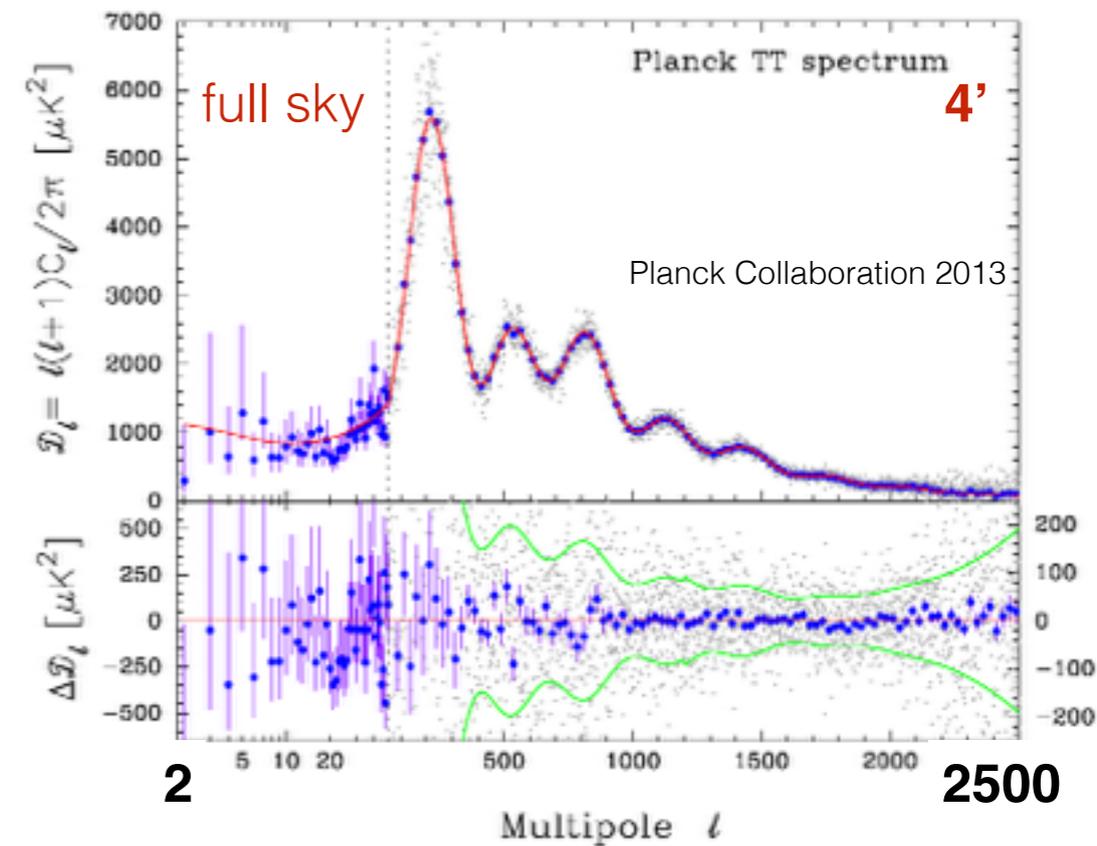


# Inflation Probe SIG PhysPAG Update

Shaul Hanany  
January 2014

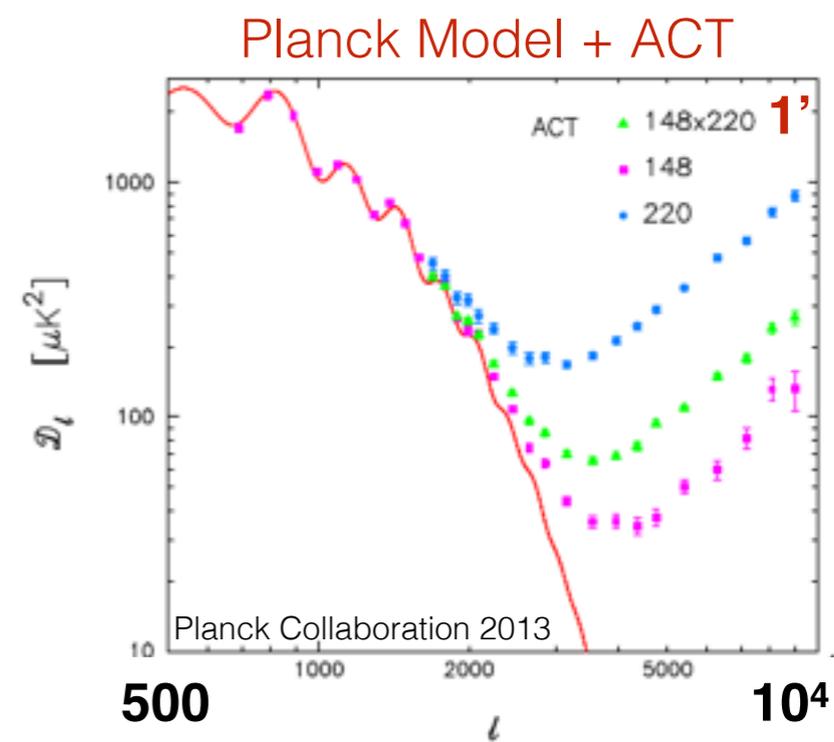
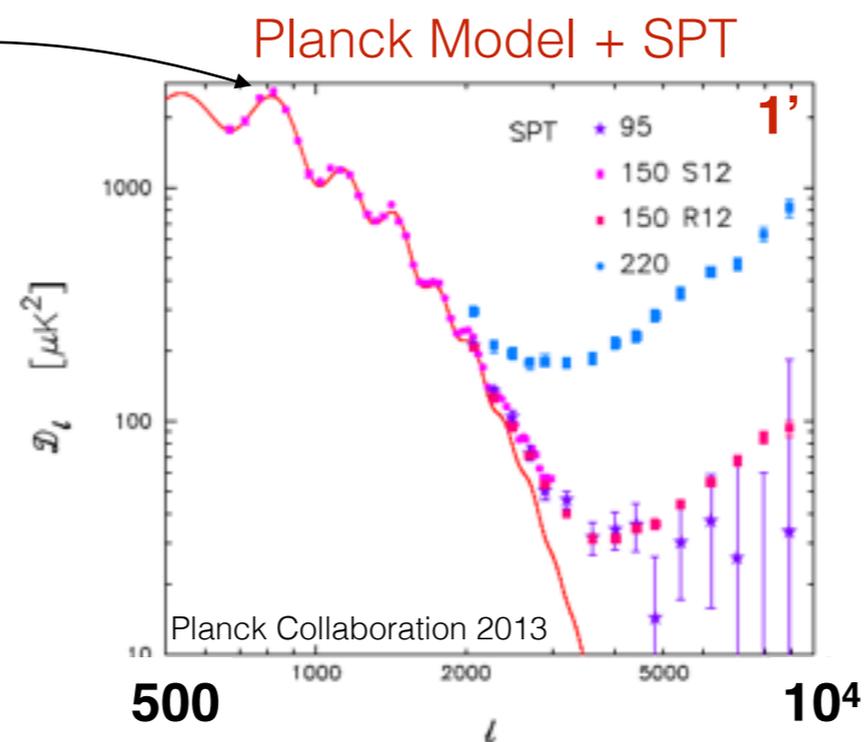
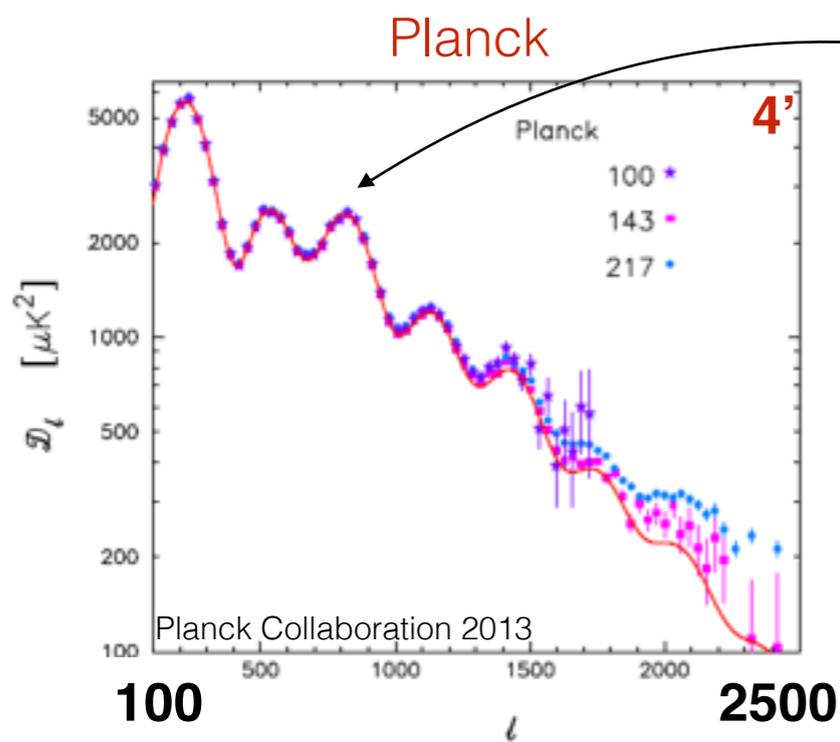
