FUNDAMENTAL AND TORSIONAL COMBINATION BANDS OF N$_2$O-C$_2$H$_2$ AND N$_2$O-C$_2$D$_2$ IN THE N$_2$O $\nu_1$ REGION

M. DEHGHANY, MAHIN AFSHARI, J. N. OLIAEE, N. MOAZZEN-AHMADI, Department of Physics and Astronomy, University of Calgary, Calgary, AB T2N 1N4, CANADA; A.R.W. MCKELLAR, Steacie Institute for Molecular Sciences, National Research Council of Canada, Ottawa, ON K1A 0R6, CANADA.

Spectra of the weakly-bound N$_2$O-C$_2$H$_2$ and N$_2$O-C$_2$D$_2$ complexes in the region of the N$_2$O $\nu_1$ fundamental band (2224 cm$^{-1}$) are observed in a pulsed supersonic slit jet expansion probed with a tunable diode laser. Two bands are analyzed for each complex: the fundamental (N-N stretch), and a combination involving the intermolecular torsional (out-of-plane bend) vibration. The resulting torsional frequencies are 44.37 and 40.01 cm$^{-1}$ for the C$_2$H$_2$ and C$_2$D$_2$ complexes, respectively. This represents the first observation of the N$_2$O-C$_2$D$_2$ isotopomer, and the first direct determination of an intermolecular frequency for nitrous oxide - acetylene.