

# Development of a Blackbody Microwave Source for Cosmic Background Polarimeter Characterization

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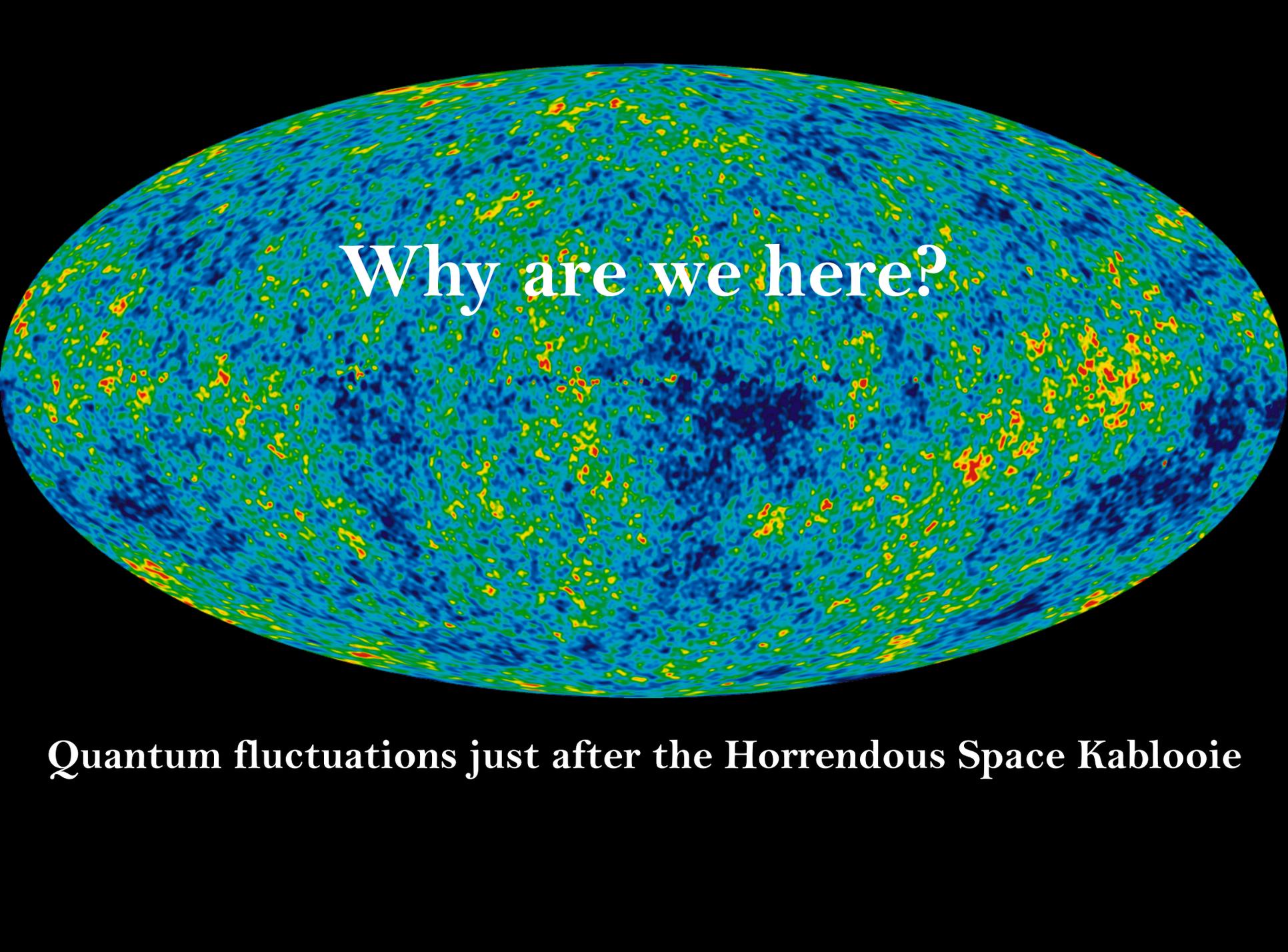
**Rhodes College**

—1848—



# Where Was I?



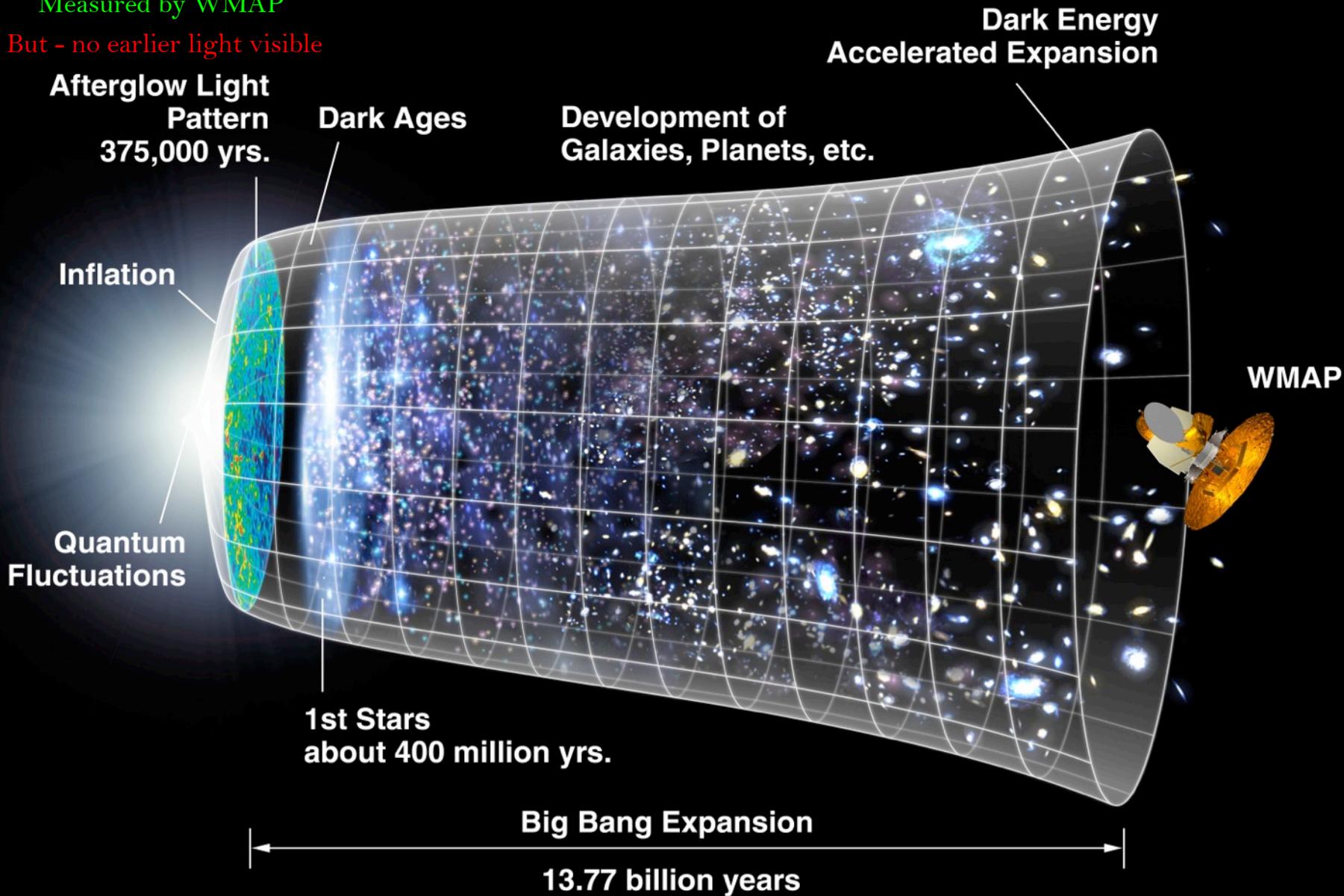


Why are we here?