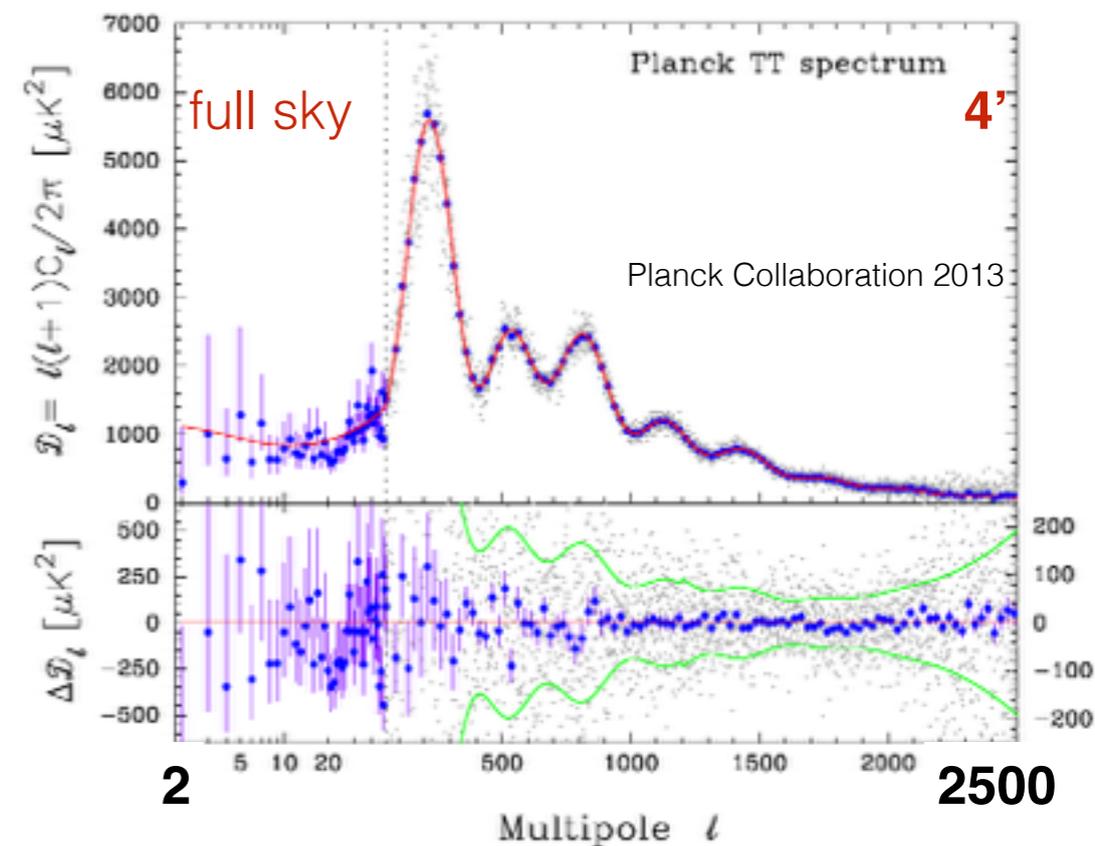
# CMB: What's Happening Now - Planck

- Planck temperature results: early 2013
  - Rich cosmological, galactic data set (see *Lawrence's talk during CMB special session on Thursday*)



