Arutyunov and Lehtinen Reply: We are very pleased that our decade old paper [1] stimulates scientific discussion [2]. Since that time the new results were obtained [3] with a better understanding of the quantum phase slip (QPS) process [4].

(i) The *overheating* due to the dissipation of Joule power $P = \mathrm{IV}$ [2] is correct only in the case of a dc electric current through an ohmic element. In a QPS junction [1] phase slips contribute to time-averaged voltage $V \equiv \langle V(t) \rangle$ [5] and current originates from discrete "single Copper pair" transport $I \equiv \langle I(t) \rangle$. Hence, generally speaking, $P \neq \langle V(t) \rangle \langle I(t) \rangle$. Estimation [2] naively assumes that all power $P = \mathrm{IV}$ is dissipated inside a QPSJ as Joule heat, which is not correct. For example, in Josephson junctions (JJs) one can obtain high voltage and current [6], while the energy is dissipated in external (dissipative) circuit and/or removed by photon emission. The most probable mechanism of energy dissipation in QPSJ is the excitation of charge density waves [7,8] which is of primary importance for the QPS process [4,5,9,10].

(ii) Giant blockade and modulation voltages originally [1] were explained as "unintentionally formed weak links." However, only recently it became clear that it should be like this without assumption of any hypothetically formed weak links. Strong quantum fluctuations wipe out phase coherence at distances and L_c and yield an effective localization of Cooper pairs [4,10]. Hence, the system splits into $\sim(L/L_c)$ domains connected in a series leading to integral insulating behavior. In the thinnest nanowires [1] L_c is of the order of coherence length ξ. The corresponding Coulomb gap is $V_{\mathrm{CB}} \sim (L/\xi)(\Delta/e) \sim 250(\Delta/e) \approx 15\,\mathrm{mV}$. Certainly, this observation does not remove the original scenario [1] with unintentionally formed tunnel junctions, but clearly demonstrates that in a long QPS nanowire the Coulomb gap can be significantly larger than the superconducting energy gap Δ.

(iii) The period of Coulomb gap modulation ΔV_{gate} is determined by the capacitance of gate-island, with an effective dimension of the latter $\sim L_c$: $C_{\text{gate-island}} \sim C_{\text{gate-wire}}(L_c/L) \sim 6 \times 10^{-16} \times (80\ \mathrm{nm}/20\ \mu\mathrm{m}) \sim 2.4 \times 10^{-18}$ F, corresponding to the observed $\Delta V_{\mathrm{gate}} \sim 100$ mV for Sec. 1, and ~20 mV for the closer Sec. 23 [Fig. 3(a), inset]. For a QPSJ the relevant condition for observation of Bloch oscillations deals not with charging E_C and Josephson E_J energies [2], but with the relation of dual quantities inductive E_L and QPS E_{QPS} energies [11].

(iv) *Material.*—Numerous structures fabricated using similar technology as [1] exhibited clear superconducting transition, though noticeably broadened due to QPS effect [12]. All structures in normal state demonstrate ohmic behavior: linear dependence of resistance vs inverse cross section. Indeed, the T_c of the thinnest titanium structures is reduced (compared to bulk), but it is not a sign of degradation. Variation of T_c in low-dimensional superconductors is known for decades [13].

Summarizing, we firmly state that "… our experiment is clear evidence of Bloch oscillations," which is the central novelty point of our Letter [1] published a decade ago. The physics of ultranarrow *long* superconducting nanowires studied in [1] (and presumably in [14–16]), should be analyzed based on recent advanced approach [4,10], and not using simplified considerations [2], which might work for static JJ or very short QPSJ (e.g., Ref. [5] from [2]).

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