Nonthermal Equilibrium Fluctuations of Electrons and Holes, K. M. VAN VLIET [Phys. Rev. **133**, A1182 (1964)]. In order to arrive at the expression for the variance, Eq. (3.5), the term κn_0 in the matrix element a_{22} as given by (3.2) was neglected, as well as other terms of the order κ/δ in the final result. A vital term $n_0^2 i_0$ should at least be restored to the numerator of (3.5).

However, it is now clear that seemingly small approximations in the elements of the matrices considered may grossly affect the final result. Thus, the exact solution of Eqs. (1.5), (3.2), and (3.3) using (3.4) to eliminate κ/δ is found to be

$$\frac{\langle \Delta n^2\rangle}{n_0}=\frac{(I-i_0)^2(n_0+2i_0)(n_0^2+i_0^2+3n_0i_0)+(I-i_0)n_0i_0(n_0^2+3i_0^2+4i_0n_0)+n_0i_0^2(n_0+i_0)^2}{(I-i_0)^2(n_0+2i_0)(n_0^2+i_0^2+3n_0i_0)+(I-i_0)n_0i_0(2n_0^2+3i_0^2+6i_0n_0)+n_0^2i_0^2(n_0+i_0)}, \tag{3.5a}$$

and the result corresponding to (3.8) is

$$\frac{\langle \Delta n^2\rangle}{n_0}=\frac{k^2(q+2)(q^2+3q+1)+kq(q^2+4q+3)+q(q+1)^2}{k^2(q+2)(q^2+3q+1)+kq(2q^2+6q+3)+q^2(q+1)}. \tag{3.8a}$$

This may also be put in a form suggested by Burgess,

$$\frac{\langle \Delta n^2\rangle}{n_0}=1+\frac{-q^3k+q^2(1-2k)+q}{[q^2(k+1)+q(3k+1)+k][q(1+k)+2k]}. \tag{3.8b}$$

It is, indeed, astounding, that the *simplest possible nonequilibrium model* leads to a variance as complex as given here.

The condition for super-Poissonian fluctuations to occur is

$$1+q(1-2k)-q^2k>0,$$

or

$$kq<(1+q)/(2+q)\approx \text{order } 1.$$

Equation (3.12) shows in turn that if the cross section ratio y be such that $y<\frac{1}{2}$, then a range exists $q<(1-2y)/y$, in which the above condition is satisfied. A *sufficient* condition for *large* super-Poissonian fluctuations is $kq\ll 1$ which is satisfied in part of the superlinear photoconductance range, as stated in the text. The variance then approximates to Eq. (3.6) given there.

For very low light excitation, $q\ll 1$ and $k\gg 1$. In that case, $\langle \Delta n^2\rangle/n_0=1$, as before. However, for high light, $q\gg 1$ (or $n_0\gg i_0$), we now find for arbitrary k:

$$\frac{\langle \Delta n^2\rangle}{n_0}\approx\frac{(I-i_0)^2+(I-i_0)i_0+i_0^2}{(I-i_0)^2+2(I-i_0)i_0+i_0^2},$$

or

$$\frac{\langle \Delta n^2\rangle}{n_0}\approx\frac{k^2+k+1}{k^2+2k+1}=1-\frac{k}{k^2+2k+1}.$$

This reaches the high light asymptote unity if $k=(I-i_0)/i_0\to 0$ (small κ/δ) or if k becomes very large (large κ/δ). A minimal high light asymptote of 0.75 is observed for $k=1$, corresponding to $\kappa/\delta=1$ [see Eq. (3.12)].

Hence, in the computer solution, Fig. 4, the decreasing parts for high light are erroneous and should level off to these constant values [see improved Fig. 4(a)]. The result of Fig. 5 is still in close agreement with (3.5a) for $n_0/I\lesssim 10^{-1}$, approaching the asymptote 1 for higher values.

Recent experiments have substantiated the feasibility of this model.

I am greatly indebted to Professor R. E. Burgess of the University of British Columbia for pointing out this error and for correspondence on the present solution.

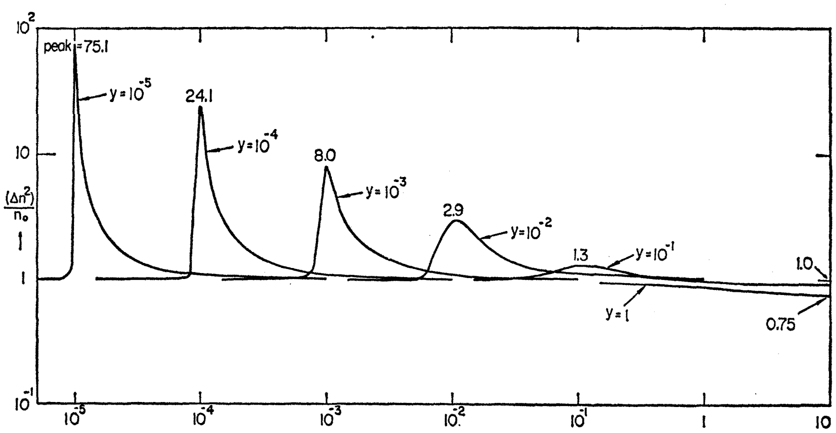

FIG. 4(a). The relative variance $\langle \Delta n^2\rangle/n_0$ versus $\mathfrak{L}$.