



## High Density, Low Heat Load Superconducting Flex Cables for Cryogenic Microwave Readouts

**Main author:**

WALTER Alex B.

**Co-authors:**

Bockstiegel Clint, University of California Santa Barbara

Daal Miguel, University of California Berkeley

Mazin Benjamin A., University of California Santa Barbara

Walter Alex B., University of California Santa Barbara

We present S-parameter measurements and heat load calculations of superconducting flex cables at sub-Kelvin temperatures. The cables are custom designed with a NbTi ground plane, a flexible substrate, and microstrip NbTi traces wirebonded to a microstrip to coax transition PCB. Our measurements show better than -3 dB transmission loss and -30 dB nearest neighbor crosstalk at 8 GHz for a 22 cm flex cable. The heat load from 4 K to 100 mK, assuming thermalization at an intermediate 800 mK stage such as in a two stage ADR, is about 7.7 uW-cm and is dominated by the dielectric. Multiple designs were considered including various trace pitches, and dielectric materials.