Quantum fluctuations just after the Horrendous Space Kablooie

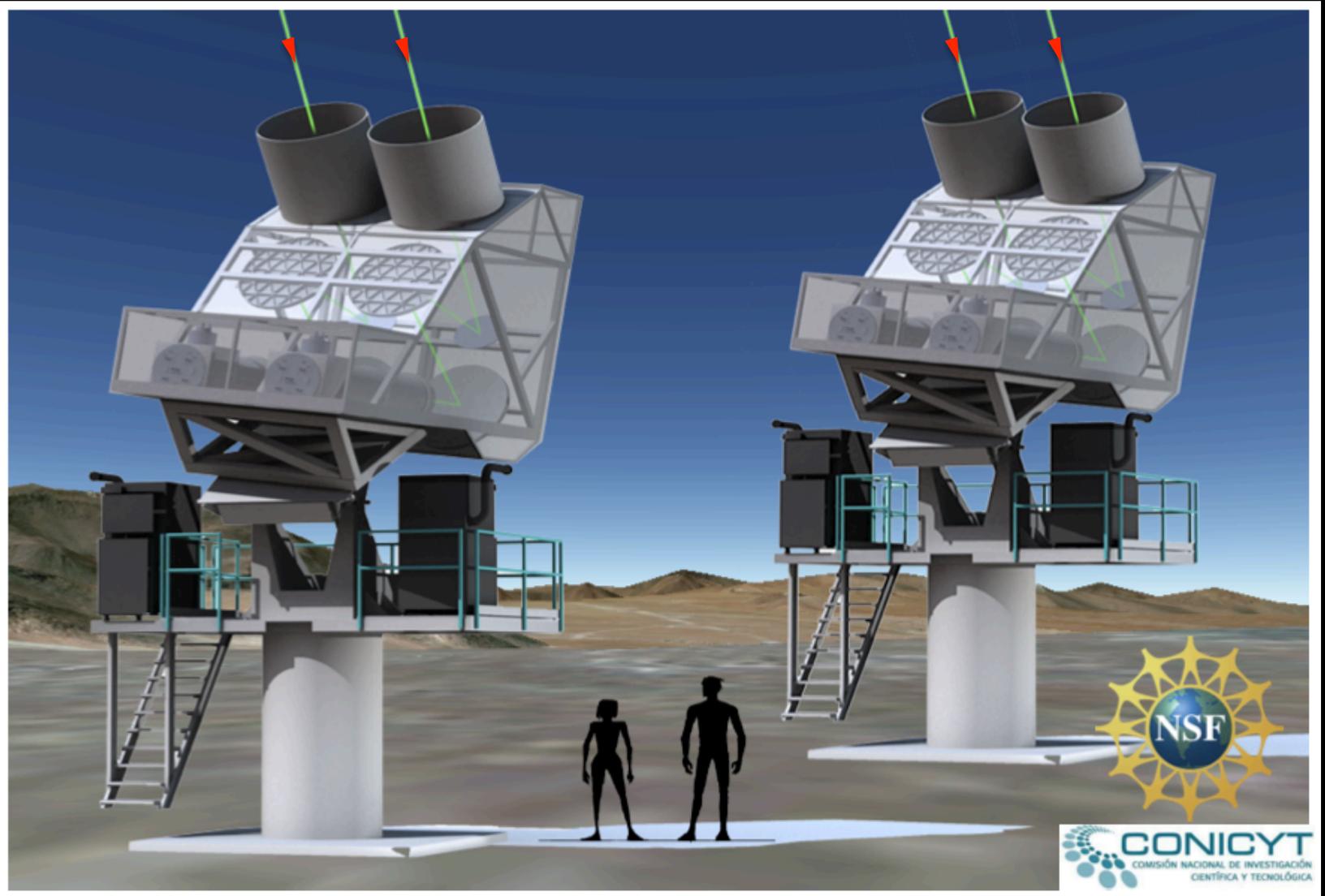
Measured by WMAP

But - no earlier light visible



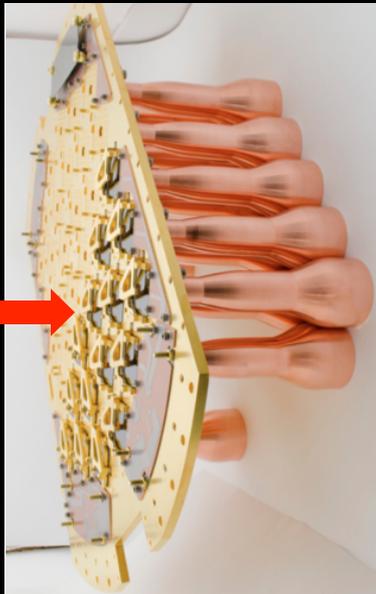
**So how do we measure the Cosmic  
Microwave Background?**

