

# **SUPERCONDUCTING HOT ELECTRON BOLOMETERS ON FREESTANDING SILICON NITRIDE MEMBRANE STRIPS USING FLIP-CHIP MOUNTING**

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We report on a novel fabrication scheme for 1.9 THz waveguide mixers for SOFIA, where Hot Electron Bolometer mixers (HEB) or SIS mixers are fabricated on 2  $\mu\text{m}$  thick  $\text{Si}_3\text{N}_4$  membrane strips. The strips are robust enough to be mounted on a separately fabricated Si support frame using an adapted flip-chip technology. Mounted onto the frame, the devices can be easily positioned and glued into a copper fixed tuned waveguide mount. Fabricating the large frames and the tiny  $\text{Si}_3\text{N}_4$ -strips separately requires significantly less space on the device wafer, allowing many more devices per wafer.

This concept is currently being tested in an 800 GHz prototype mixer with a HEB device. We have demonstrated that the cooling of the device via membrane and RF filter metalization is sufficient, by comparing the R versus T measurements in Helium atmosphere and in vacuum. Heterodyne and Fourier transform spectroscopy measurements are currently set up.

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