

Astronomy and Astrophysics at UBC

Astronomy Faculty:

Aaron Boley: Planetary Science
Brett Gladman: Planetary Science
Mark Halpern: Cosmology
Gary Hinshaw: Cosmology
Jeremy Heyl: Compact Objects
Paul Hickson: Galaxies, Instrumentation
Jaymie Matthews: Extrasolar Planets

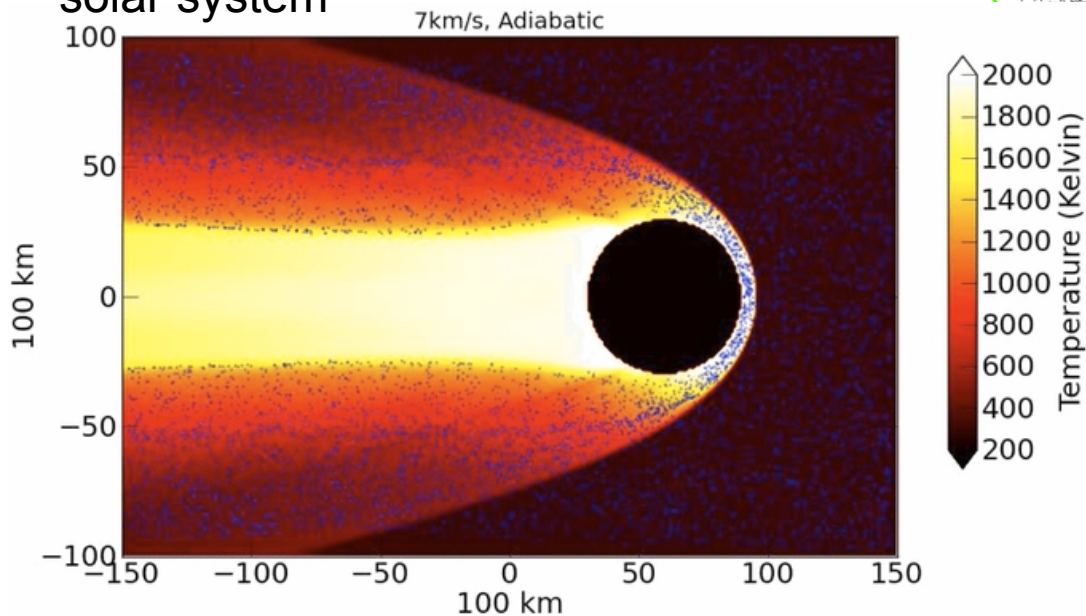
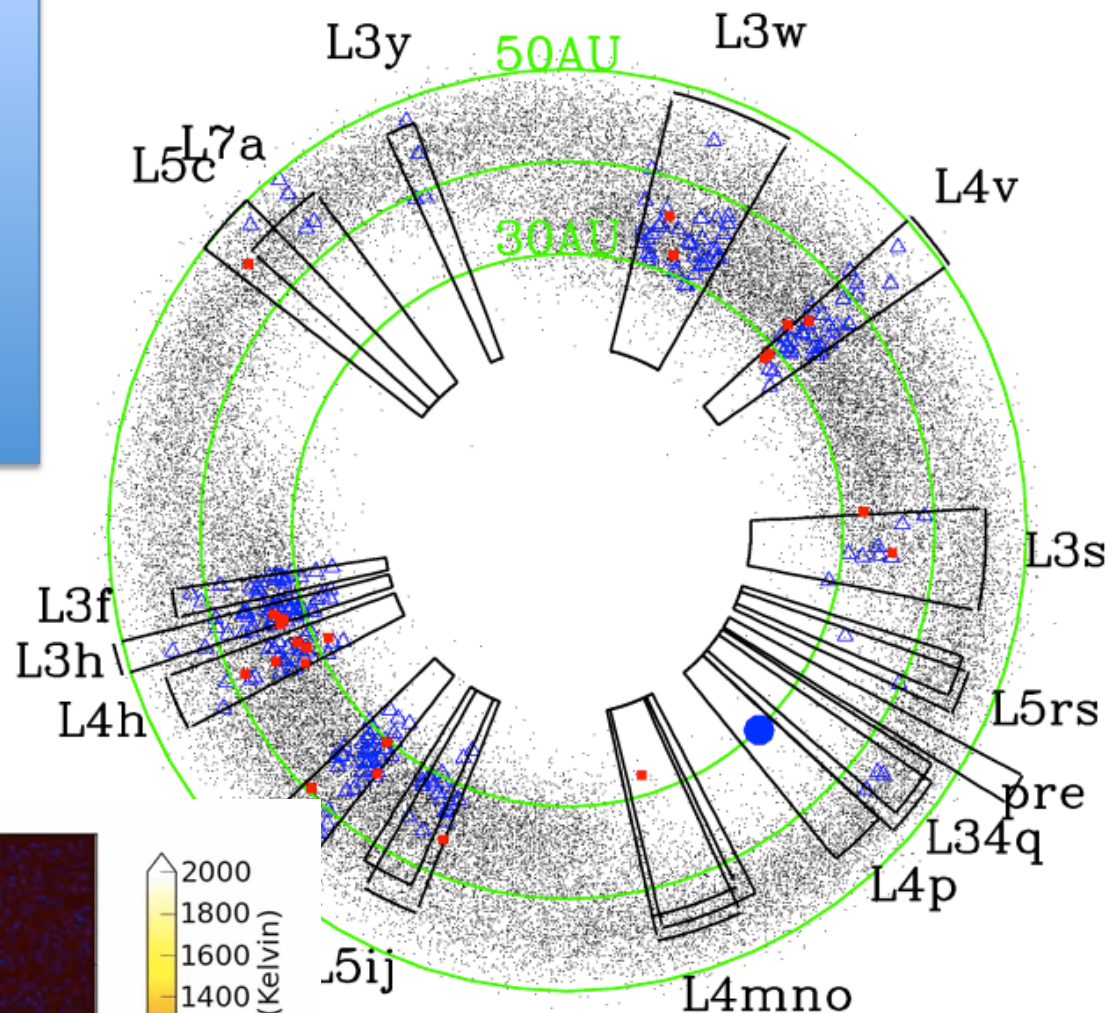
Bill McCutcheon: Interstellar Medium
Harvey Richer: Stellar Populations
Douglas Scott: Large Scale Structure
Kris Sigurdson: Particle Astrophysics
Ingrid Stairs: Pulsars and Gravity
Ludovic van Waerbeke: Weak Lensing
Jasper Wall: Radio Galaxies
www.astro.ubc.ca