# Cosmology Large Angular Scale Surveyor

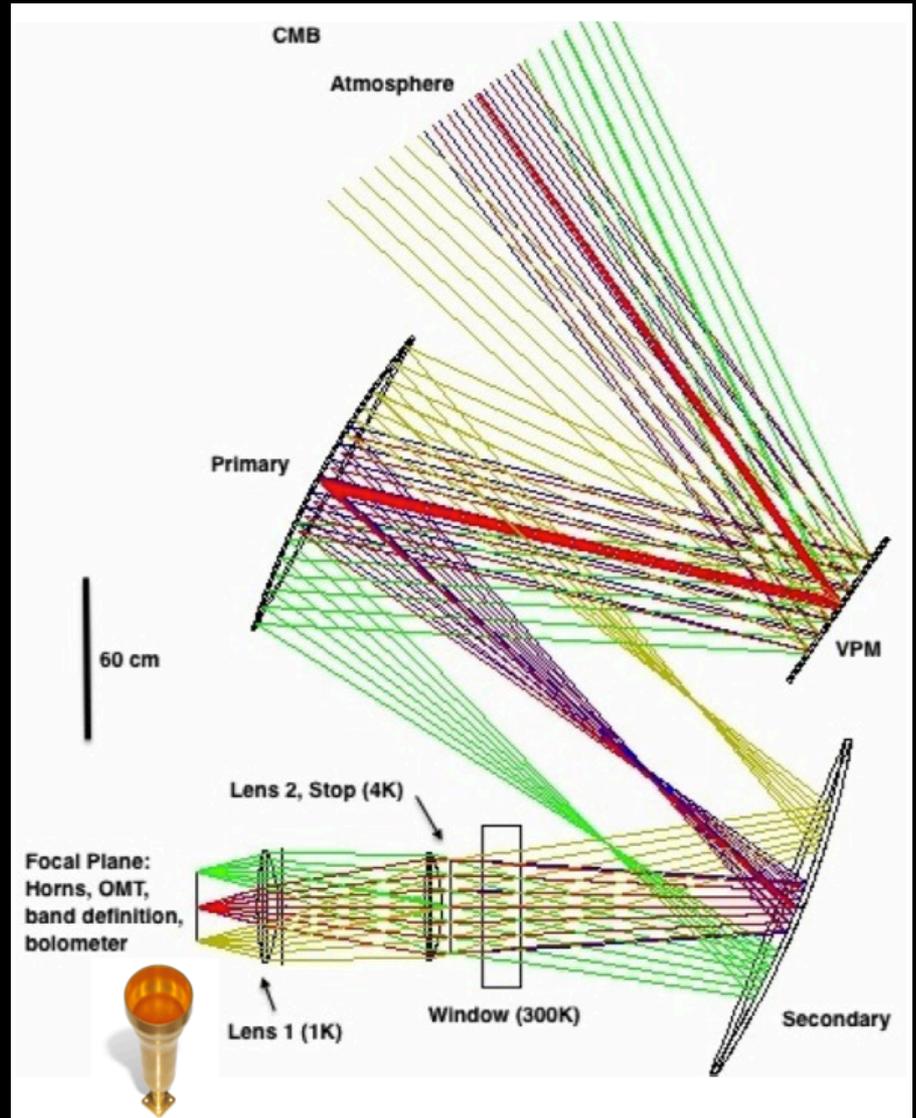
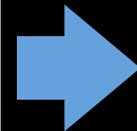