# CMB: What's Happening Now - Planck+

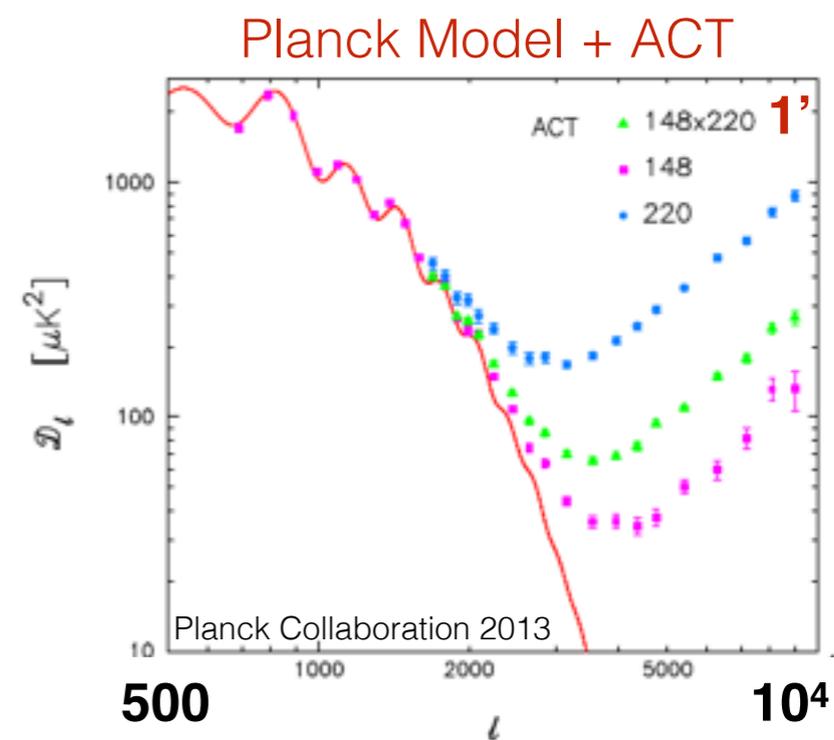
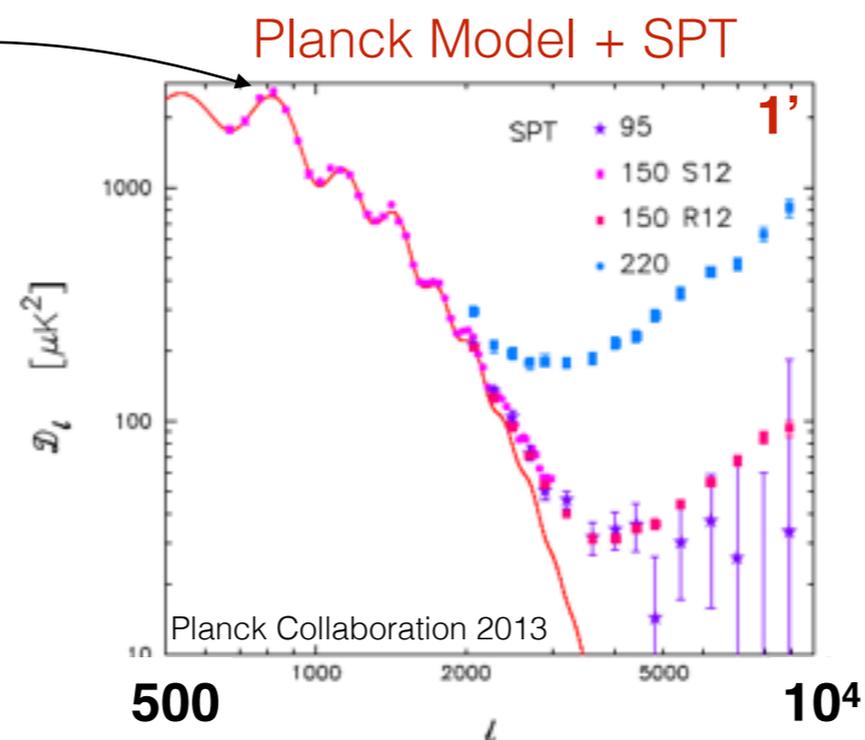
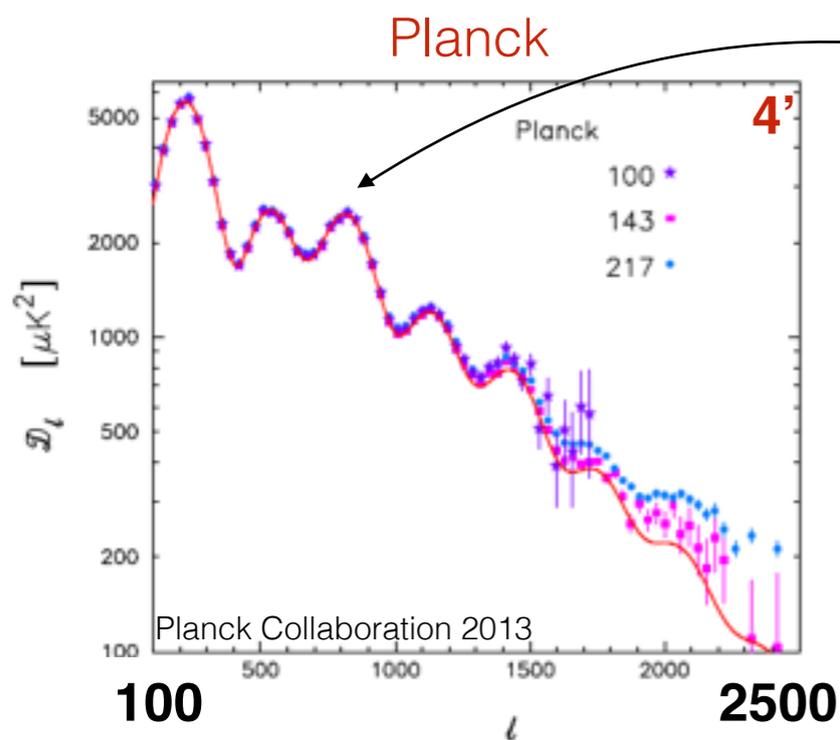
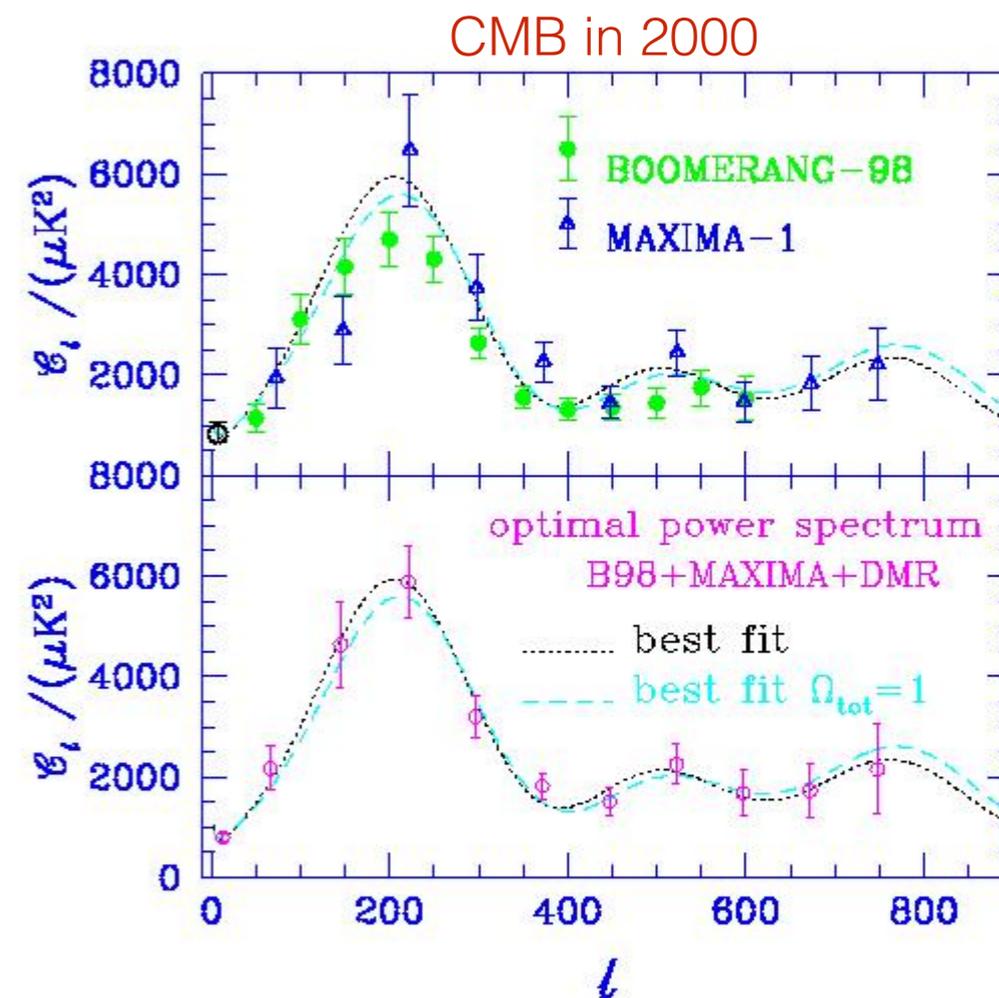
- Planck temperature results: early 2013
  - Rich cosmological, galactic data set
  - Complementary to SPT + ACT