Photo: Alma as seen from the Atacama Cosmology Telescope. Chile

Aaron Boley
 Brett Gladman
 Jaymie Matthews

- The Solar System
- Planet formation and evolution
- Extra-solar planets

Modeling of how particles are altered as they pass through a bow shock connects properties of meteorites to their history and that of the solar system



Search for and detection of Kuiper belt objects provides a data set from which the dynamic history for the solar system can be inferred

Finding new planets with a micro-satellite built at UBC: MOST

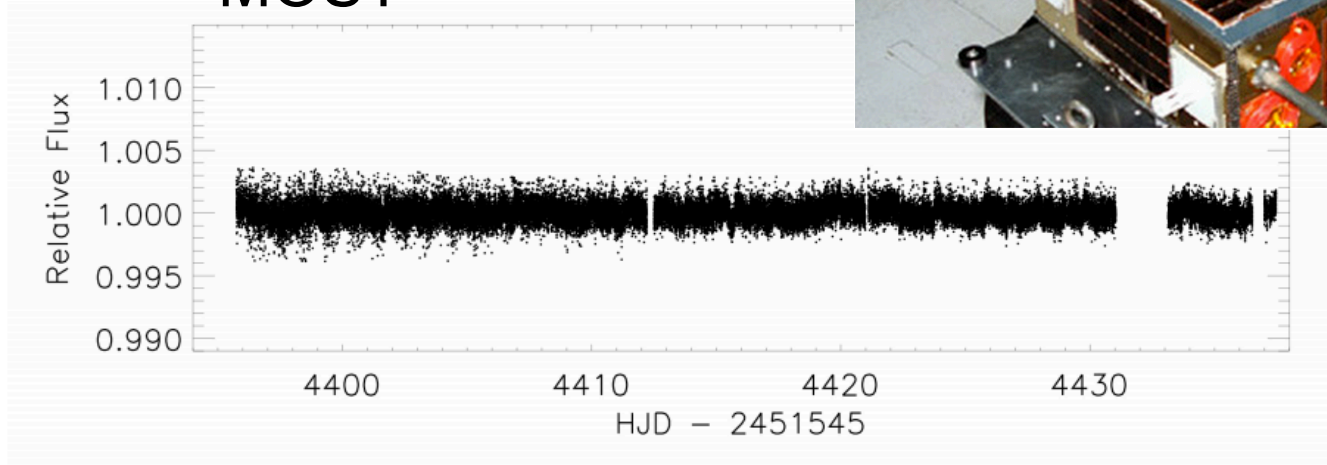


Figure 1. MOST 2012 light curve after de-correlation of magnitudes from sky background and x and y pixel position, and the running average correction for straylight variations at the MOST orbital period.