# Telescope Design

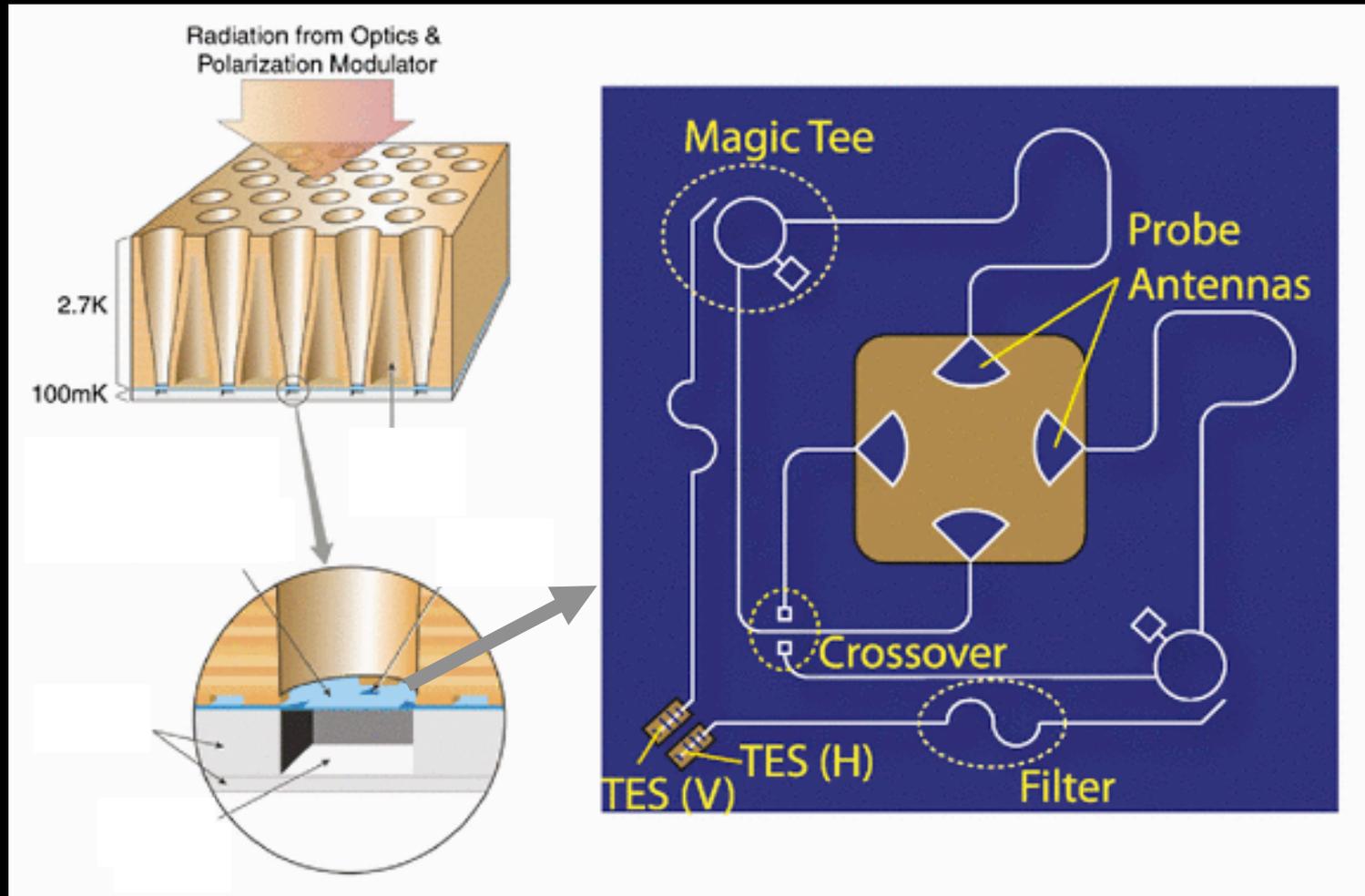
Focal Plane



Detectors

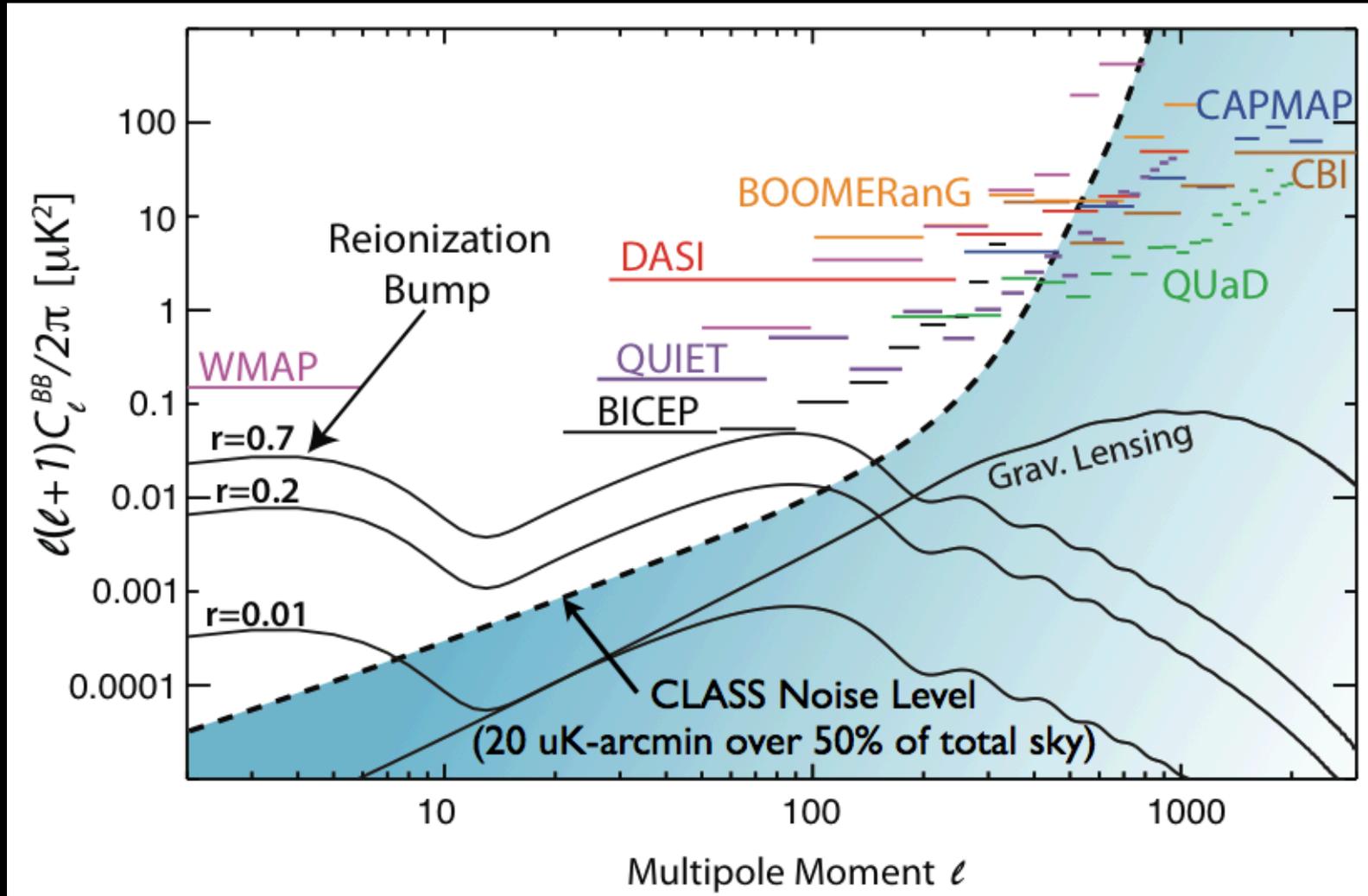


# Focal Plane



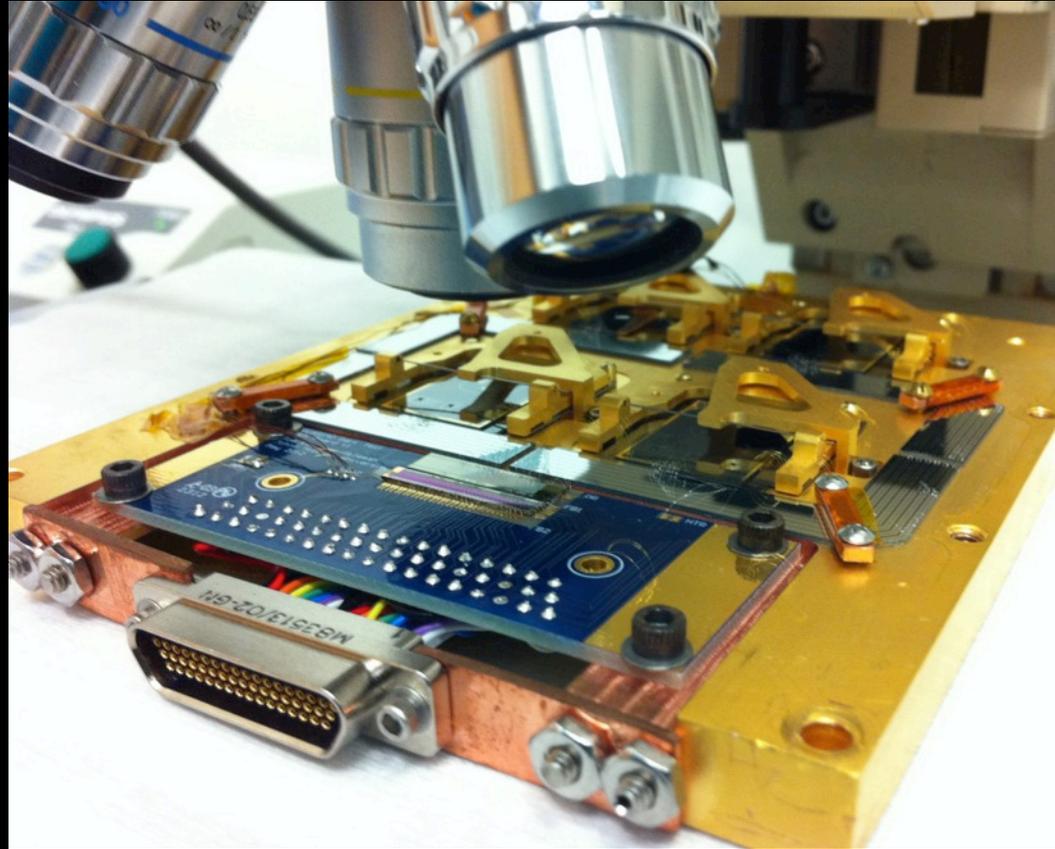
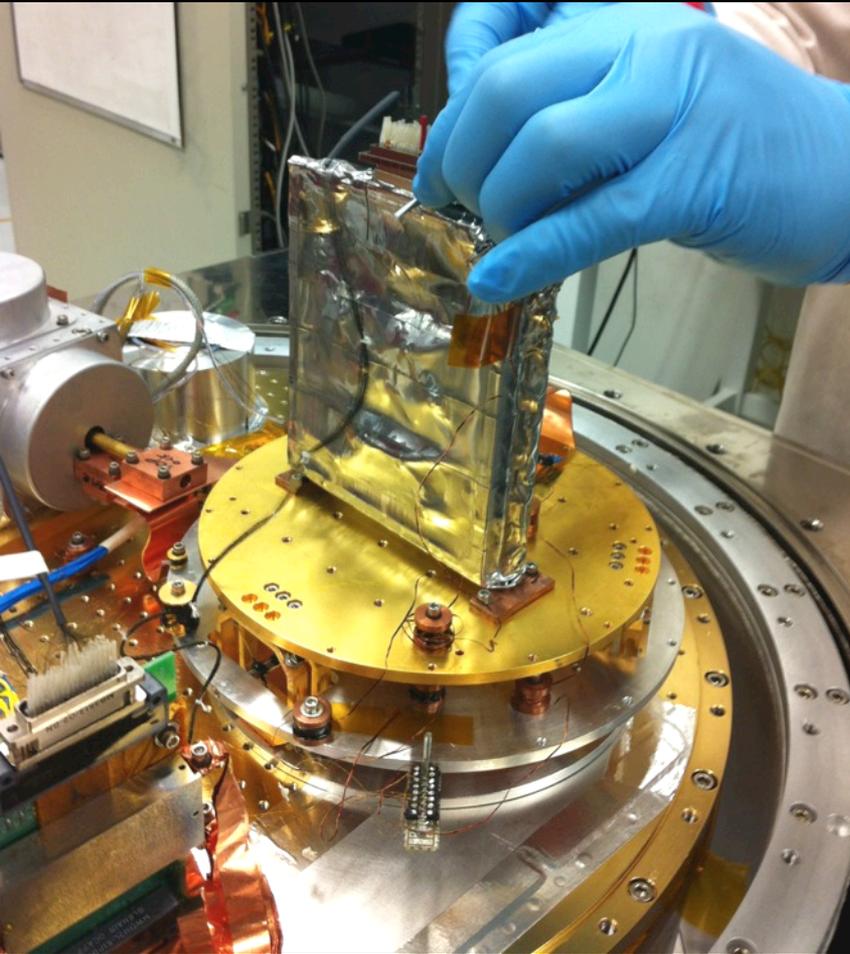
The Transition Edge Sensors operate on the normal-superconducting transition at 150mK.

