

MAGNETIC TRAPPING OF $^3\Sigma$ MOLECULES AND TIME-DOMAIN MEASUREMENT OF VIBRATIONAL LIFETIMES

WESLEY C. CAMPBELL, MATTHEW T. HUMMON, HSIN-I LU, LAURENS D. VAN BUUREN, EDEM
TSIKATA, and JOHN M. DOYLE, *Harvard-MIT Center for Ultracold Atoms, Cambridge, MA 02138.*

NH molecular radicals are magnetically trapped using helium buffer-gas loading at ~ 600 mK. The helium collision Zeeman relaxation and energy transport cross sections are measured, and the ratio of these cross sections is $\sigma_d/\sigma_{in} = 7 \times 10^4$, sufficient for trap lifetimes of order 1 s. The scaling of the helium-induced Zeeman relaxation of $^3\Sigma$ molecules is investigated by changing the radical rotational constant through isotopic substitution. We also measure the spontaneous emission lifetime of NH($X, v = 1$), providing a precision measurement of this transition strength for the astrophysical community.