LINE BROADENING AND SHIFTING OF THE RAMAN Q-BRANCH IN D_2 AND D_2-He MIXTURES AT LOW TEMPERATURES

S. HAMID FAKHR-ESLAM, GUY D. SHELDON, P. M. SINCLAIR, J. R. DRUMMOND, and A. D. MAY,
Department of Physics, University of Toronto, 60 St. George Street, Toronto, Ontario, M5S 1A7.

Using high resolution Raman gain spectroscopy, we have measured the broadening and shifting of Q(0) to Q(2) lines in D_2 and D_2-He mixtures at 250K, 200K, 150K, and 100.7K. At each temperature, the linear broadening and shifting coefficients were extrapolated to the case of infinite dilution, and compared with theoretical calculations. The calculated broadening and shifting coefficients are in a good agreement with our precise measurements.
The diffusion constants extracted from the linewidths are in agreement with mass diffusion constants at different temperatures. We have also observed a deviation from soft collision model in D_2 and D_2-He mixtures at low densities.