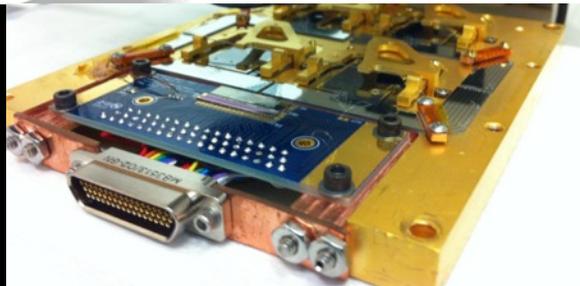
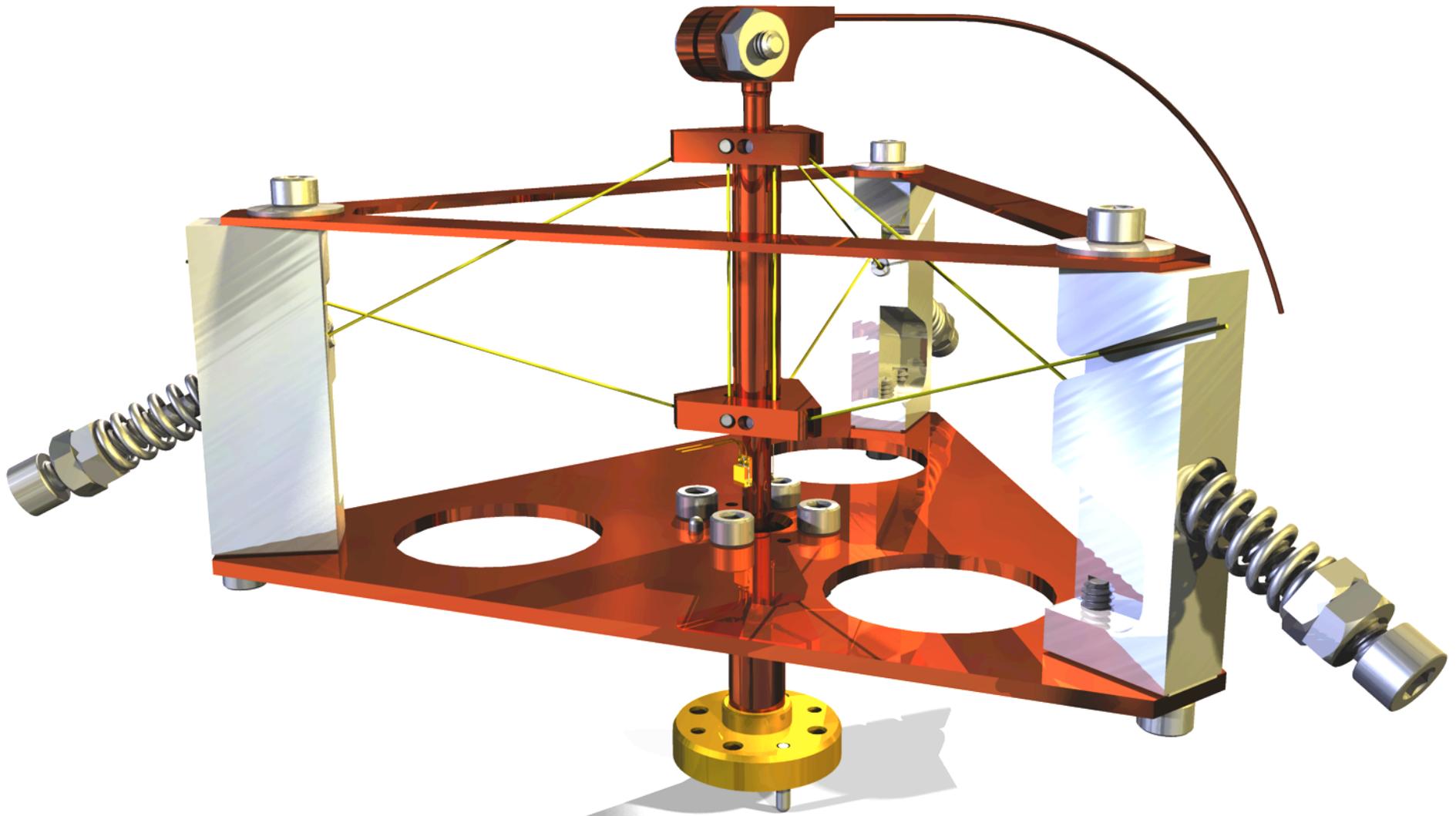
# Sensitivity Level

