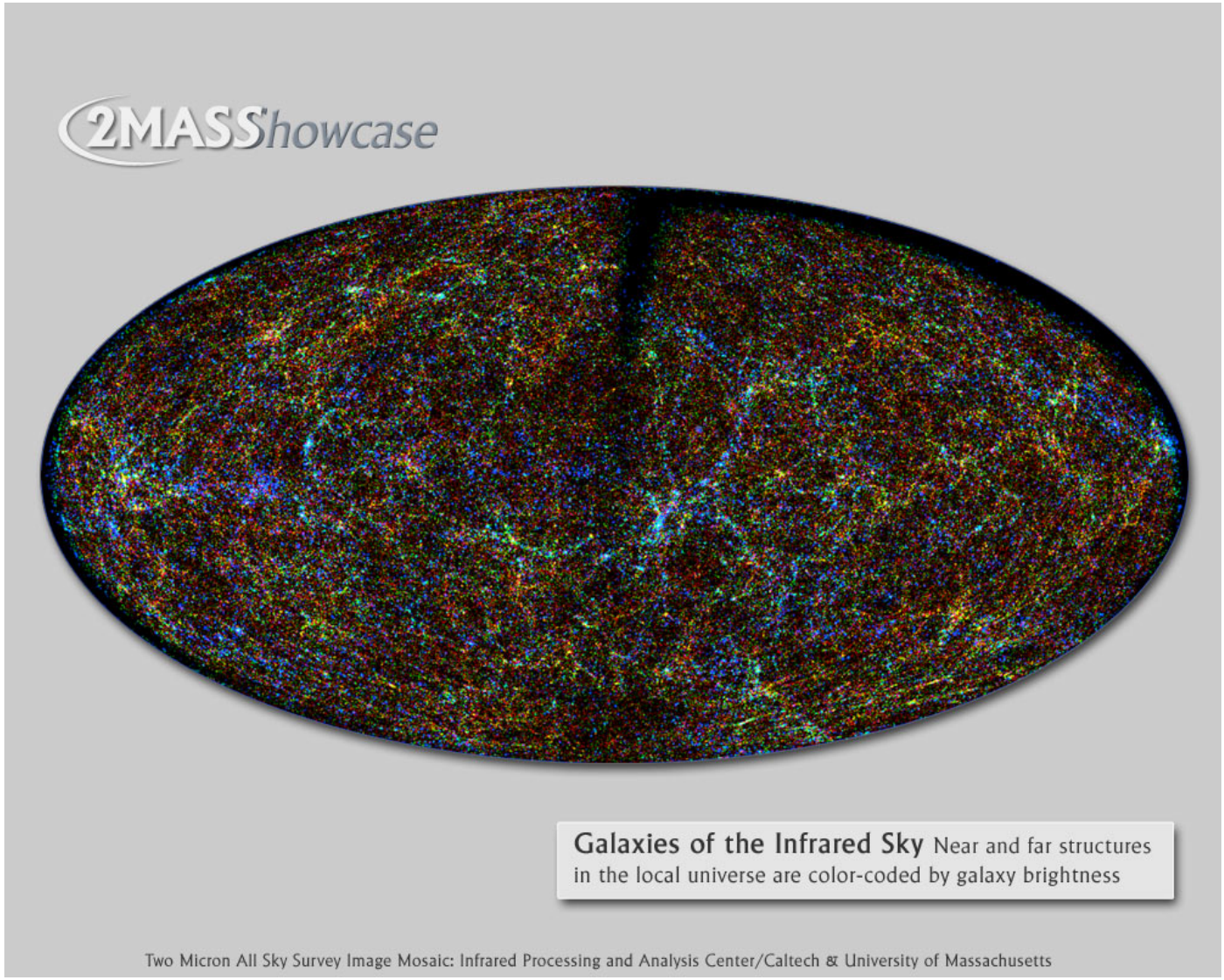
structuration of matter



clusters, galaxies



galaxies


2MASSShowcase
Galaxies of the Infrared Sky Near and far structures in the local universe are color-coded by galaxy brightness
Two Micron All Sky Survey Image Mosaic: Infrared Processing and Analysis Center/Caltech & University of Massachusetts

one last word

your professors are working in laboratories at the forefront of research:
take this opportunity for discussions & lab visits !

e.g. Planck HFI – Instrument Operation Room – Institut d'Astrophysique Spatiale

(c) H. Dole

plan of semester

- lectures 1,2,3 (Hervé)
  - introduction to the structured universe, observables, definitions and statistical tools; current state of observations (CMB, BAO, SN, lensing, clusters EBL etc.).
- lectures 4,5,6 (Michael)
  - structure formation in the standard model: linear regime; overview of theory of structure formation; physics of linear fluctuations; CMB & P(k), BAO, WL.
- lectures 7,8 (Michael)
  - structure formation in the standard model: non-linear regime;
- lectures 9,10 (Hervé)
  - galaxy formation and other hot topics; bias, dark universe, reionization

NPAC Structure Formation & Evolution

- Monday pm-> check syllabus
  - beware: next 2 classes:
    - monday Jan 23rd 2-5pm (here)
    - thursday, Jan 26th 9am-noon (here)
  - then: on monday afternoons at Jussieu
- Textbooks -> check syllabus
- Evaluation -> check syllabus
  - short written exam (2h)
  - individual 30 min oral exam:
    - 15min questions about lectures
    - 15min informal blackboard presentation of a paper (NO computer) and questions
- Visit of IAS, LPNHE etc. labs possible whevener