# CMB: What's Happening Now - Planck+

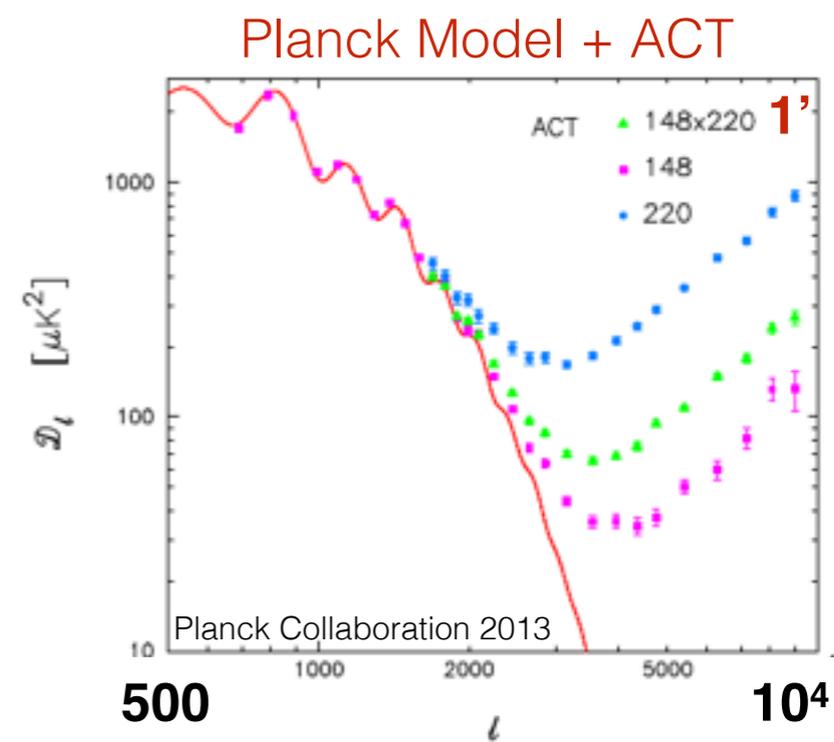
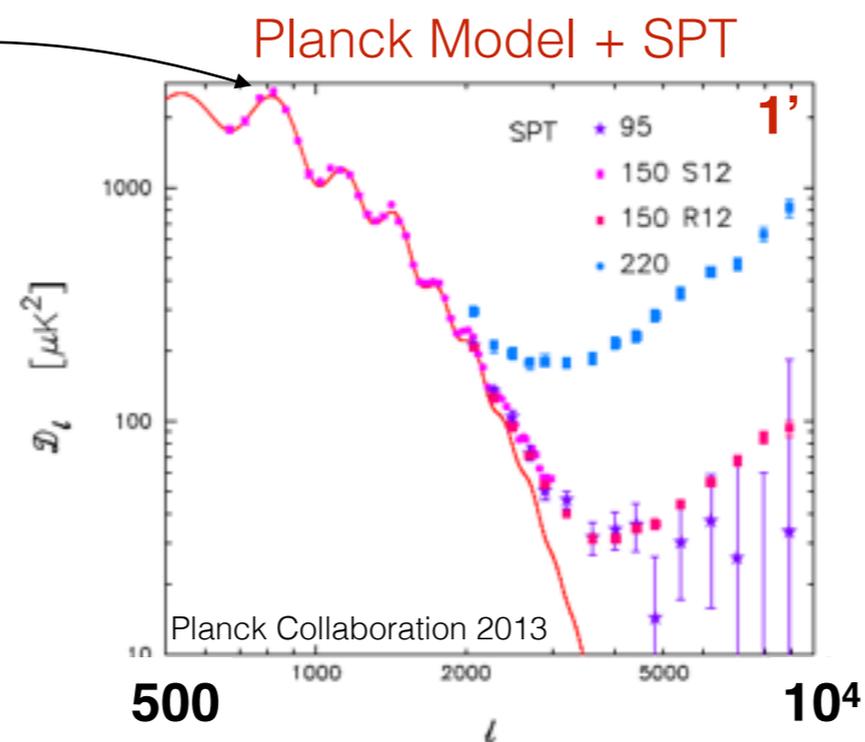
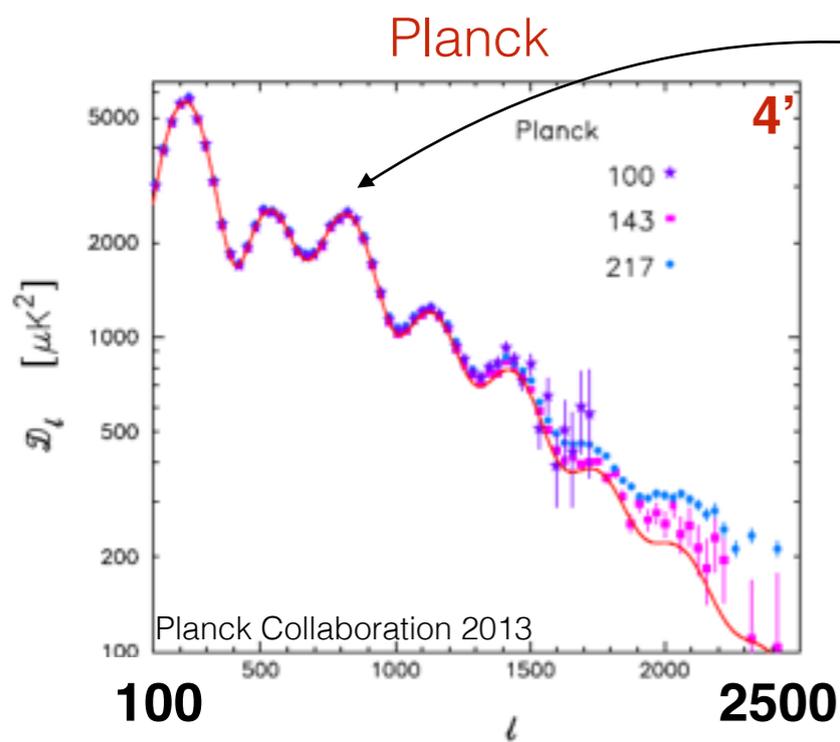
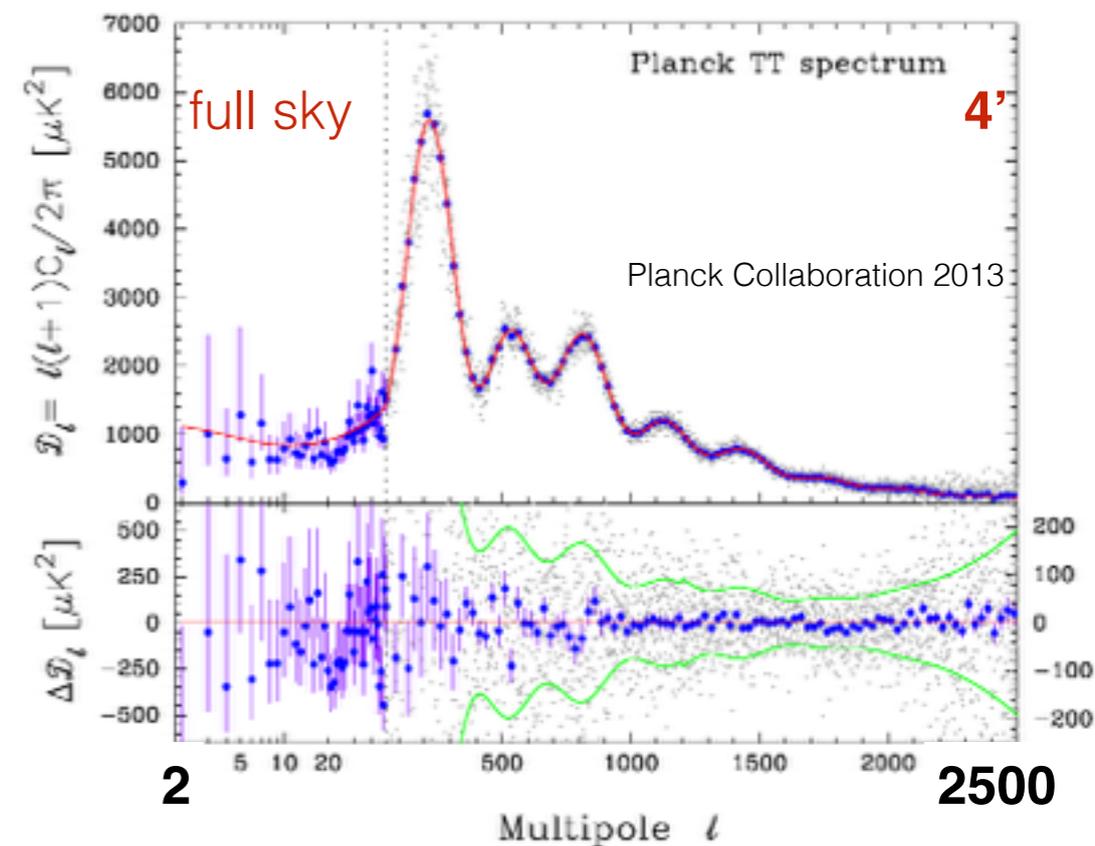
- Planck temperature results: early 2013
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NASA Supported Balloon Experiments  
+ COBE/DMR



