

# The broadband anti-reflection coated extended hemispherical silicon lenses for POLARBEAR-2 Experiment

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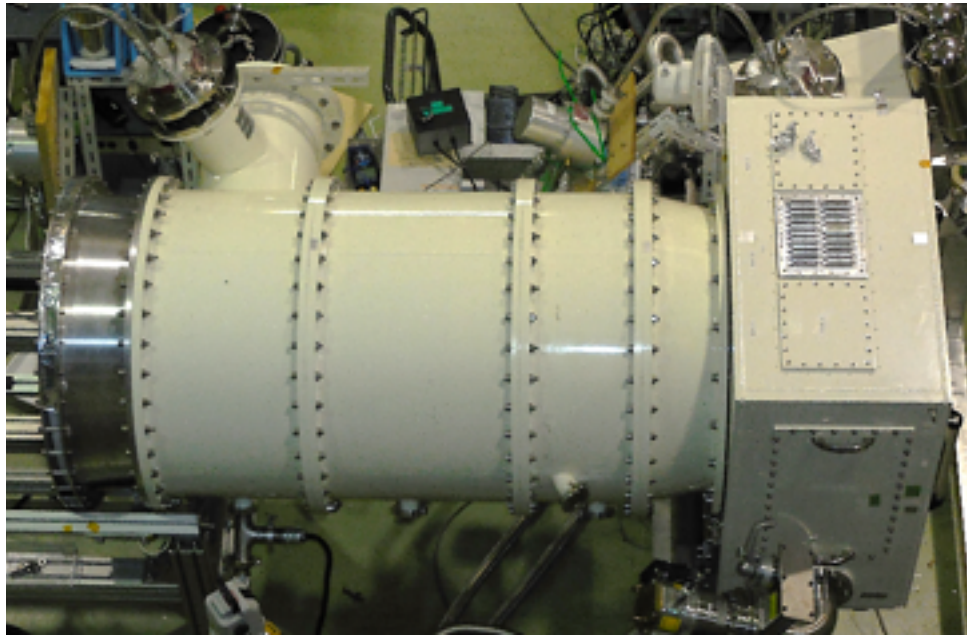
UC San Diego

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# The broadband AR coated extended hemispherical silicon lenses for PB-2

## MOTIVATION



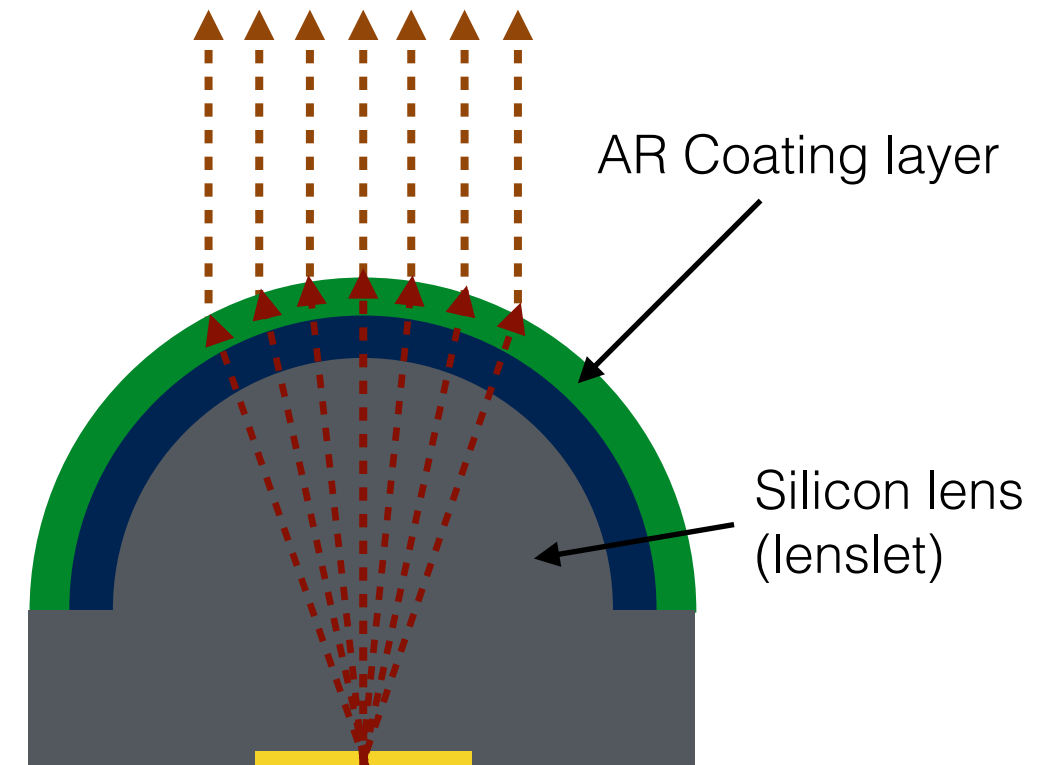
POLARBEAR-2 receiver

### Challenging

- Applying on a small curvature surface (diameter = 5.346 mm)
- Broadband frequency (95 GHz and 150 GHz)
- Mass-produceable (1897 pixels)

