

Abstract Submitted  
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**Dynamic calibration and modeling of a cold wire for temperature measurement**<sup>1</sup> GILAD ARWATZ, CARLA BAHRI, Princeton University, ALEXANDER SMITS, Princeton University, Princeton NJ 08544, U.S.A and Monash University, VIC 3800, Australia, MARCUS HULTMARK, Princeton University — The dynamical behavior of cold wires and their supporting structure is investigated. It is shown that conventional cold wires are slower than previously believed, which can cause substantial inaccuracies in temperature data. A new method for accurate temperature measurements using cold wires is presented. A lumped parameter model that accounts for the effects of end conduction on wire response is developed. To verify and validate the model, an experimental investigation is conducted where the frequency response of the wire is investigated under different heating conditions. The response obtained from the model is compared to experimental results with convincing agreement. The new model can be used to correct data acquired with conventional cold wire sensors, with non-negligible end-conduction effects, so that accurate measurements can be obtained. Lastly, the new model can be used to design a new temperature sensor that has a better frequency response when compared to conventional cold-wires.

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