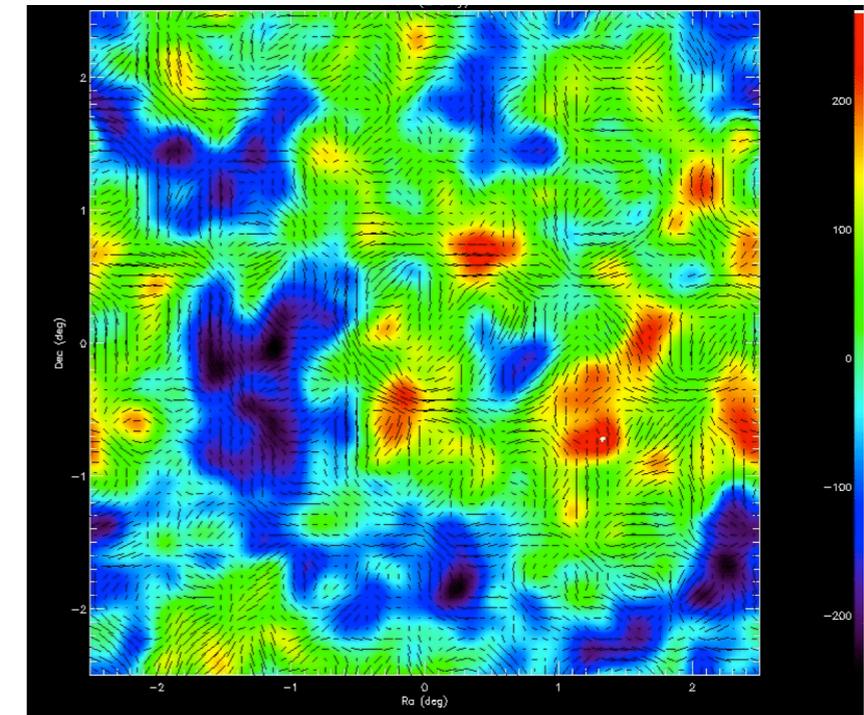
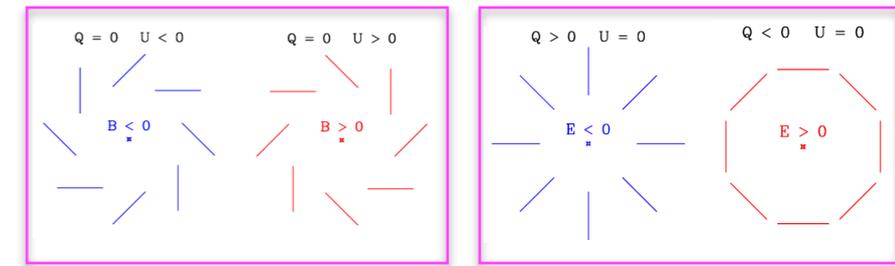
# CMB: What's Happening Now - Planck+

- Planck temperature results: early 2013
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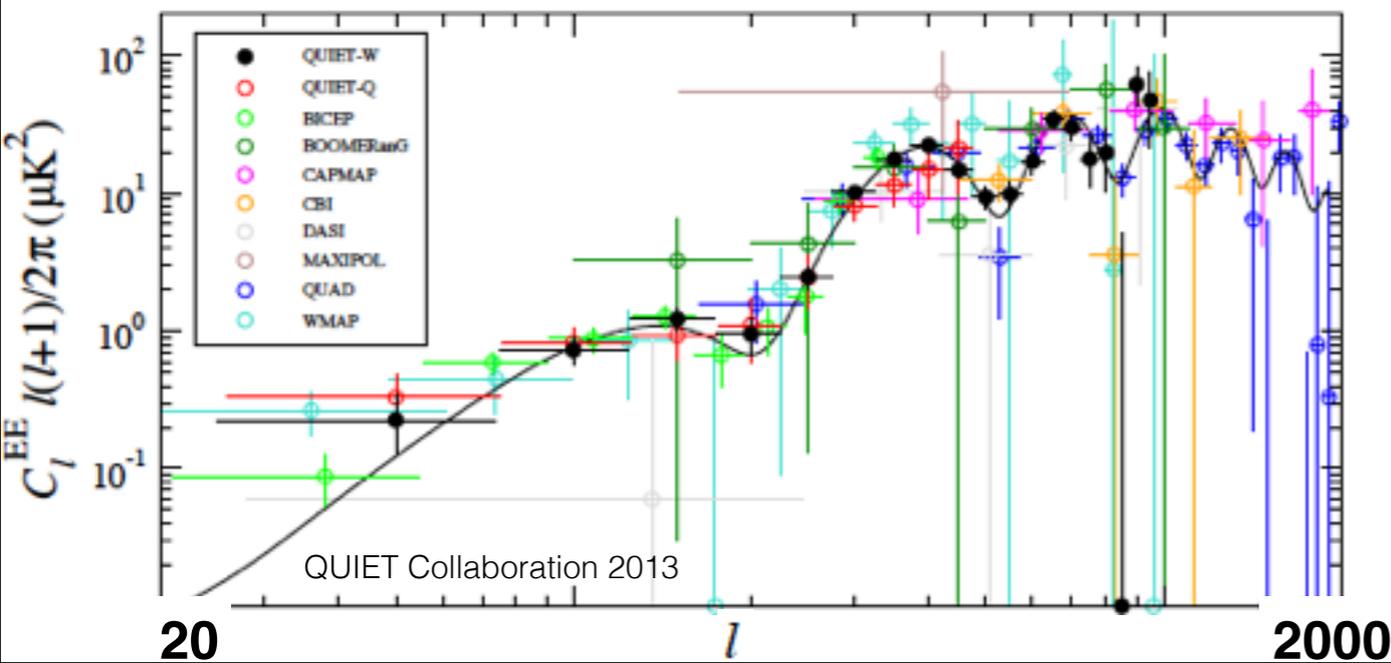