More detail : **Aritoki Suzuki** *4.2 mm & submm astronomy*  
“Polarbear-2 and Simon Array project”

**Praween Siritanasak**

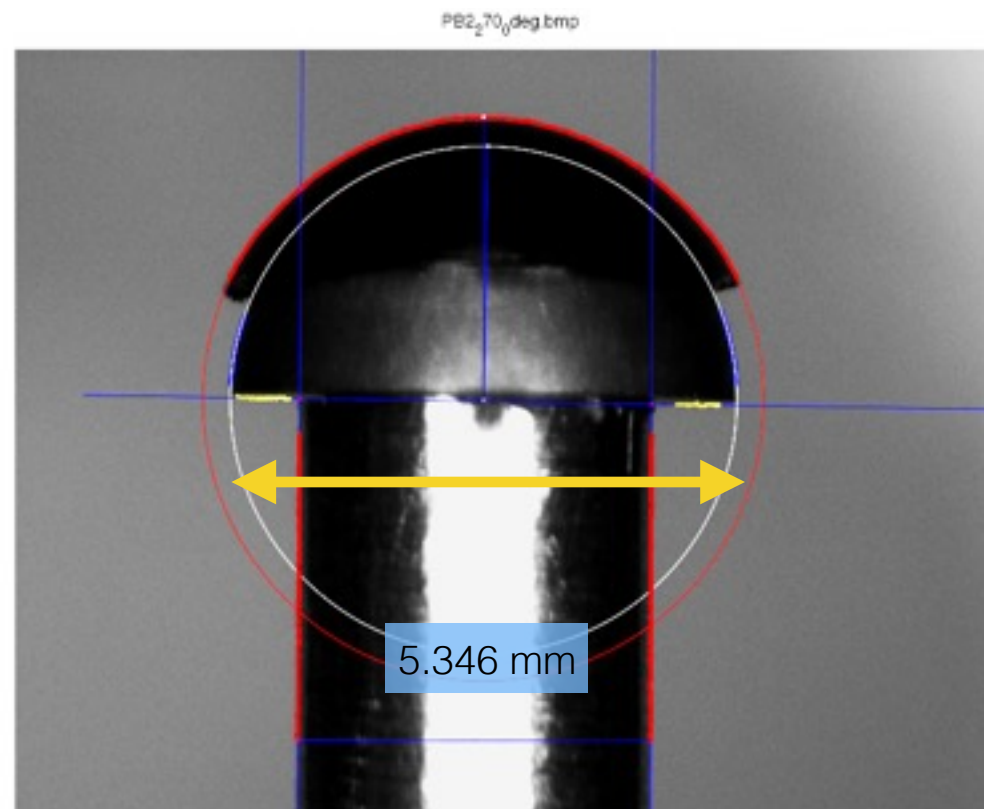
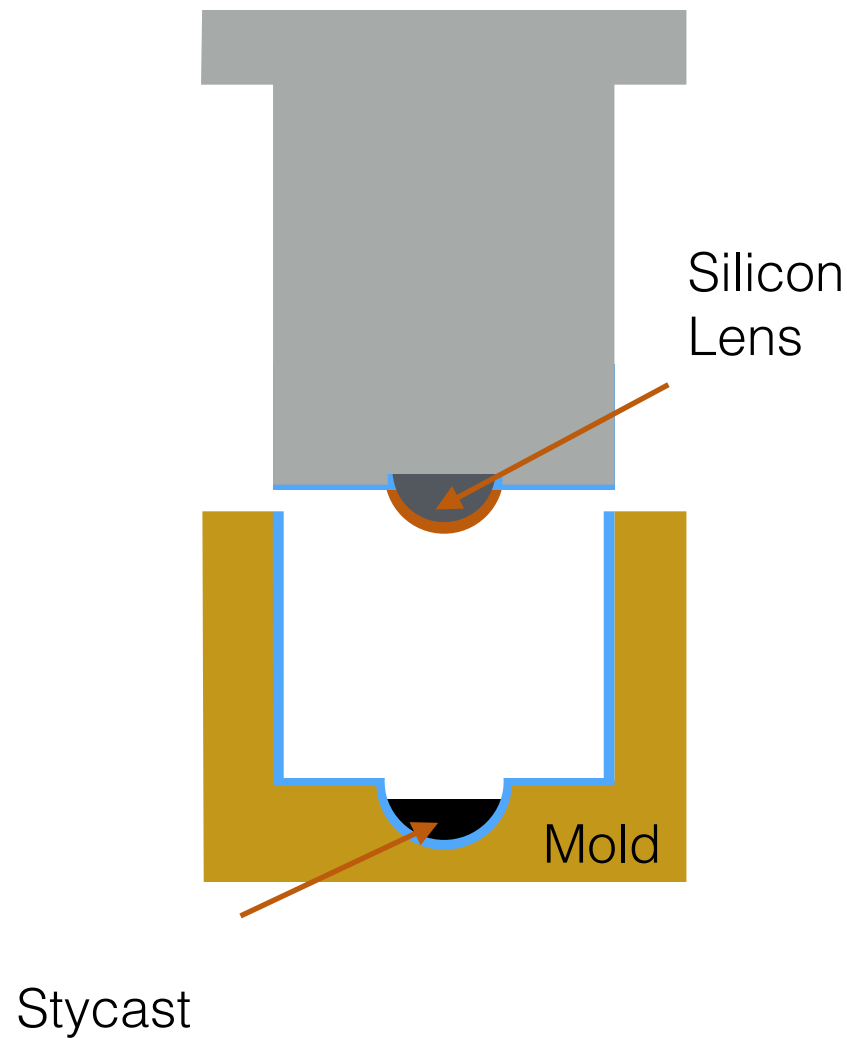