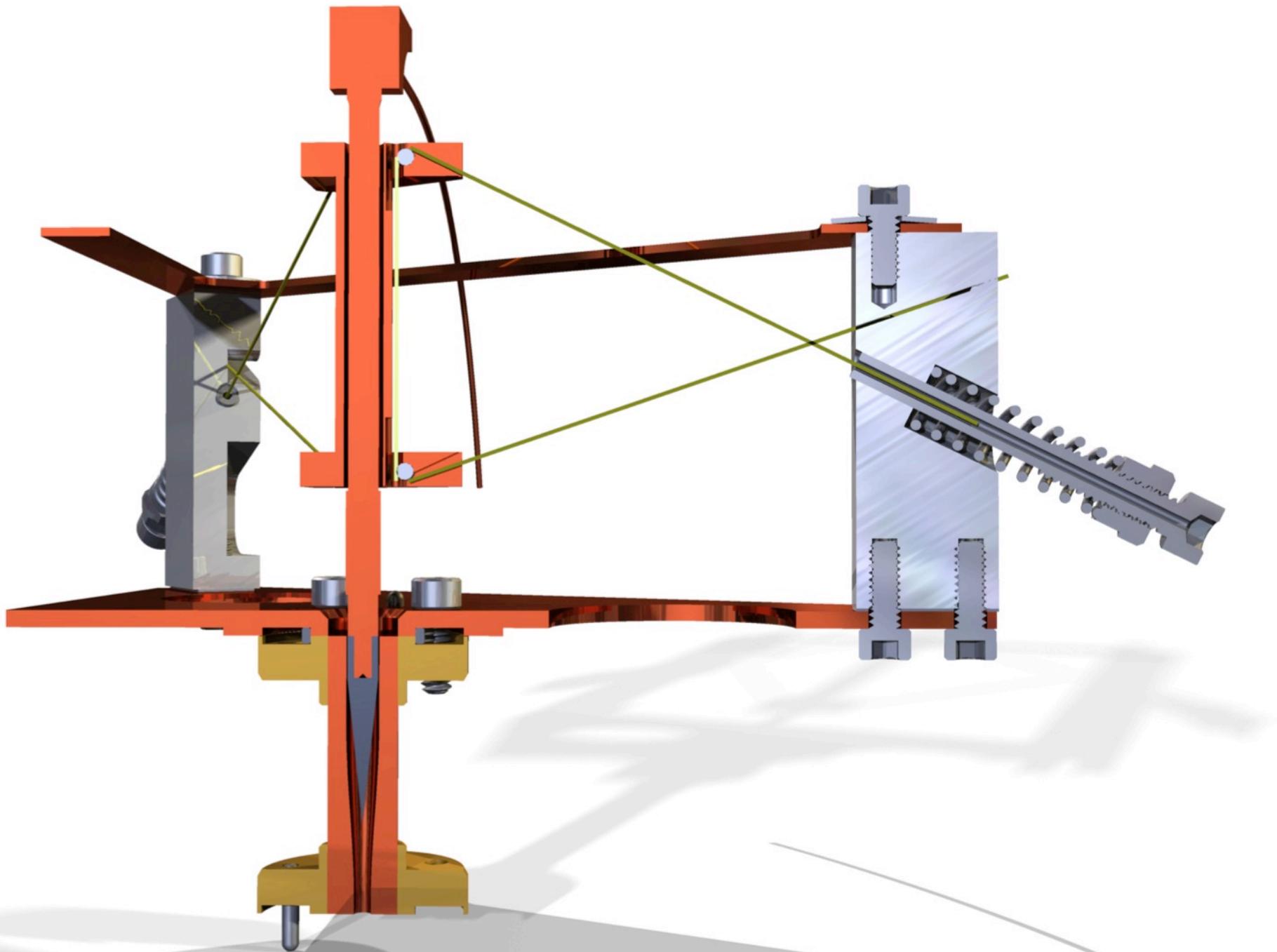


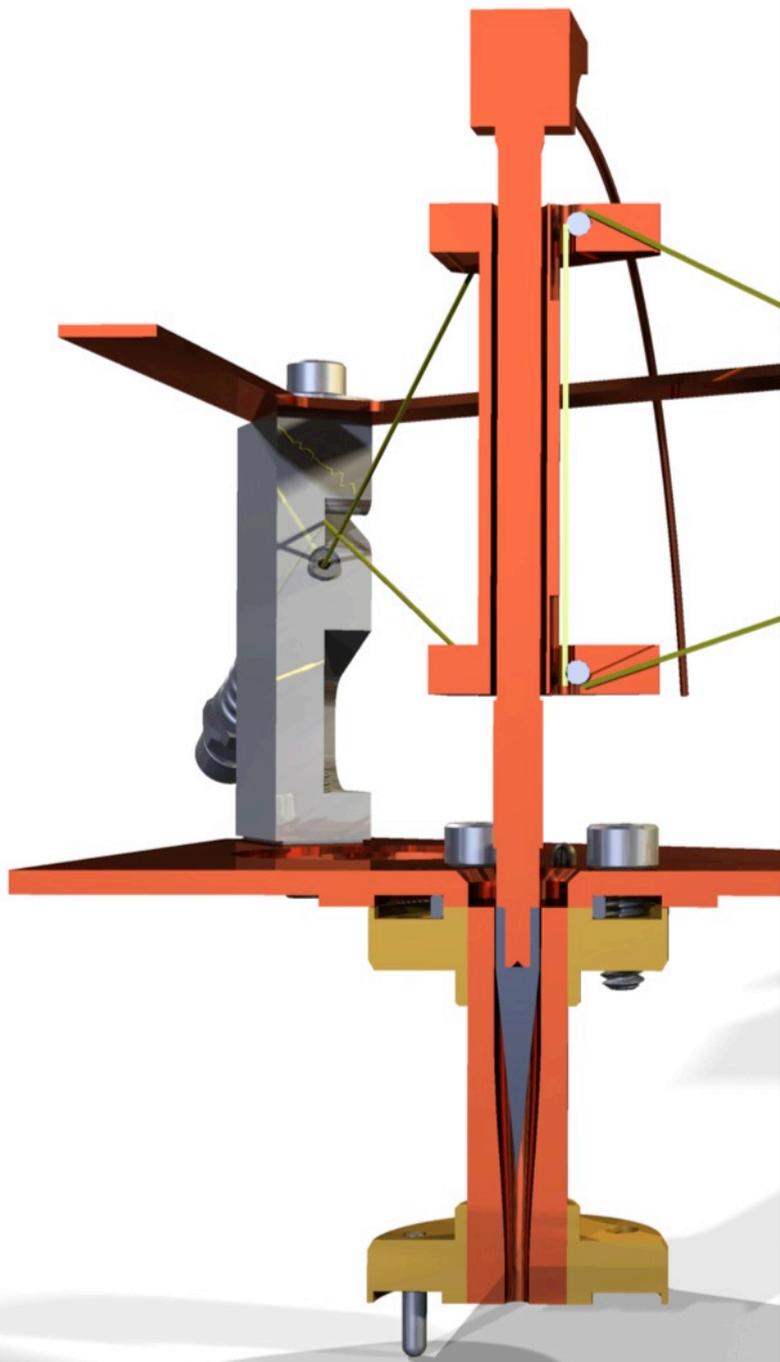
But only if the detectors behave predictably – so how do we accomplish this?