# CMB: What's Happening Now - Polarization

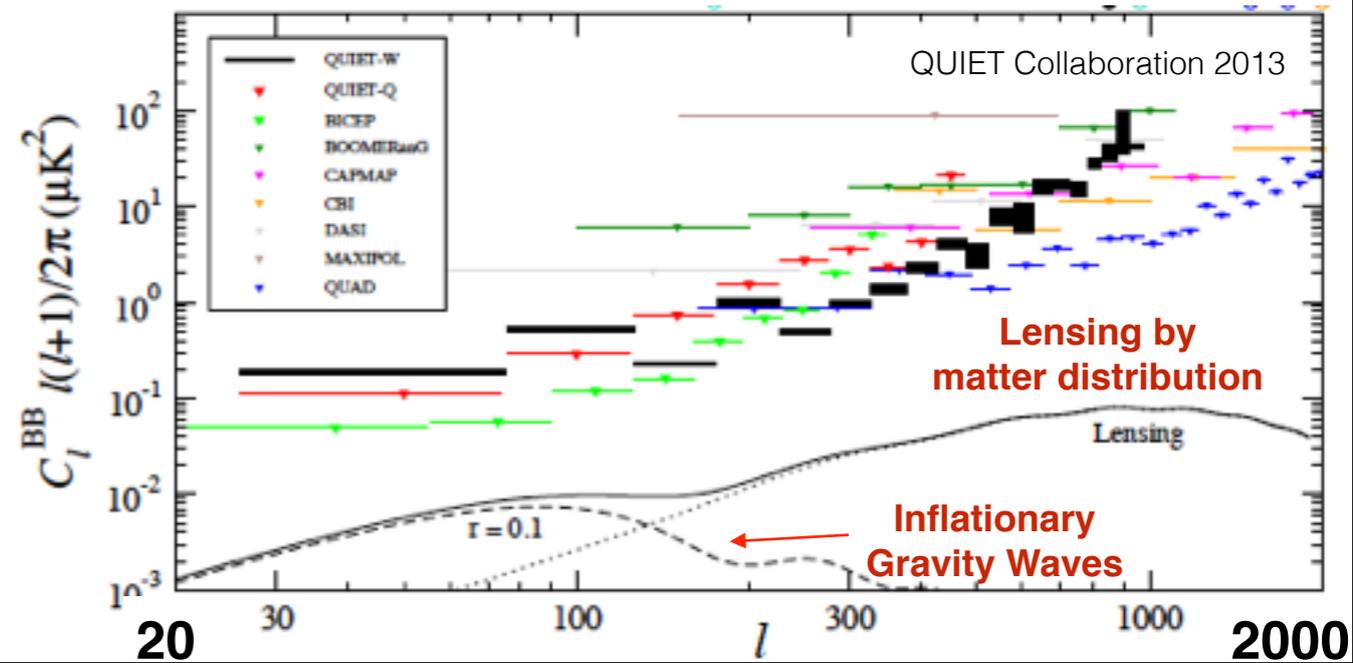
- Planck temperature results: early 2013
  - Rich cosmological, galactic data set
  - Complementary to SPT + ACT
- SPTPol detected B-mode polarization: July 2013  
(see Henning's talk during CMB special session on Thursday)
- POLARBEAR just announced B-mode results



