Wybourne and Kanskar Reply: In our recent Letter [1] we observed that at temperatures below 1 K the temperature of the electrons, T_e, in metal wires of length L was determined by the voltage V applied across the wires rather than by the electric field, $E = V/L$. As the voltage was increased, a crossover was observed to a regime in which the electron temperature was determined by the electric field. We interpreted this crossover behavior as a change from dissipationless to dissipative transport. By dissipationless transport we mean that the relaxation length characteristic of energy relaxation to phonons $l_i > L$. Crossover to the dissipative regime occurs when $l_i \approx L$, that is, when phonon emission in the wire becomes likely. In the dissipationless regime the relationship $V \approx 3(k/e)T_e$ was found which we compared to an earlier result [2] that gave a similar slope, but was based inappropriately on cooling by phonons. As pointed out by Prober [3] and shown sometime earlier for free-standing electron wires [4], diffusion out of the wires removes energy from the electron system and results in a nonuniform electron temperature profile along the length of the wire. Solving the electron diffusion equation along the wire and using the Weidemann-Franz relation, the electron temperature profile is [4]

$$T_e^2(x) = T_s^2 + \frac{3}{\pi^2}\left(\frac{e}{k}\right)^2 E^2(Lx - x^2), \qquad (1)$$

where T_s is the lattice temperature. Therefore, the maximum electron temperature is described by

$$(kT_{e\,\max})^2 = (kT_s)^2 + \frac{3}{4\pi^2}(eEL)^2. \qquad (2)$$

To characterize the electron heating, in the Letter [1] we used a critical electric field defined as the field at which the heating due to the field and lattice was equal, as indicated in the inset to Fig. 1 of Ref. [1]. Using this definition Eq. (2) gives a slope of $2.56(k/e)$, which is close to the observed value and to the result obtained by Prober's argument. Using the average electron temperature, the numerical factor is about 3.2. While this explanation predicts a slope close to that observed, we note that Eq. (2) does not appear to explain the rapid onset of the electron heating observed in the experiments.

In summary, while the experimental conclusion of our Letter remains unchanged, we agree with Prober's comment that the scaling observed in the regime of long electron-phonon relaxation length can be interpreted in terms of the Weidemann-Franz relation.

We thank Professor Prober for bringing this point to our attention.

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