# Testing!

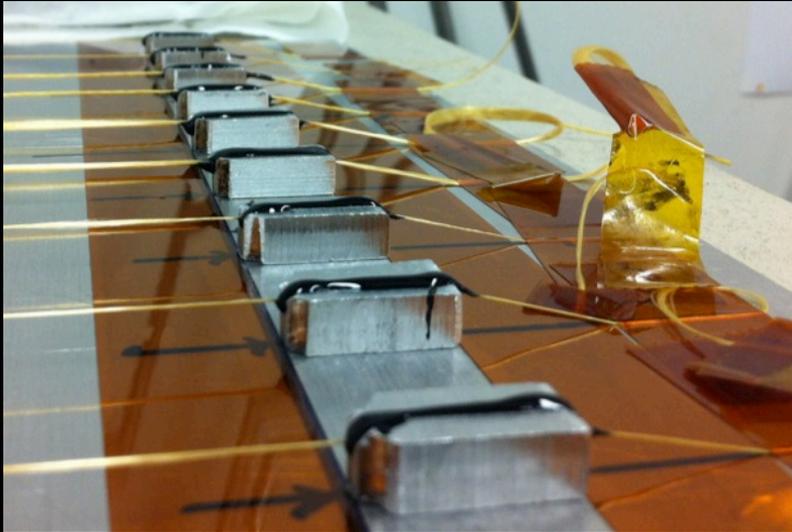




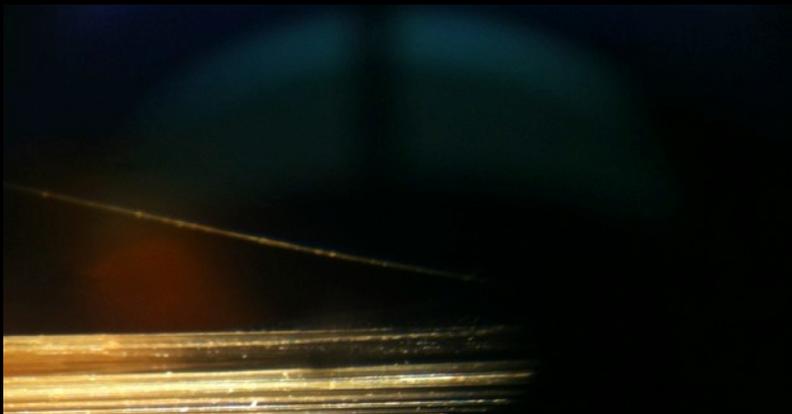




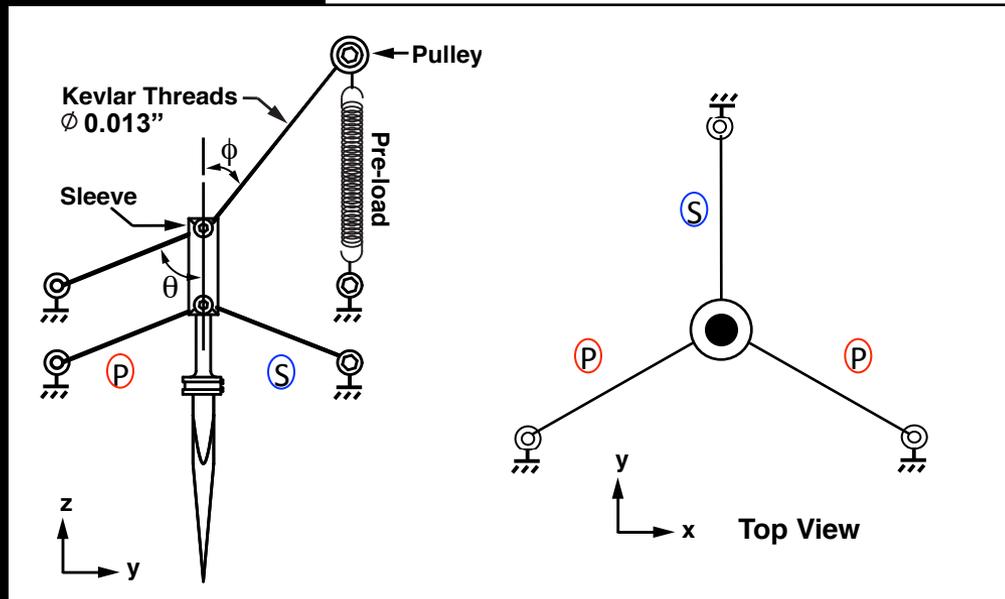
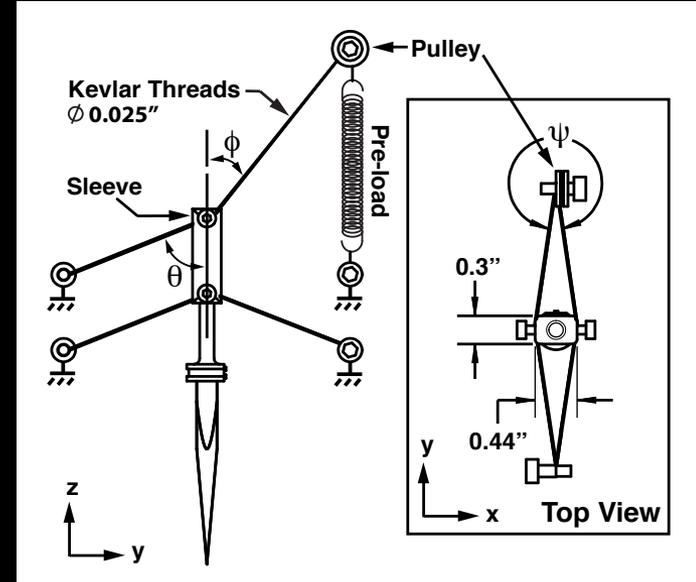
# Innovations



