



Fabrication and test of large area spider-web multi-mode bolometers for CMB polarization measurements.

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Detecting the primordial 'B-mode' polarization of the Cosmic Microwave Background (CMB) is one of the major challenges of modern observational cosmology. Microwave telescopes need sensitive cryogenic bolometers with an overall equivalent noise temperature in the nK range. In this poster, we present the development status of multimode spider-web bolometers for the balloon-born mission "Large Scale Polarization Explorer" (LSPE). This approach gives larger signal to noise ratio and it is not a limitation for the science goal of detecting B mode. Multimode bolometers have large area, about 1 cm², that imply additional fabrication challenges. The spider-web is a suspended Si₃N₄ 1 μm thick and 8 mm diameter with mesh size of 250 μm. They are designed in order to couple with approximately the first 20 modes of the cavity at about 140 GHz. The thermal sensitive element is a superconducting Mo-Au bilayer Transition Edge Sensor (TES) at the center of the bolometer that is tuned to have a transition temperature of 500 mK. We present the fabrication process with micro machining techniques from silicon wafer covered with SiO₂ - Si₃N₄ CVD thick films, 0.3 μm and 1 μm respectively and preliminary testes