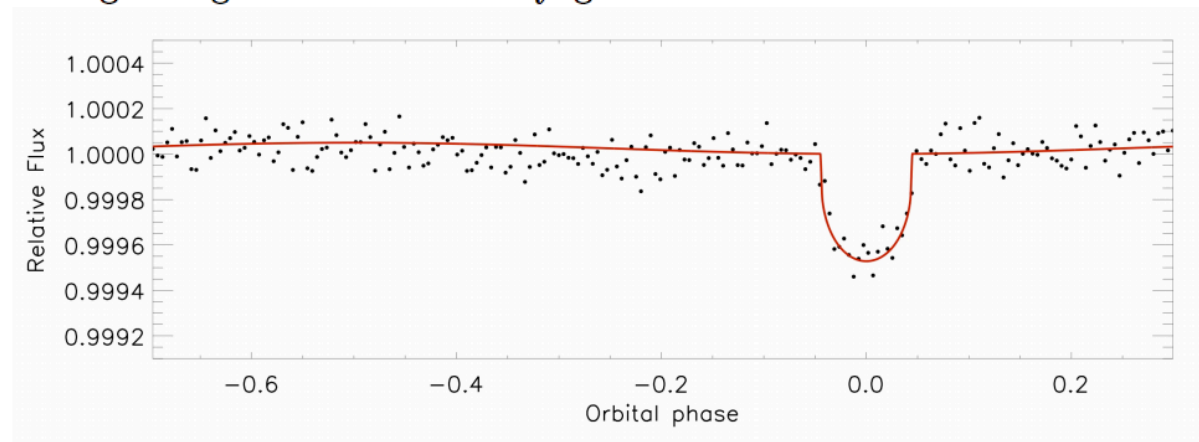
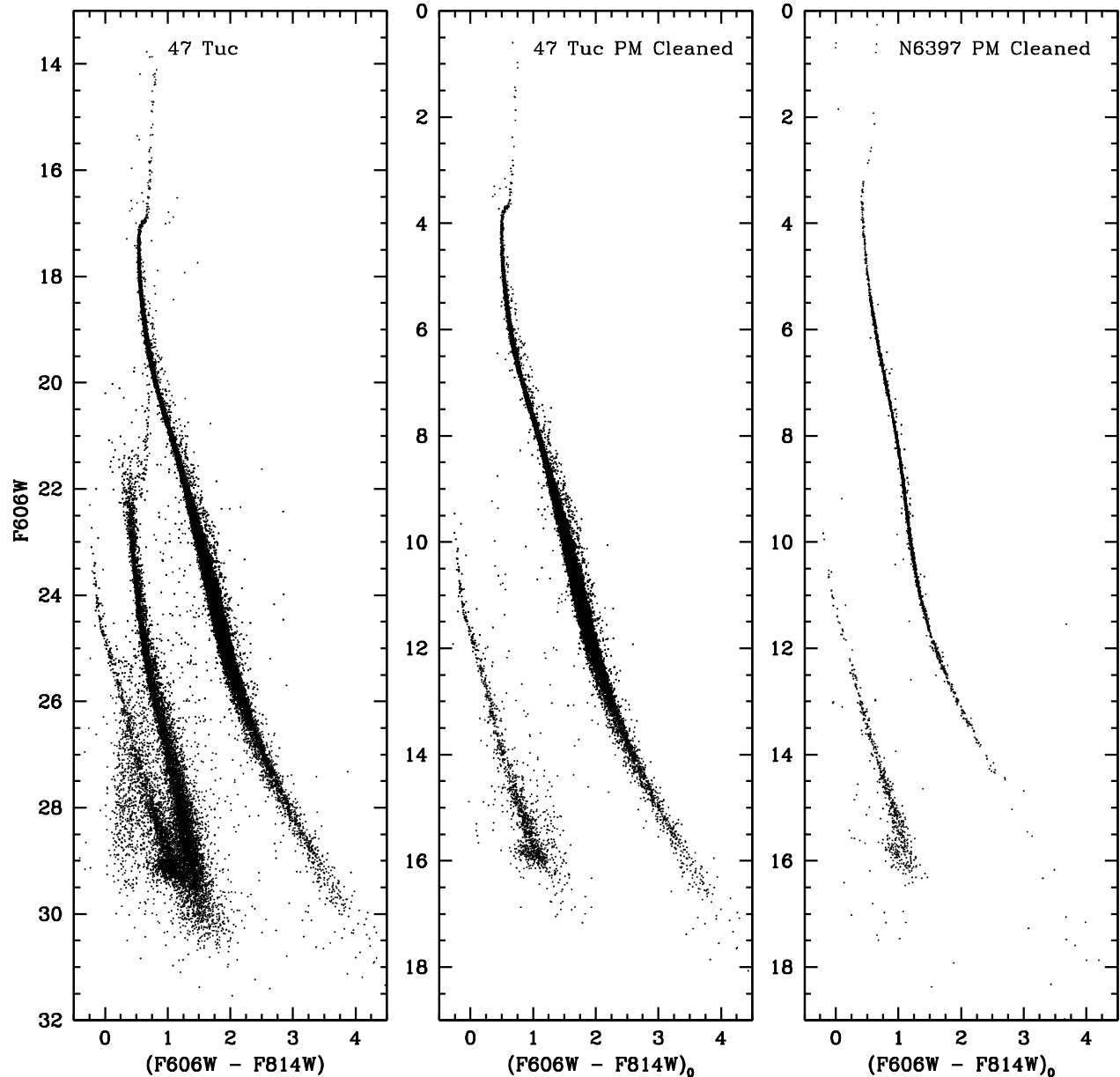


Figure 2. 2011 and 2012 photometry phased at the orbital period of 55 Cnc e and averaged in 5-min phase bins. The red line is the best-fitting transit model without a secondary eclipse parameter, based on the values in column 2 of Table 1. See Section 3 for details.



Harvey Richer Jeremy Heyl Stellar Populations

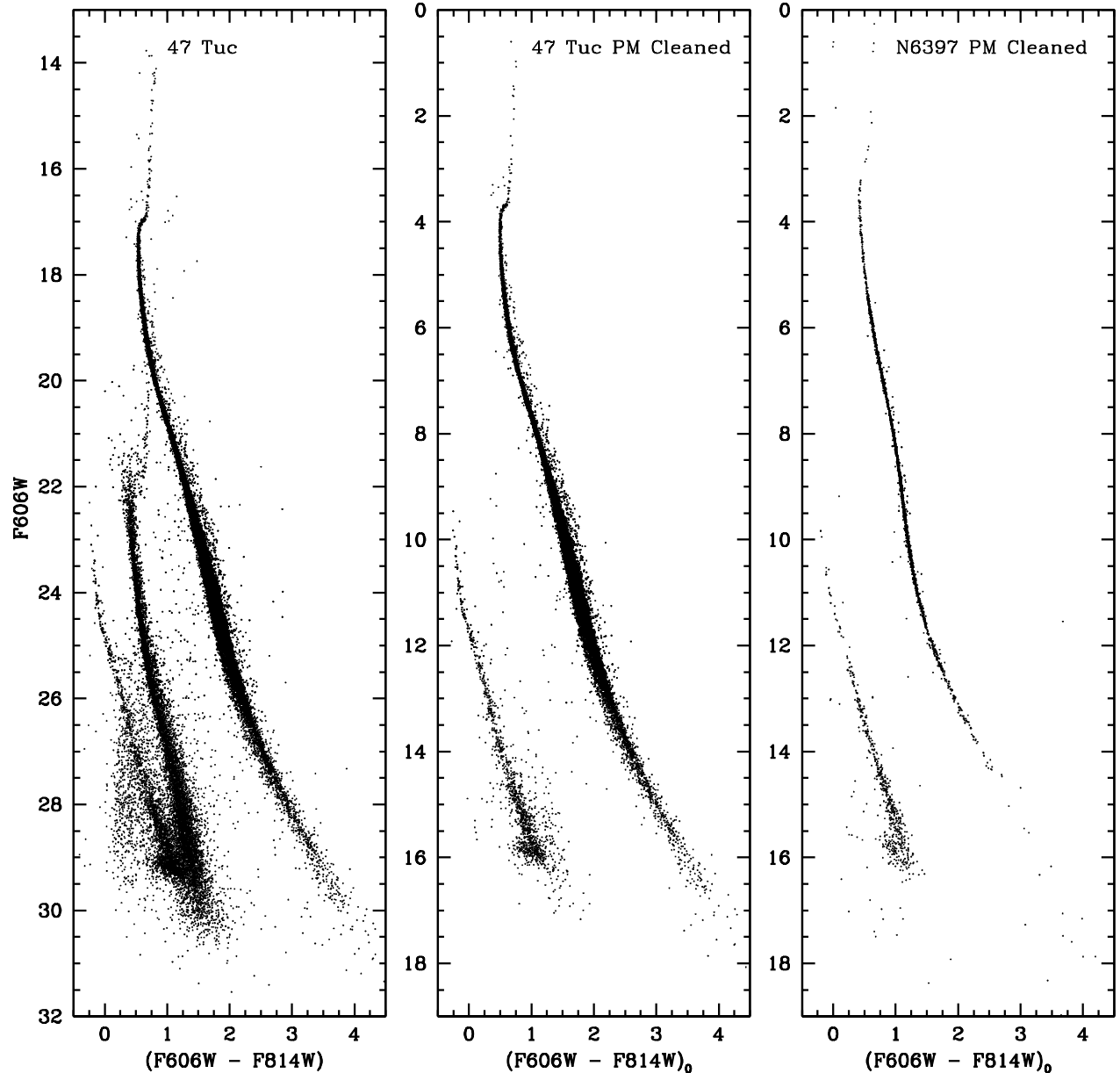
Some of the deepest images ever made with Hubble lead to new determinations of stellar ages and new understanding of formation dynamics



