Kash, Tsang, and Ulbrich Reply: In their Comment[1] on our recent Letter,[2] Alekseev and Mirlin (AM) present two criticisms. The first concerns our choice of effective mass for the hydrogenic wave function for a hole bound to an acceptor. The effective-mass approximation should be valid since the optically excited electrons are always at wave vectors less than 10% of the zone edge. AM, however, prefer a much heavier mass (0.64 vs 0.31), which would lead to faster intervalley scattering rates when analyzing the "direct" spectra [Fig. 2(a) of Ref. 2]. We note that our derived intervalley scattering rates came from *two* separate determinations which give consistent results. Our analysis of the "reentrant" spectra [Fig. 2(b) of Ref. 2] does *not* require the form of the acceptor wave function and gives scattering rates consistent with our analysis of the direct spectra. Further, we indicated in our Letter that an acceptor mass of 0.31 is required to give a good fit to the direct spectra for laser photon energies between 1.56 and 1.88 eV. For this range of photon energies, no intervalley scattering is allowed, the electron scattering is dominated by the emission of LO phonons, and the excitation energy dependence of the intensity of the direct spectra is determined solely by the acceptor wave function. In Fig. 1 here, we explicitly show this region. The predicted intensity from Eq. (1) of Ref. 2 is given as the solid curve for our choice of effective mass, while using the mass preferred by AM leads to the dashed curve. The dotted curve includes contributions from both heavy- and light-hole masses (0.64 and 0.11), using Eq. (2) of AM. Neither the dashed nor the dotted curve gives a good fit to the data for photon energies below 1.88 eV, while the solid curve fits well, confirming our choice of acceptor mass for this experiment. If, in spite of the poor fit to the data below 1.88 eV, one insists on using the masses of AM, the intervalley scattering rates would be about 3 times faster than our determination. Such fast scattering rates are inconsistent with our analysis of the reentrant spectra. We therefore still believe that the intervalley scattering rates determined in our paper are correct.

AM also question using the line shape of the hot (e,A^0) emission to place a lower bound on the electron-scattering time. Our qualitative discussion of this point is not crucial to the quantitative determination of the intervalley scattering rates, although we note that Fasol *et al.*[3] have recently used a 16×16 $\mathbf{k}\cdot\mathbf{p}$ calculation to make a quantitative fit to the line shape and determine scattering times. AM argue that the zero-phonon peak is Raman scattering as opposed to hot luminescence, and therefore, the electron lifetime does not enter into the line shape. We note, however, that the other peaks, and the reentrant spectrum are truly hot luminescence. These peaks have the same line shape as the zero-phonon peak which suggests that the zero-phonon line is in fact hot luminescence. Alternately, analysis of the line shape of these other peaks gives the same qualitative results.

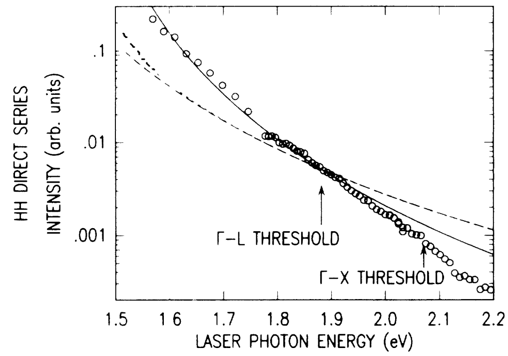

FIG. 1. The dependence of the intensity (integrated area) of hot (e,A^0) luminescence in GaAs on the laser photon energy. The data (open circles) give the integrated area of the highest-energy (i.e., zero-phonon) HH-direct-series peak, normalized to constant laser photon flux. The solid curve is the predicted variation of the intensities of these peaks from Eq. (1) of Ref. 2 with an acceptor mass of 0.31 and binding energy of 0.027 eV. The dashed curve corresponds to a mass of 0.64 and binding energy of 0.031 eV, as proposed by AM. The dotted curve includes both a light-hole mass of 0.11 and a heavy-hole mass of 0.64, both with a binding energy of 0.031 eV, from Eq. (2) of AM. All curves are scaled to pass through the data at 1.88 eV and assume a constant electron-scattering time (i.e., no intervalley scattering).

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