

LEAD SALT SEMICONDUCTOR LASER EMISSION LINESHAPE ANALYSIS

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The output power spectrum of a single frequency semiconductor laser was shown by Freed, et. al. in 1969 (1) and again in 1983 (2) to be Lorentzian. In the analysis of absorption line shapes and line strengths many groups continue to assume the emission line shape for the semiconductor laser is Doppler. We have measured the CO R(O) transition in the CO fundamental band at 4.7 microns at a gas temperature of 11 Kelvins with a total pressure less than 0.2 Torr. Our measurements suggest that the laser emission is Doppler with a width of approximately 0.000786 cm^{-1} for the particular laser we used in these experiments. The results of our analysis will be presented.

- (1) E.D. Hinckley and C. Freed, *Phys. Rev. Lett.* 23, 277 (1969)
- (2) C. Freed, J.W. Bielinski and W. Lo, *Proc. SPIE*, 438, 119 (1984)