EE Power Spectrum



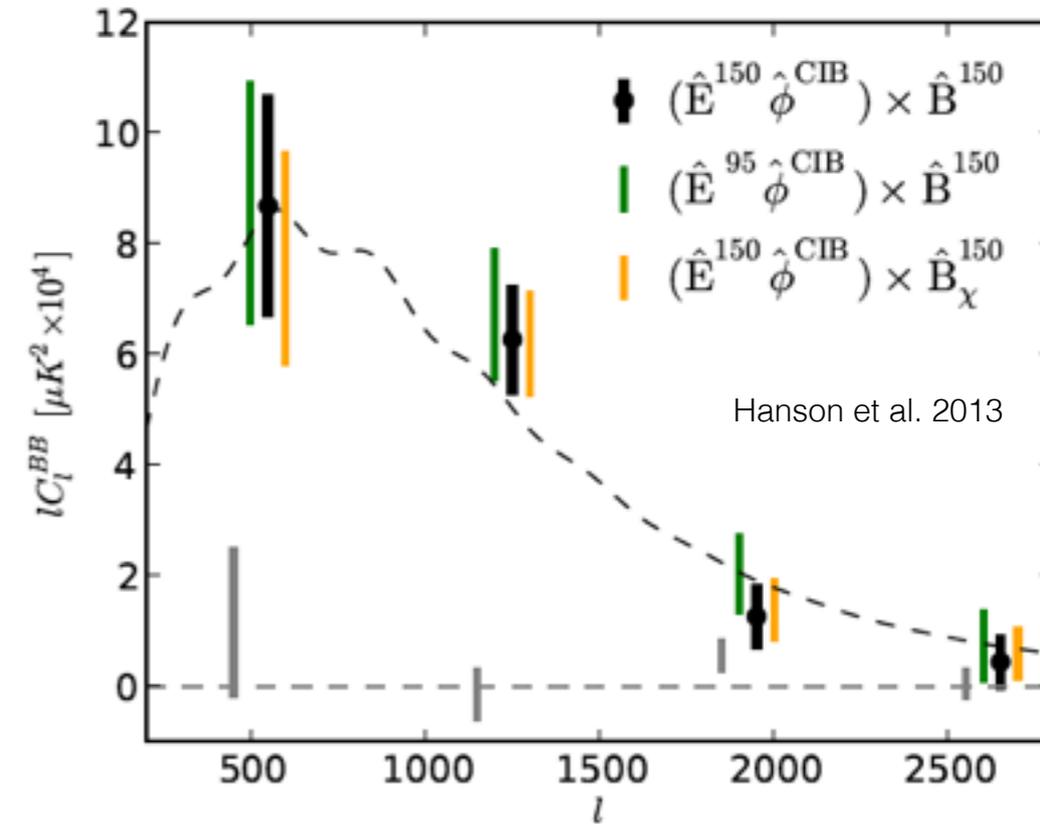
BB Power Spectrum



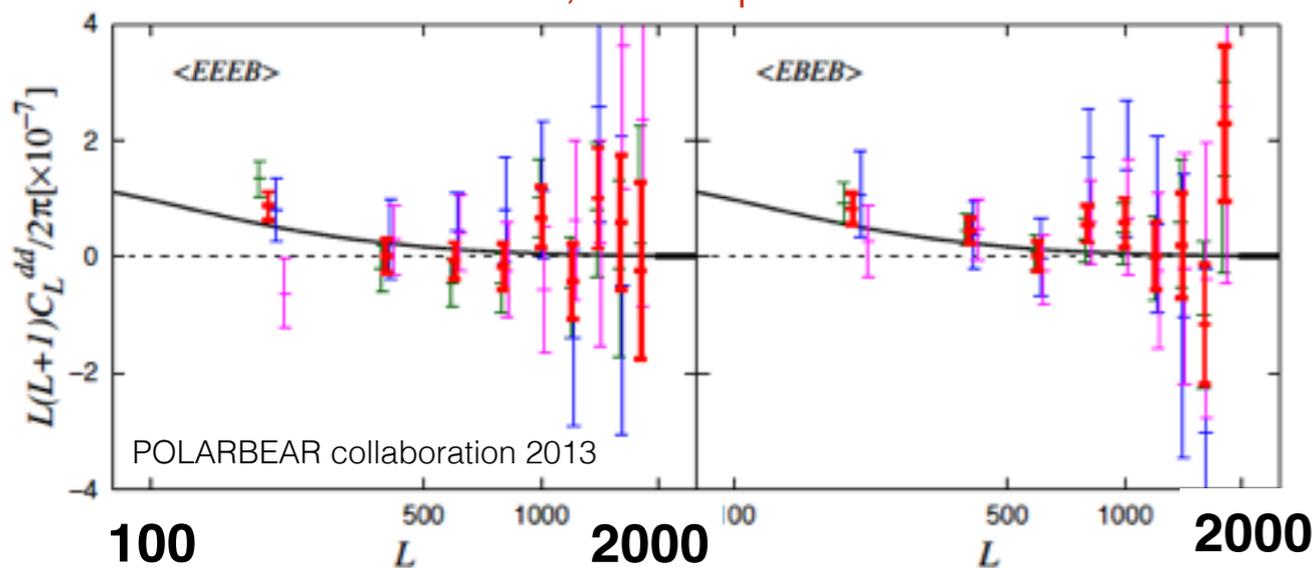
# CMB: What's Happening Now - Polarization

- Planck temperature results: early 2013
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  - Complementary to SPT + ACT
- SPTPol detected B-mode polarization: July 2013  
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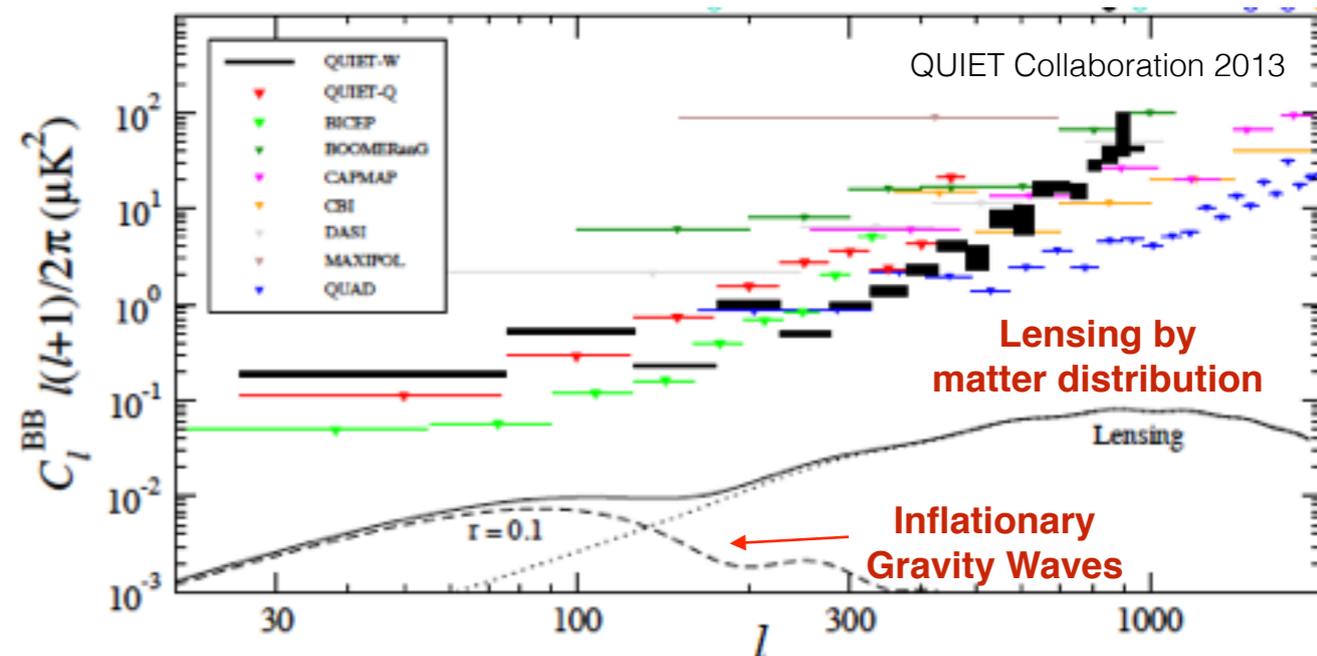
SPTPol E, lensed by the CIB, Cross-Correlated with SPTPol B



POLARBEAR, two 4 point correlations



BB Power Spectrum



# CMB: Coming Soon

- Planck polarization results: **summer 2014**
- BICEP-II (ground, low ell)
- Keck Array (ground, low ell)
- SPTPol (ground, high ell)
- ACTPol (ground, high ell)
- POLARBEAR (ground, high ell)
- EBEX (balloon, intermediate ell)
- ABS (ground, low ell)

All Analyzing  
Available  
Polarization  
Data

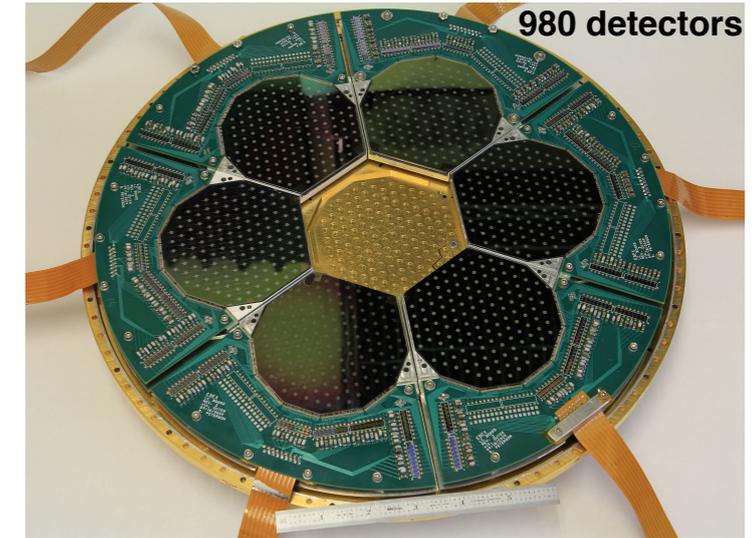
- SPIDER (balloon, low ell)
- PIPER (balloon, low ell)

