

Abstract Submitted  
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**Josephson STM at mK temperatures: Coupling to the electronic environment**<sup>1</sup> MICHAEL DREYER, RAMI DANA, WAN-TING LIAO, CRIS LOBB, FRED WELLSTOOD, BOB ANDERSON, University of Maryland — Ultra-small Josephson junctions can couple to modes in the electronic environment. This leads to sub-gap peaks in the I(V) curve in addition to the phase diffuse supercurrent. The I(V) curve can - in principle - be explained by P(E) theory [1] which describes the probability of tunneling at energy E. A recent study [2] showed that antenna modes of the STM tips could be responsible for the observed sideband structures. In our case the explanation appears to be less simple. We employ a dual tip STM at a temperature of 30 mK [3]. The I(V) spectra of the two tips show distinct patterns with only one shared mode. While the supercurrent branch for the "inner" tip is visible, it is obscured by a resonance for the outer tip. Possible causes and applications to other systems will be discussed. [1] G.-L. Ingold, H. Grabert, U. Eberhardt, PRB 50(1), 395 (1994) [2] Berthold Jäck, et. al., Appl. Phys. Lett. 106, 013109 (2015) [3] Anita Roychowdhury, et. al., Rev. Sci. Inst., 85, 043706 (2014)

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