Sinuous antenna

More detail : **Ben Westbrook** *G2.20 Macrobolometers* “Development of the Next Generation of Multi-chroic Antenna Coupled Transition Edge Sensor Detectors for CMB Polarimetry”

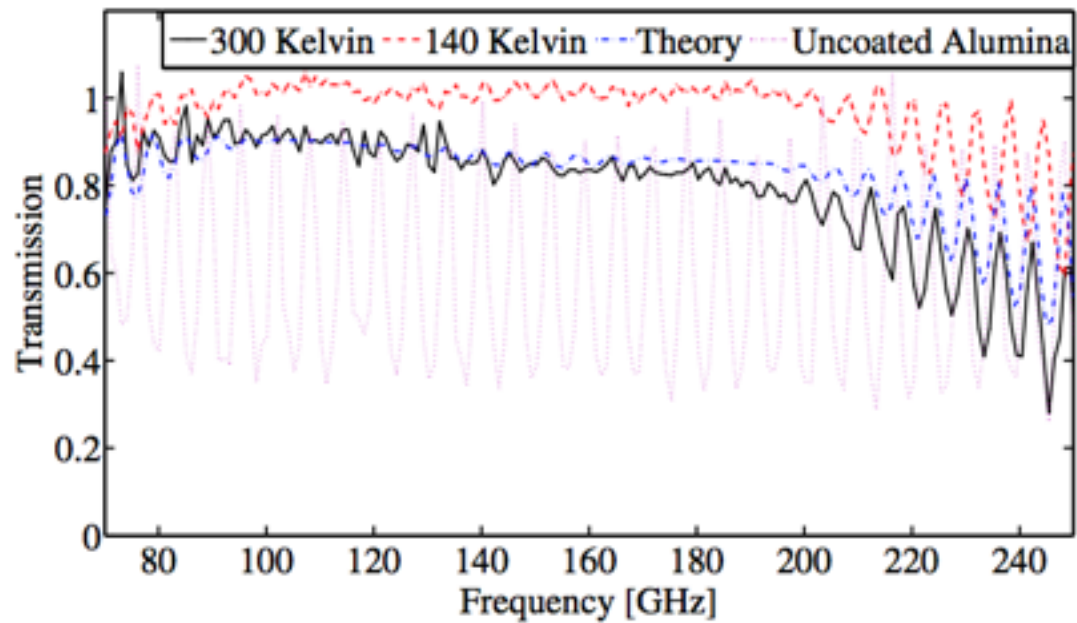
## METHOD

- Molding method
  - precise machine shop
- 2-Layer AR coating
  - Stycast2850 FT as 1<sup>st</sup> layer
  - Stycast1090 as 2<sup>nd</sup> layer