Harvey Richer

Winner of the
Beals Award for
Outstanding
achievement in
Research for
2013-2014

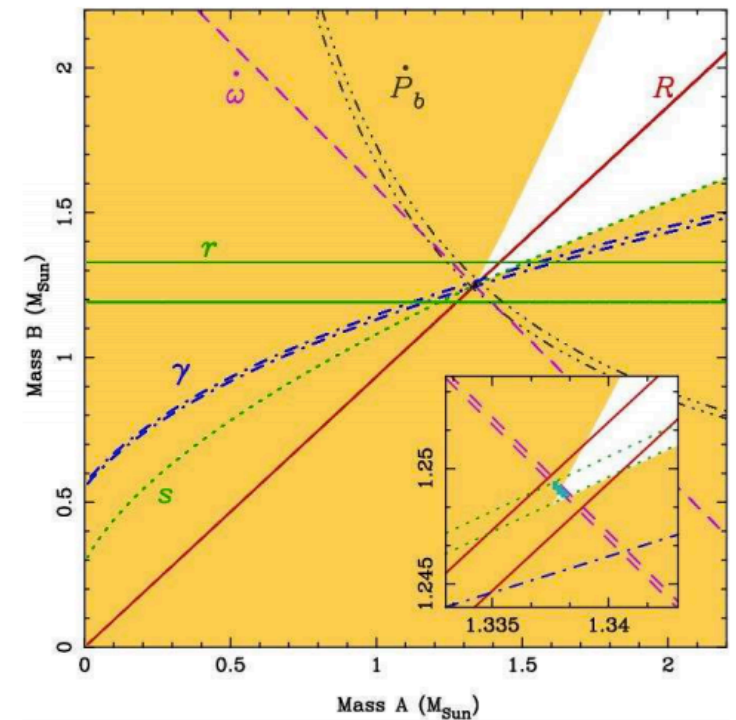
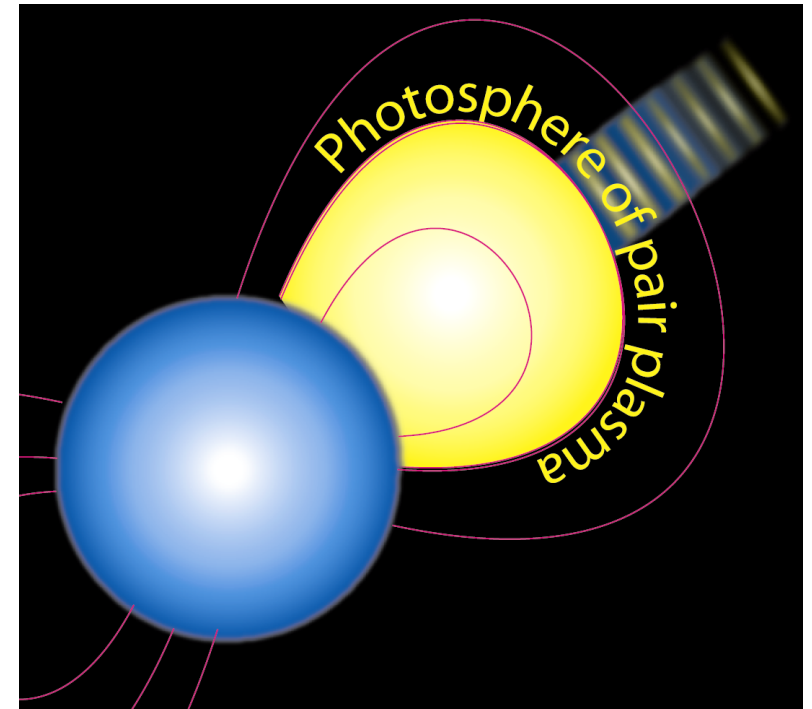
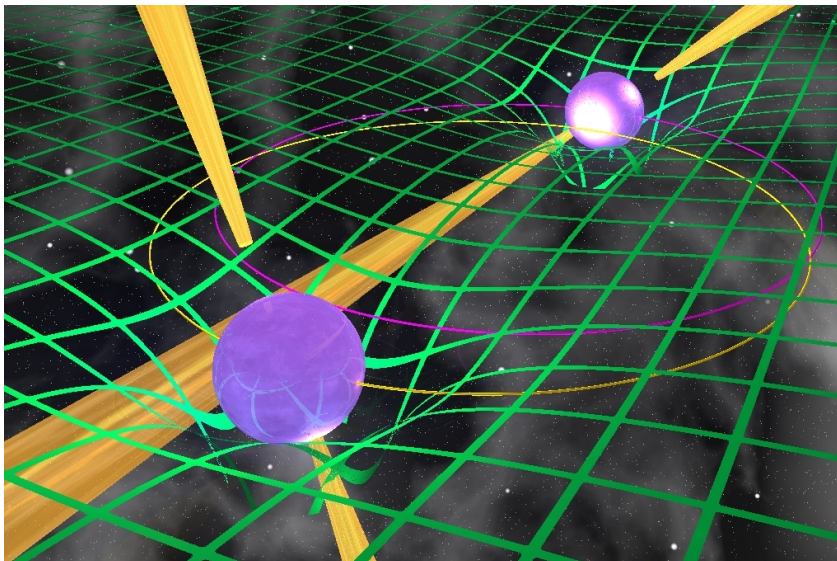
Jeremy Heyl Stellar Populations