Launch  
planned for  
2014

- SPT3G
- POLARBEAR/Simons Array

Extensions  
to ~20,000  
detectors;  
funded

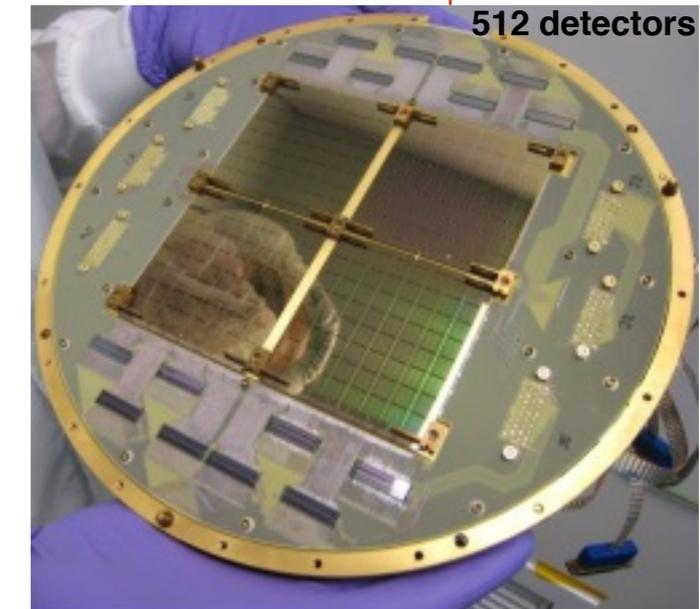
EBEX Focal Plane (1 of 2)



POLARBEAR focal plane



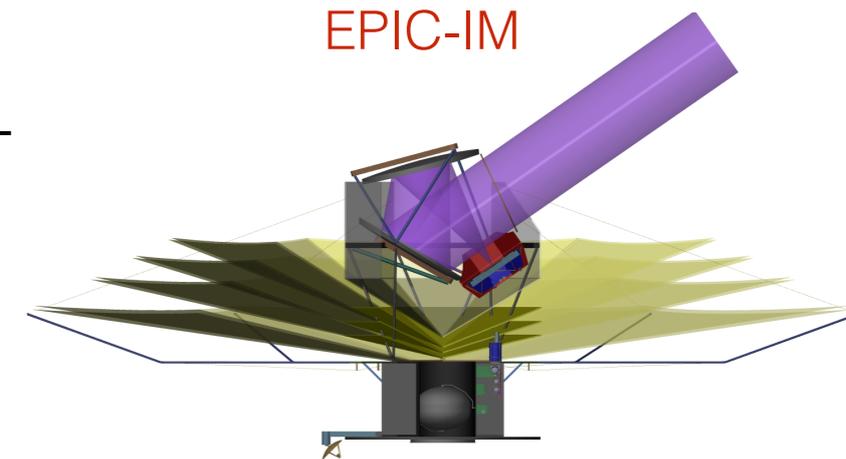
BICEP-II focal plane



# Inflation Probe: Space Projects

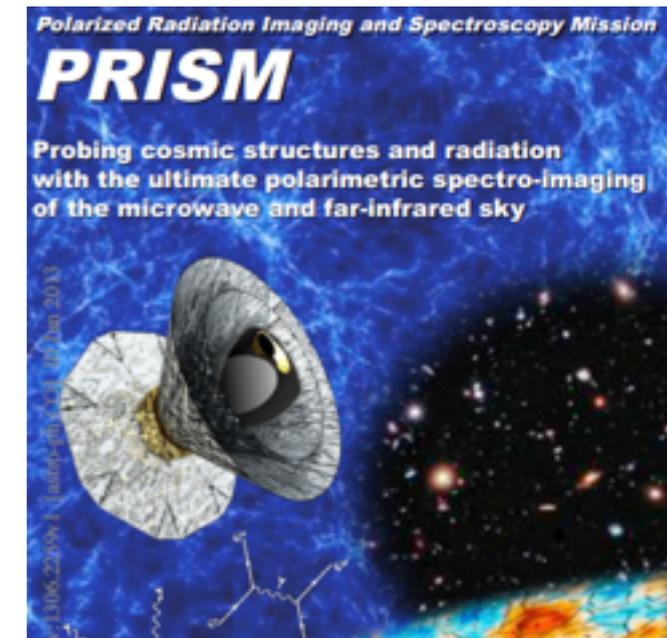
- US

- NWNH Decadal Panel: “The convincing detection of B-mode in the CMB polarization ... would represent a watershed discovery.”
- NWNH: review case for Inflation Probe mission by a mid-decade review panel.
- NASA’s plan (pre L2/L3 decisions): Inflation Probe at lower priority; new mission study possibly after 2015.



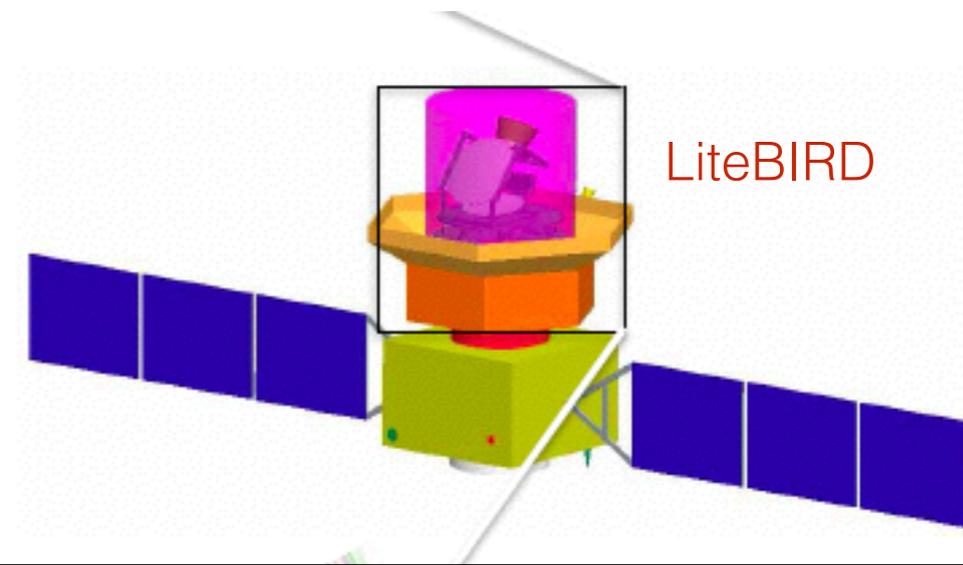
- ESA L2/L3

- PRISM short-listed (among first 5); science highly ranked
- Encouraged to apply to M-class call ~2014/15



- JAXA

- LiteBIRD is being discussed
- Both ESA and JAXA missions include plans for US participation (not endorsed by NASA)



# IPSIG

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- Submitted the first technology development plan (2011) toward a future space mission
  - Defined three areas of specific emphasis: detectors, optics, coolers
  - Out of 13 SAT grants 2012 - 2014, 2 are in CMB (1/1 in 2014), both in detector technology
- Advocated (without much success) for a new mission study prior to a mid-decade review
- Supported European colleagues in ESA mission-concept submissions: CORE (M-class), PRISM (L-class)
- Organized several CMB special sessions at the AAS (See Last Slide)
- Supported CMB-S4, a 'Stage 4' ground-based experiment with 250,000 detectors
- Interested in NASA's plans post ESA L2/L3 selections

# Thursday's Special Session (+ Other CMB)

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- Lawrence: *Planck and state of the art in CMB measurements*
- Mather: *What we know and what we don't know about the CMB spectrum*
- Spergel: *CMB as a probe of the low redshift universe*
- Kamionkowski: *Constraints on Inflation from polarization and spectral distortions*
- Kogut: *The once and future signal: CMB science from sub-orbital and proposed satellite missions*
- Henning: *SPTPol's B-mode polarization detection*
  
- 6 'Cosmology + CMB' oral sessions; 2 poster sessions

# Extra Slides

# To Do

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- Confirm bicep-II detector count