Schäfer *et al.* Reply: In their Comment on the Au-induced nanowires on Ge(001) [1], van Houselt *et al.* question the inhomogeneity of the differential tunneling conductivity. As reported by us [2], metallic states exist, suggestive of one-dimensional (1D) electronic behavior. We welcome an independent inspection [1], which gives us the opportunity to clarify some important aspects.

For measuring dI/dV, the authors take the stance that an *identical setpoint* should be used on-wire and off-wire [1]. Yet for different sample areas [with different local density of states (LDOS)], one must realize that by choice of setpoint $I_0(V_0)$, a *scaling operation* of the signal under scrutiny (assigned as LDOS) is performed. In comparing areas which conduct either well (metal) or poorly, respectively, the scaling will wrongly make their LDOS look alike.

In this awareness, in Fig. 4(a) of Ref. [2], we aimed at a more appropriate setpoint with $+0.1$ V on-wire and -0.6 V off-wire (at 0.3 nA each). The latter setpoint allows for a low LDOS in the bulk band gap of Ge (0.7 eV), also roughly comparing to the low DOS window at the insulating surface of plain Ge(001) [3]. The anisotropic result in Fig. 4(a) may be considered an estimate, for assumptions consistent with angle-resolved photoelectron spectroscopy (ARPES) referred to below. We thank the authors of Ref. [1] for pointing out that one cannot obtain a quantitative measure of the inhomogeneous tunneling conductance on and off the wires from scanning tunneling spectroscopy (STS) alone, but at best a qualitative picture. It emerges that due to this methodical difficulty, one must include other techniques.

A further problem is inherent in using the normalized differential conductance (NDC) in [1] as an alternative measure of the LDOS (rather than dI/dV directly). This can lead to artifacts in the spectra [4] and distorts the DOS at the Fermi level. As a mathematical consequence of its definition NDC $= (dI/dV)/(I/V)$, it follows that NDC $=$ 1 at zero bias [5]. This falsely eliminates any energy gaps. The NDC curves of Fig. 2(d) in [1] must hence coincide around E_F, thereby suppressing the effect under study.

Independent information on the band situation comes from ARPES. Here one detects only one metallic band [see Fig. 4(b) in [2]], and its dispersion does not vary perpendicular to the chain direction, leading to strictly 1D Fermi surface sheets [6]. Thus, while the van Houselt group claims the surface was ''only marginally'' metallic [7], the ARPES data provide evidence to the contrary.

An important consideration in tunneling spectroscopy is the *substrate* contribution. A low substrate conductivity can seriously distort the spectra [8]. Notably, a resistivity of 25 Ω cm used in [1] corresponds to an impurity concentration of $\sim 10^{14}$ cm^{-3} (close to the intrinsic carrier concentration) and renders the substrate virtually insulating. In contrast, we used moderately n-doped substrates of 0.4 Ω cm ($\sim 10^{16}$ cm^{-3}). Exceedingly low substrate conductivity as in [1] in the presence of surface states implies a large space charge layer with concomitant band bending. In tunneling spectroscopy, a voltage drop results [8] so that spectral features can shift as much as ~ 1 eV. A second effect is that the substrate limits the electron transport, and current saturation will occur. These correlations are well documented for various semiconducting substrates [8,9], including n-doped situations with a metallic surface band pinning the Fermi level, as in the present case.

In then looking at the STS spectra of van Houselt *et al.* in [1], Fig. 2, as well as in [7], Fig. 5, it becomes apparent that the dI/dV spectra look largely different from ours in the whole energy range (-0.3 V to $+0.3$ V). One also notes that at 77 K in [7], the spectra radically change, opening a gaplike feature of ~ 0.2 eV width below E_F. This may reflect temperature-dependent changes in the substrate, for low doping known to affect both the Fermi level position and the space charge layer. In view of this situation, a direct comparison of different samples in [1] and [2] seems not very meaningful.

Hence, this analysis shines light upon the implications of tunneling conductance measurements, and it points at a high substrate impedance as a source of deviant results. Combining different spectroscopic techniques, our accumulated evidence on the nanowire electronic behavior unambiguously argues towards a 1D electron liquid.

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