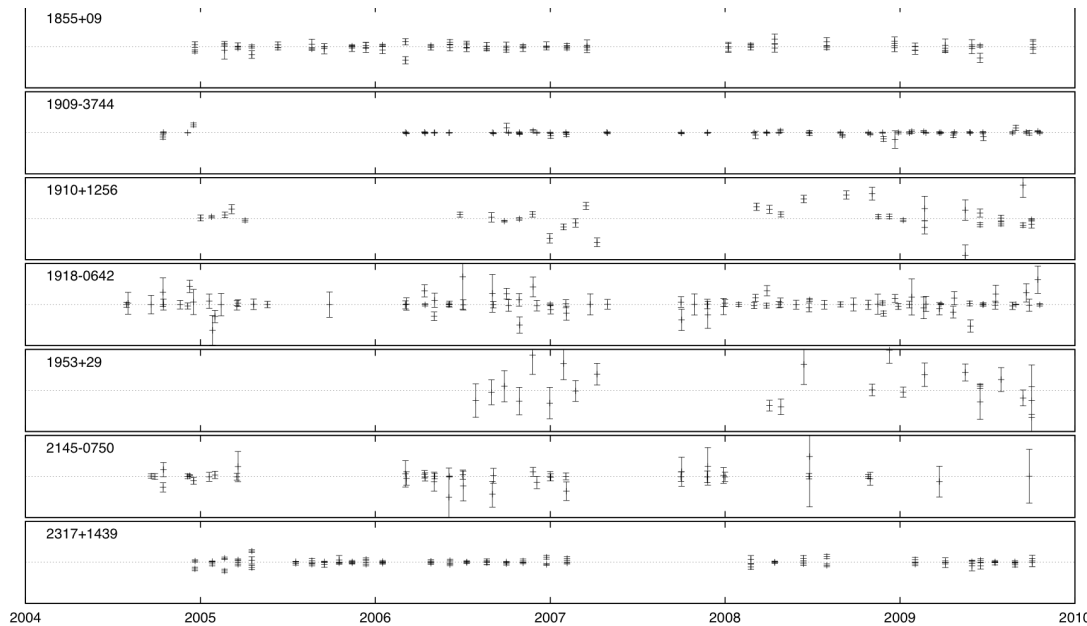
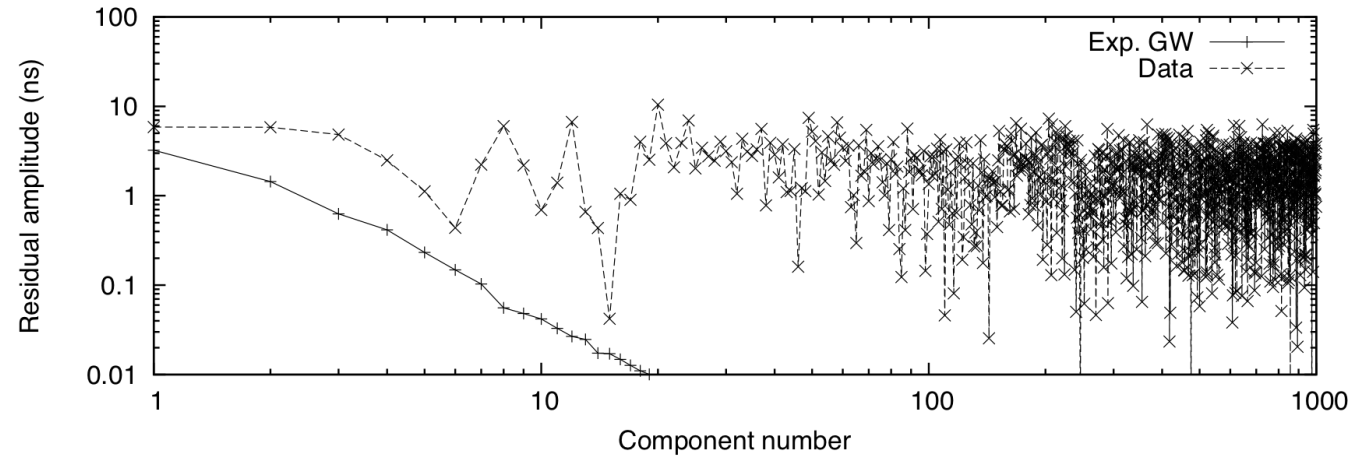
Ingrid Stairs, Jeremy Heyl

Pulsar Astrophysics

- Pulsar searches and high precision timing
- Tests of Relativity
- Binary stellar evolution
- Mechanical properties of neutron-star crusts
- Birthrate of magnetars



LIMITS ON THE STOCHASTIC GRAVITATIONAL WAVE BACKGROUND FROM THE NORTH AMERICAN NANOHERTZ OBSERVATORY FOR GRAVITATIONAL WAVES



Nano-grav is a program to search for very low frequency ($f \sim 1/y$) Gravitational radiation by timing many pulsars.

