Simons Array

• Located at the POLARBEAR Site; 5200 m in the Andes and the Atacama Desert of Northern Chile
• 3 polarization-sensitive, multi-chroic receivers
• PB2- A and B (95+150 GHz); PB2-C (220+270 GHz)
• Entire array will deploy ~23,000 bolometers
• Will observe the CMB and cosmic foreground to constrain cosmological parameters

Receiver & Focal Planes

• Each receiver houses a 7 sub-array focal plane assembled in closed-hex pattern
• Each sub-arrays has 271 pixels for a total of 1897 optical pixels in each focal plane
• Each pixel has two colors and two polarization for a total of 7,588 transition edge sensor bolometers
• Bolometers are read out using 40X digital frequency domain multiplexing

PB2-A Arrays

• SiOx as dielectric for the μ-strip
• Band position and shape are good
• $P_{\text{sat}}$ is with in our spec for leg lengths between 900 and 1400 um
• We have produced 7-arrays with an average warm TES yield of ≈ 93%

PB2-B Arrays

• 85% and 60% (for 90 and 150 Ghz) pixel efficiency using SiN as dielectric for the μ-strip
• Band position and shape are good
• Cross-under design works well

Production Status

PB2-A Candidate Wafers:

<table>
<thead>
<tr>
<th>Wafer</th>
<th>11.01</th>
<th>11.02</th>
<th>11.03</th>
<th>11.04</th>
<th>11.05</th>
<th>11.06</th>
<th>11.08</th>
</tr>
</thead>
<tbody>
<tr>
<td>TES Warm Yield (%)</td>
<td>92.5</td>
<td>95.7</td>
<td>93.5</td>
<td>88.2</td>
<td>95.0</td>
<td>90.2</td>
<td>94.0</td>
</tr>
</tbody>
</table>

PB2-B Wafer Production Status:

• Two prototype nitride arrays fabricated
• Production batch of 6 ready early August

PB2-C Wafer Production Status:

• Prototype 220/270 GHz pixels fabricated
• Characterization on going

The POLARBEAR Collaboration