Gershoni *et al.* Reply: Kash, Mahoney, and Cox[1] (KMC) raise three points: (1) That our experimental observations may be due mainly to roughness and well-width fluctuations caused by nonstandard epitaxial growth on a (110) cleaved substrate. (2) That anisotropic strain by itself is sufficient to cause anisotropy in the polarization of optical transitions even in the absence of confinement. (3) That their finite-element analysis predicts essentially no strain modulation in our structures. Below, we address each of these points:

(1) Since high-quality epitaxial growth of samples on a (110) cleaved substrate is novel, we characterized our samples very carefully. Using cathodoluminescence (CL), photoluminescence (PL), PL excitation (PLE), mobility measurements, and transmission electron microscopy,[2-4] we rule out any "unusual growth phenomena" leading to *chaotic* behavior such as suggested by KMC. On the contrary, the morphology, the PL linewidths (4 meV), the Stokes shift (3 meV), and the mobility (6.1×10^5 cm^2/Vs) indicate a truly high-quality material. It is impossible that the large red shifts between the optical transitions of the strained quantum wires (SQWRs) and those of the quantum wells (QWs) are due to roughness, because first, almost no linewidth broadening of the CL spectra is observed. Second, the relative energy shifts of 28 (17) meV for the light- (heavy-) hole transitions observed in the SQWRs (Ref. 2) are much larger than either the observed CL and PLE linewidths, or the observed Stokes shifts. Third, the shifts were determined by comparison between PLE spectra. PLE probes directly the density of states, and unlike PL, it is not sensitive to extrinsic or low-energy states which are produced by roughness.

(2) It is well known that anisotropic strain can produce optical polarization anisotropies.[5] In our Letter [Fig. 3(b)] we calculated what these polarizations should be in presence of the strain- *and* composition-induced confinement. The agreement with experiment indicates that we correctly estimated the strain. In addition, the strain-induced lateral confinement alters the symmetry of the envelope functions.[6] This leads to different polarization behavior of transitions belonging to the *same* band.

(3) We clearly stated[2,4] that our results were surprising since estimations based on continuum elasticity do suggest that the strain should decay away from the substrate. Our data do not support such decay: The second quantum well was deliberately placed further away from the substrate in order to address this problem. It showed shifts very similar to the first, closer one. Though our estimation[7] of the strain field in the QW plane is much larger than that of KMC, it is still too small to explain the observations.

To better convince ourselves that the strain does penetrate, we repeated the experiment reported in Ref. 2 using only four $In_{0.15}Ga_{0.85}As$ strained layers in the cleaved substrate. The layers are 10, 20, 40, and 80 Å wide, separated 500 Å apart, and capped with a 2-μm-thick GaAs layer. Clearly, in this case, relaxation of strain according to the conventional calculation would yield no shifts at all. Figure 1 displays CL spectra obtained from the (110) regrown facet of the sample, at various positions of the exciting electron beam. The spectra are dominated by two peaks due to radiative recombination of carriers within the (110) QWs. When the electron beam is over the strained layers, each peak develops redshifted satellites. The strain now is larger than before,[2,4] and the shifts (~35 meV) are also much larger. This proves that a single strained layer of 80 Å or less can dramatically change the band structure of an epitaxial layer pseudomorphically grown up to 500 Å above it.

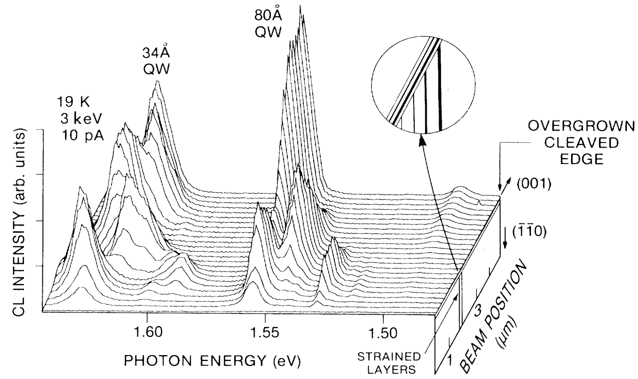

FIG. 1. CL spectra of the regrown (110) cleaved edge vs distance from the (001) face. The beam is incident normal to the cleaved edge. The layers are drawn to scale.

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