PIPER & ICarIS

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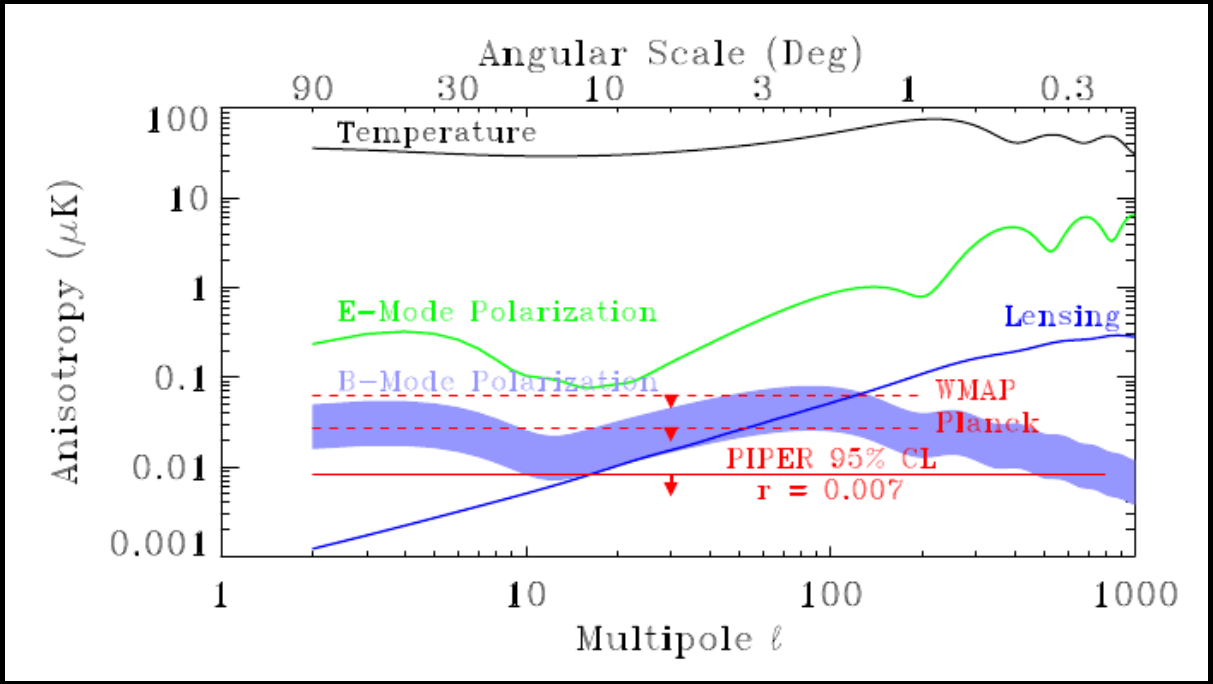
Part One

The Primordial Inflation Polarization Explorer (PIPER)

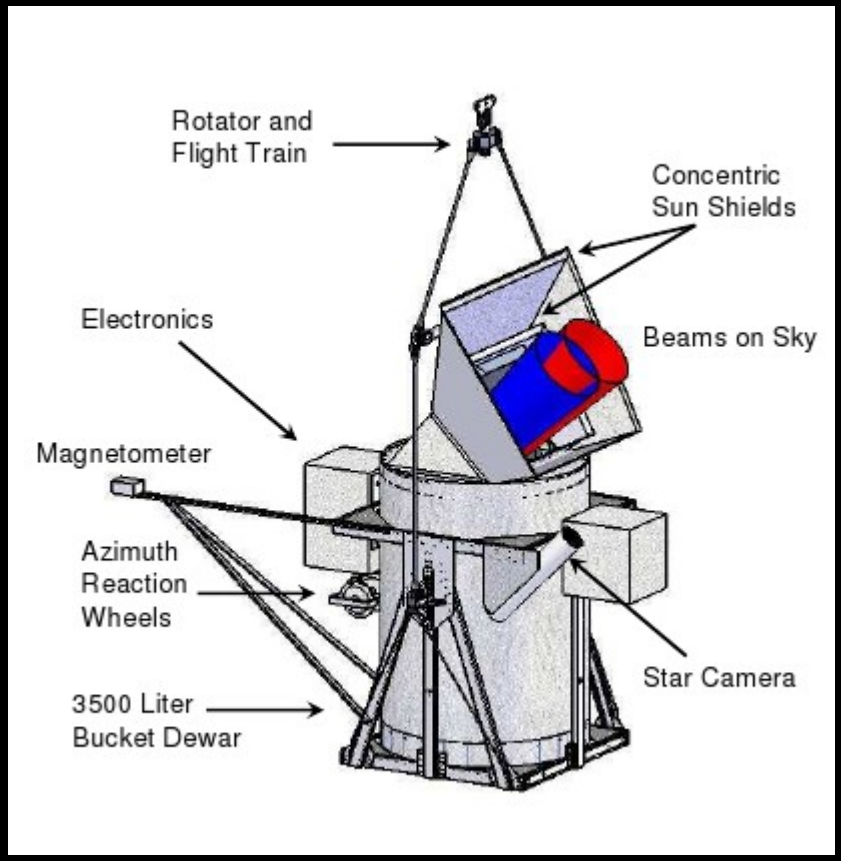
PIPER Science Goals

- B-Mode CMB polarimeter r<0.007
  - Observe ½ sky; 0.3° resolution; 1500, 1100, 850, 500 μm; 5000 bolometers



PIPER Instrument

- two 41cm telescopes cooled to 1.5 K
- 3500 L Helium dewar
- 2400 kg
- Re-using ARCADE dewar



PIPER Team

PI: A. Kogut, GSFC

- GSFC, John Hopkins, NIST, ARC
- UBC (M. Halpern)
  - Read-out electronics

PIPER Flight Planning

- 2400 kg on a 800,000 m^3 balloon to float (~35 km)
- Dawn launch
- 30 hour conventional flight (Ft. Sumner, NM)
- 4 flights required, first flights 2013
- 2 flights per year (spring/fall)
- Autonomous operation

Part Two

The Ionized Carbon Imaging Spectrometer (ICarIS)

ICarIS Science

- Galactic formation
- Flux limited, spectroscopic redshift survey of ~100 (U)LIRGs at $1<z<3$
- SF history using [CII] luminosity as SF indicator
- Relation of ULIRGs to large-scale structure

ICarIS Instrument

- Re-uses the BLASTpol platform
- 2.2 m warm telescope
- 300-650 μm; 34-74” FWHM, 430 km s^{-1}
- 1920 spatial pixels
- ~2000 kg

ICarIS Team

PI: J. Aguirre, Penn

- Penn, JPL, NIST, Cardiff, Cornell
- Toronto (Netterfield)
  - Flight software, pointed platform
- UBC (Halpern)
  - Read-out electronics

ICarIS Flights

- 2000 kg on a 1,000,000 m^3 balloon to float (~35 km)
- 21-day long-duration (LDB) flight (Antarctica)
- Autonomous operation
- First LDB flight end of 2015

Summary

	PIPER	ICarIS
Science	B-mode CMB	Galaxy formation
Instrument	2x41cm Lhe cooled polarimeter	2.5m mapping spectrometer
Mass	2400 kg	2000 kg
Flight	4x30h	21 day LDB
1st Flight	Spring 2013	December 2015
Total Cost	~$5 mil	~$5 mil