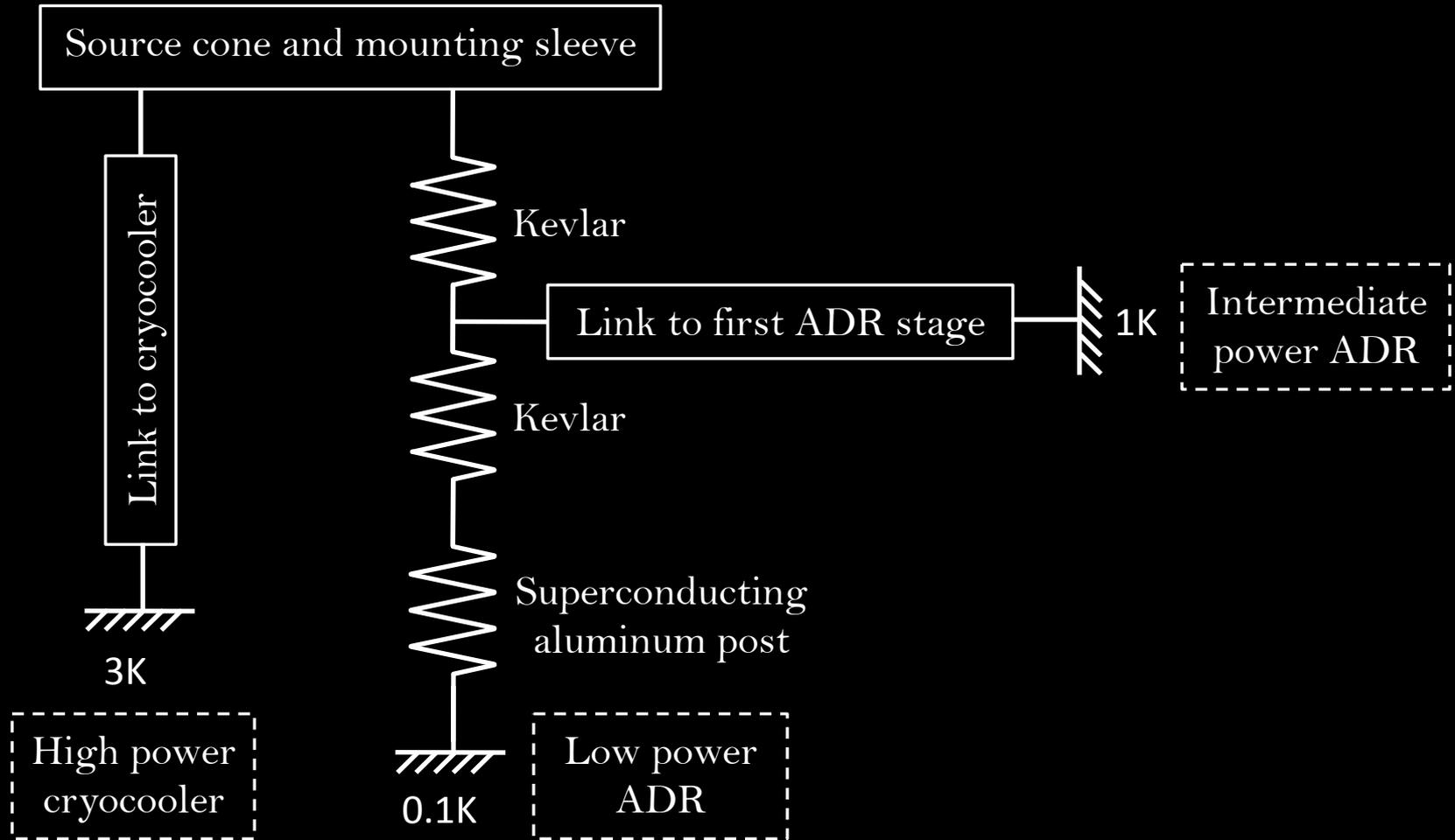
Improved Kevlar bonding



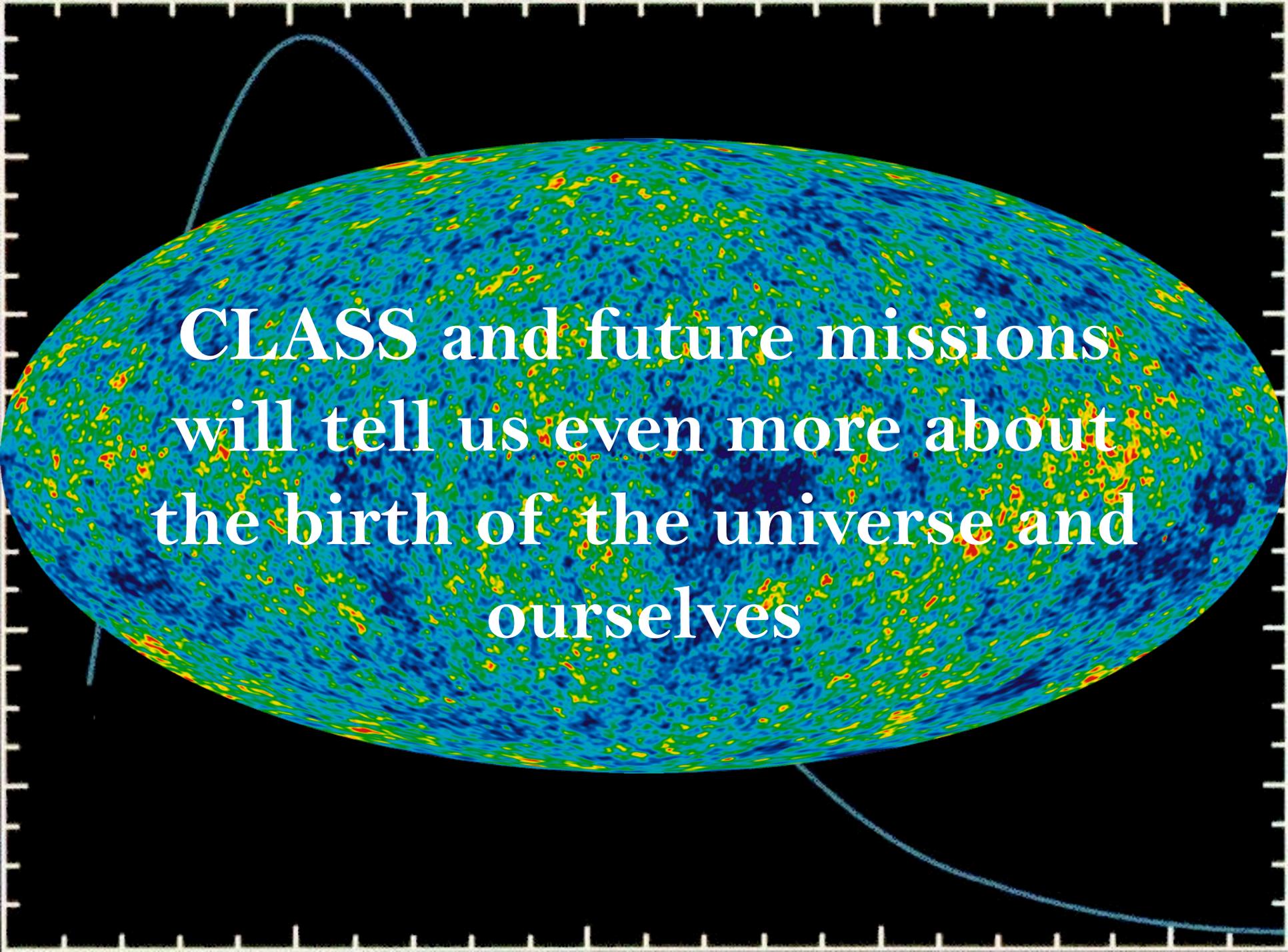
Reduction  
to six  
threads  
from eight



# Thermal Circuit



Thinner Kevlar and aluminum posts will provide hold times 2-3 times longer than the existing design

The image features a Cosmic Microwave Background (CMB) fluctuation map, which is a color-coded representation of temperature variations across the sky. The map is centered and occupies most of the frame, showing a complex pattern of blue, green, yellow, and red spots. The background is black with a white grid of tick marks. Overlaid on the map is a white text box containing the following text:

**CLASS and future missions  
will tell us even more about  
the birth of the universe and  
ourselves**

# Acknowledgements

- Dave Chuss, Ed Wollack, Karwan Rostem, Felipe Colazo Petit, Matthew Francom – NASA GSFC
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- The SPS interns
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