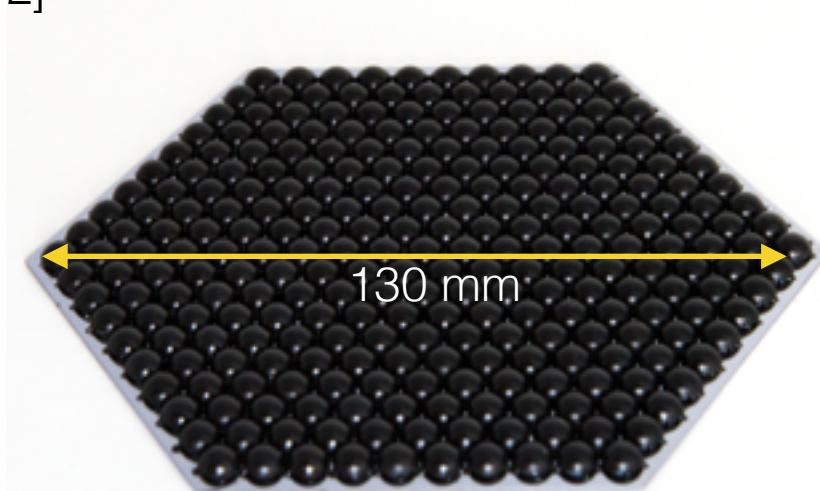


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## RESULT

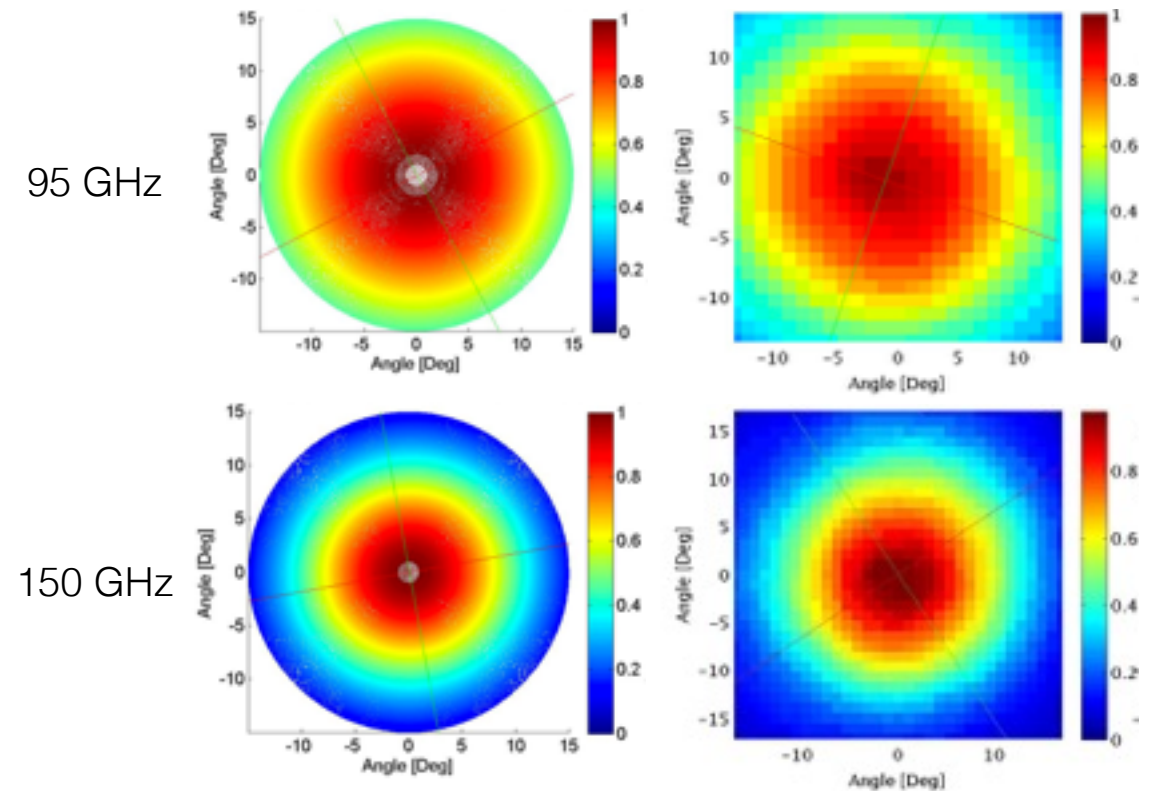


Transmission spectra of two-layer AR coating on an alumina disk at 300K and 140K [Rosen et al, 2012]



A full populated two-layer AR coating lenslet on silicon wafer.

A comparison beammap result



HFSS result

Beammap result

**See more detail : Poster G3.9**