FIG. 1.— Overview of timing residuals for all sources, showing observational cadence and coverage during the five-year time span. The gap in 2007 was due to an extended maintenance period at both telescopes. The full scale of the y-axis is $10 \mu s$ in all cases.

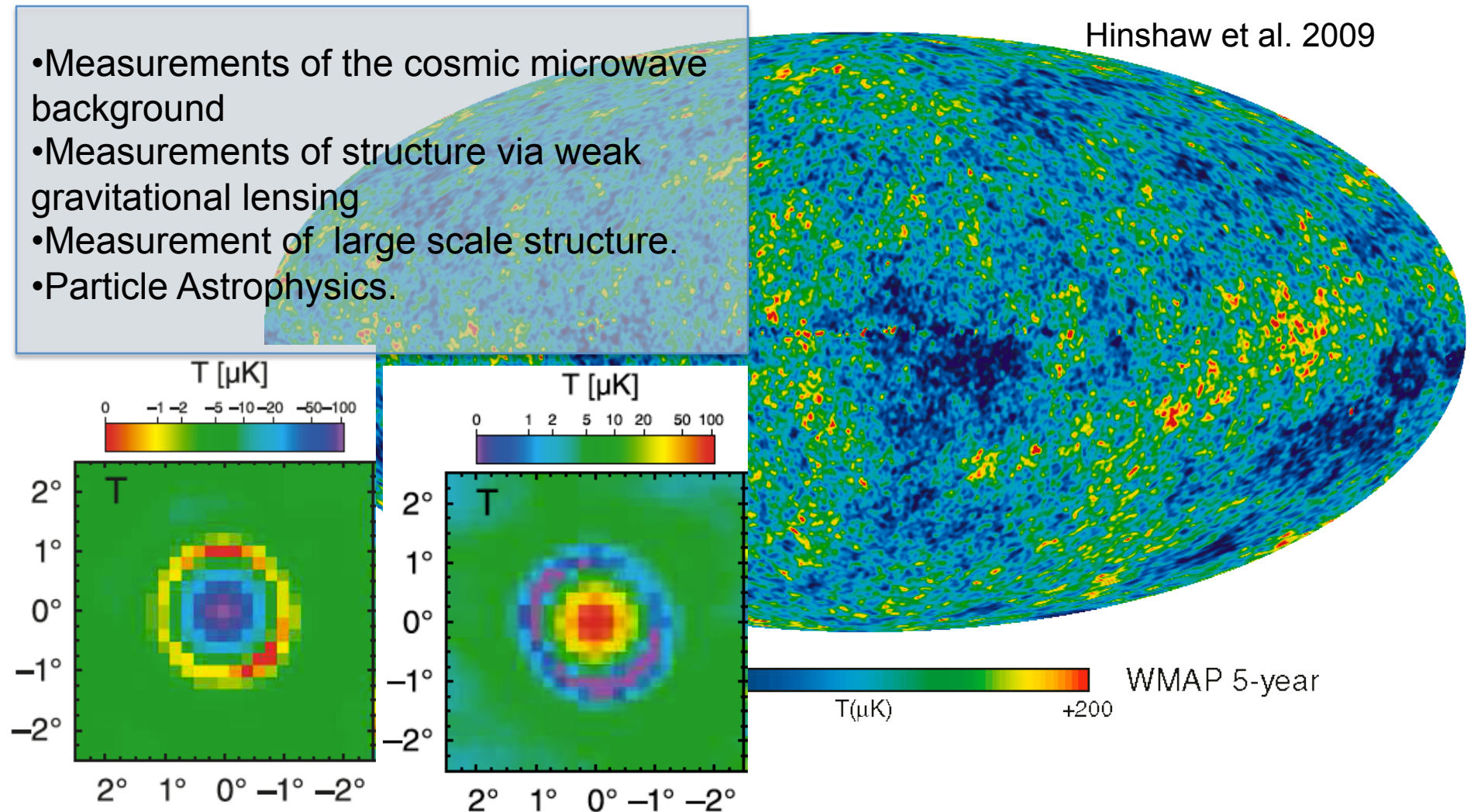
Physical Cosmology:

Mark Halpern, Gary Hinshaw, Douglas Scott,

Kris Sigurdson, Ludo van Waerbeke

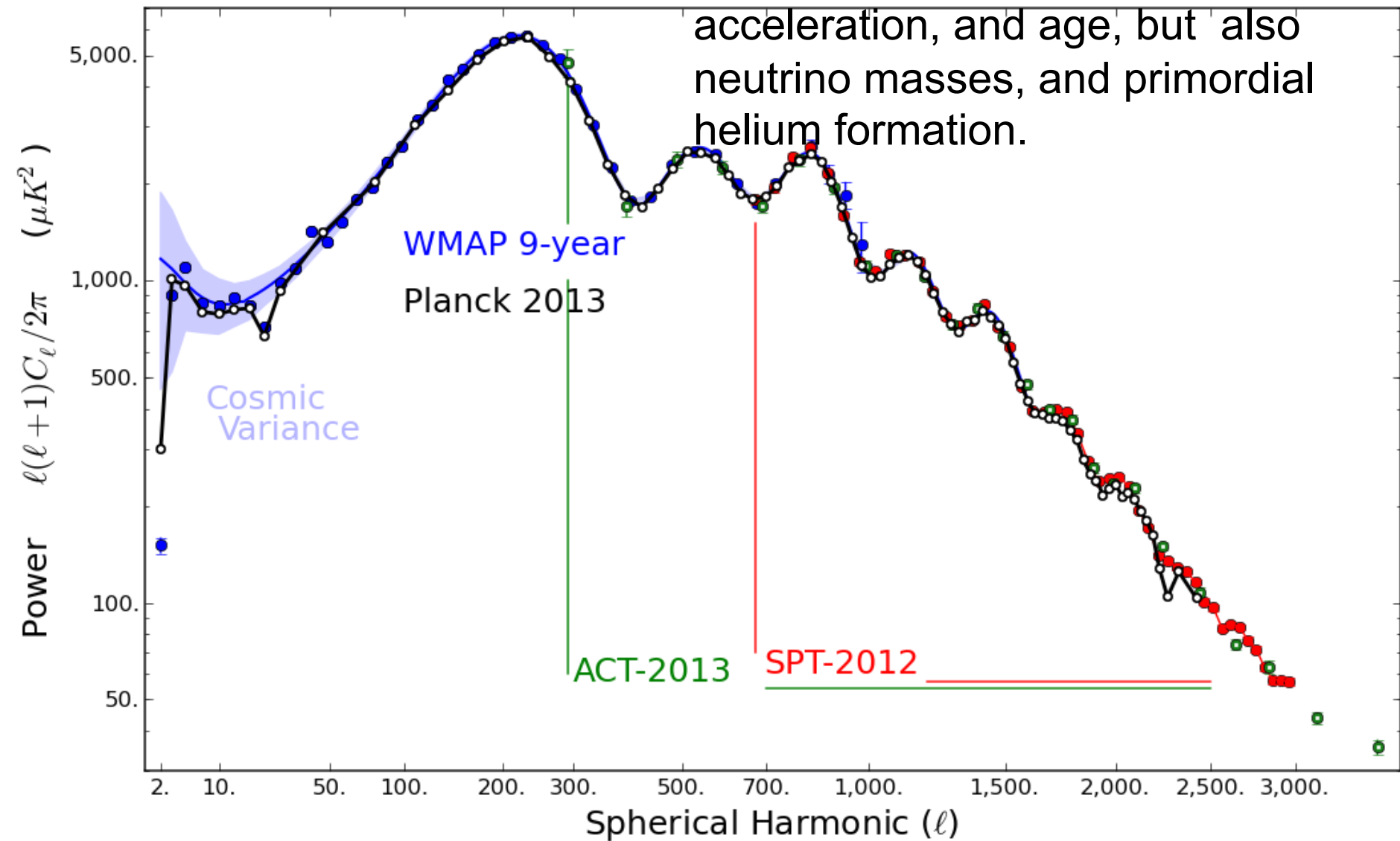
- Measurements of the cosmic microwave background
- Measurements of structure via weak gravitational lensing
- Measurement of large scale structure.
- Particle Astrophysics.

