

COLLISION-DEPENDENT LINE AREAS IN THE  $a^1\Delta_g \leftarrow X^3\Sigma_g^-$  BAND OF MOLECULAR OXYGEN

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We report precise line areas for individual rotationally resolved transitions within the  $a^1\Delta_g \leftarrow X^3\Sigma_g^-$  electronic band of molecular oxygen recorded as a function of pressure for both neat samples of O<sub>2</sub> as well as samples of O<sub>2</sub> dilute with a variety of collisional partners. Using optical frequency comb referenced frequency-stabilized cavity ring-down spectroscopy (FS-CRDS) near 1.27  $\mu\text{m}$  we measure line areas with a quality-of-fit  $\text{QF} \leq 50,000$  using a partially correlated quadratic-speed-dependent Nelkin-Ghatak profile. This spectrometer has achieved this high QF by both suppressing coupled cavity effects and by preserving a high-fidelity frequency axis with absolute frequency accuracy approaching 1 part in  $10^9$ . With this instrument we are also currently exploring collision-induced absorption (CIA) and perturbative line mixing effects in O<sub>2</sub> over the entire 7800-7940  $\text{cm}^{-1}$  spectral range.