Hinshaw et al. 2009

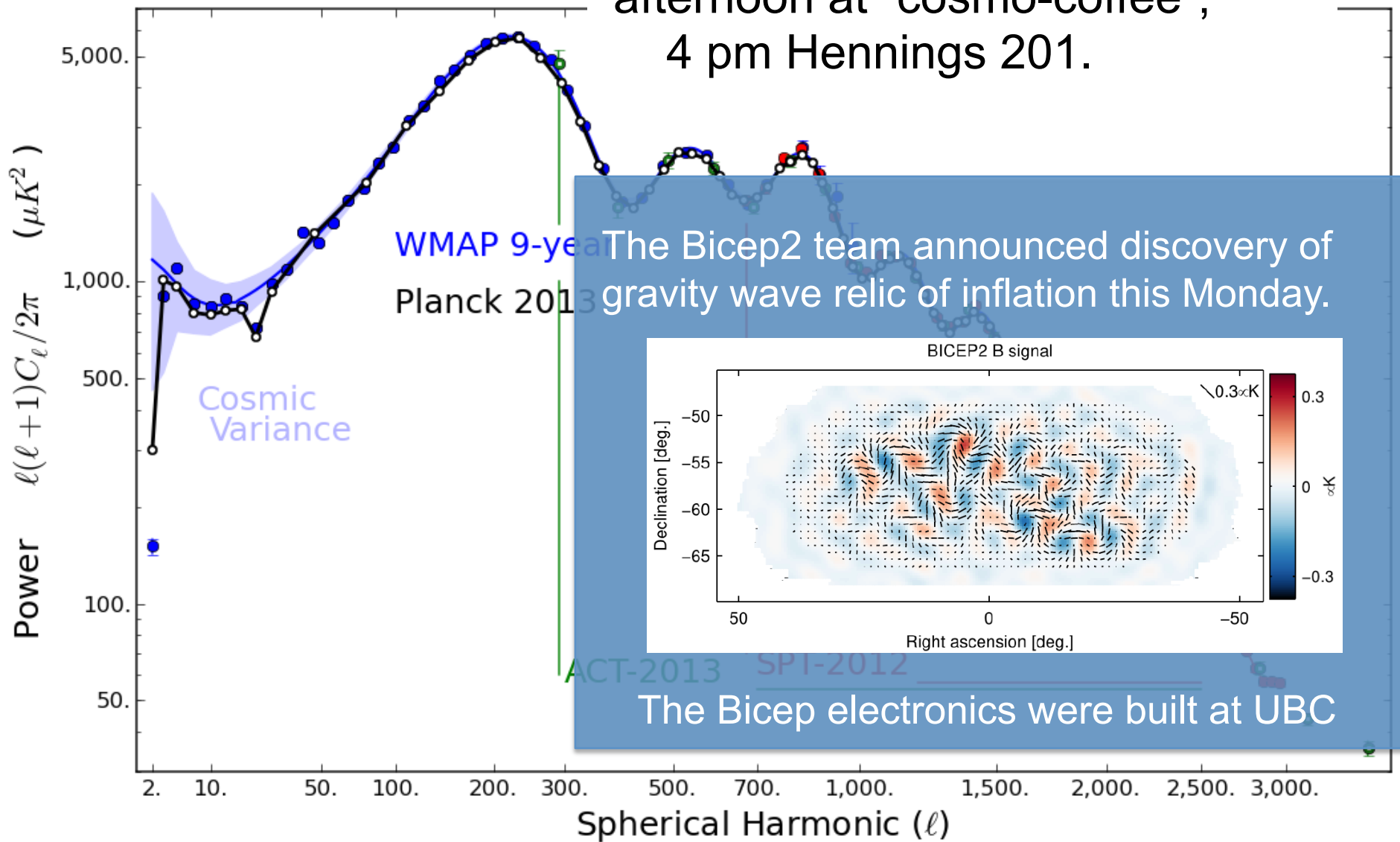


Komatsu et al. 2010

The power spectrum from those maps is fit to model which includes baryon density, curvature, expansion rate and acceleration, and age, but also neutrino masses, and primordial helium formation.



Please come to a presentation of the Bicep results this afternoon at “cosmo-coffee”, 4 pm Hennings 201.

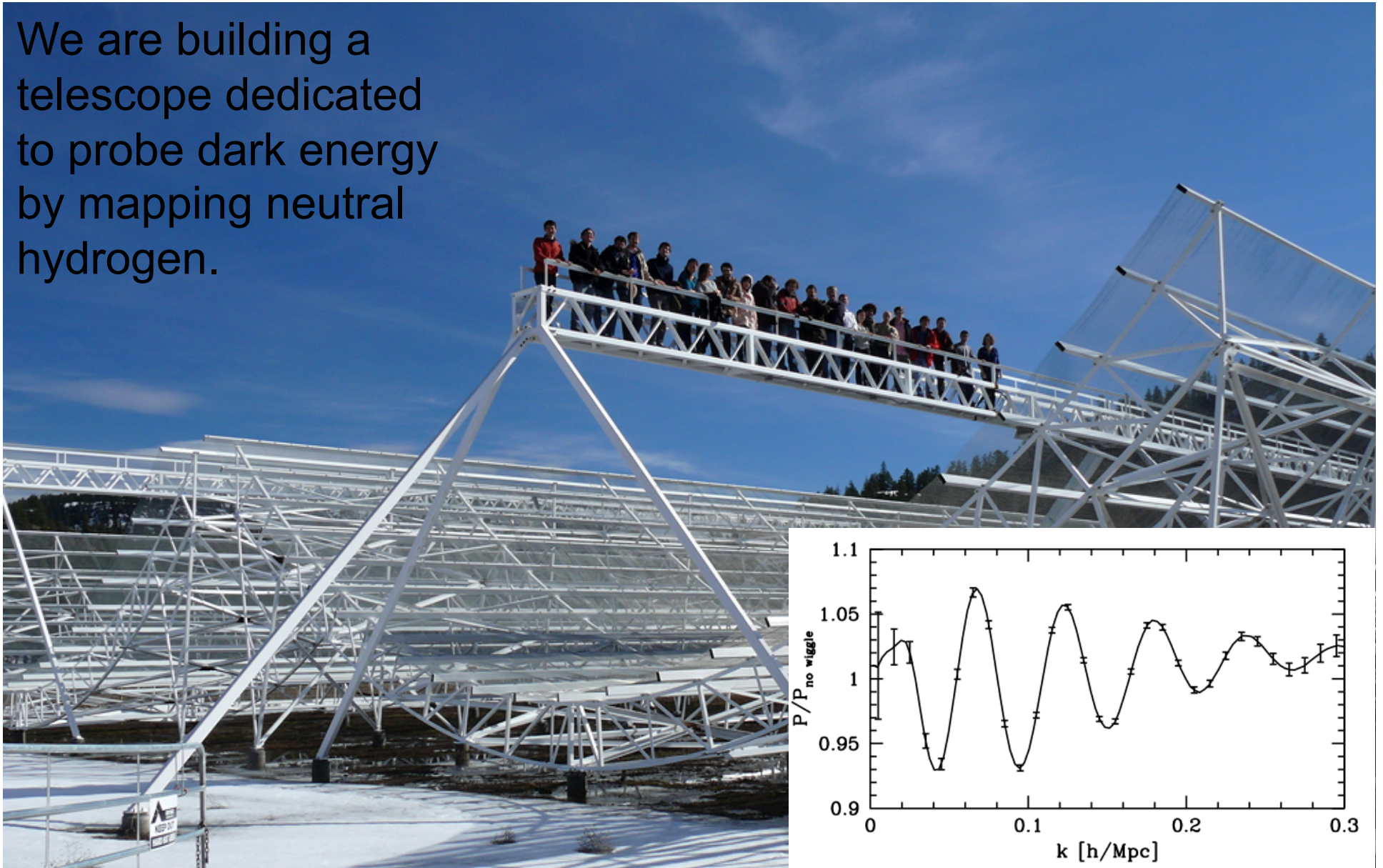


The Bicep2 team announced discovery of gravity wave relic of inflation this Monday.

The Bicep electronics were built at UBC

CHIME: Halpern Hinshaw Sigurdson,

We are building a telescope dedicated to probe dark energy by mapping neutral hydrogen.



- Thirty -Meter Telescope
 - Science Advisory Committee
 - Adaptive optics system
 - Sodium LIDAR studies
- Other Projects
 - LZT 6-m telescope
 - Robotic telescope in Chile
 - Site testing in the Arctic

