

Abstract Submitted  
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**Collisional broadening coefficients of singlet ( $a^1\Delta_g$ ) oxygen with helium** SKIP WILLIAMS, Air Force Research Laboratory, JEFFREY GALLAGHER, GLEN PERRAM, Air Force Institute of Technology — A novel laser-based technique applicable to metastable species detection is discussed. Off-axis integrated-cavity-output spectroscopy (ICOS) has been applied to the study of singlet ( $a^1\Delta_g$ ) oxygen. Singlet oxygen was generated in a microwave plasma, and the afterglow passed through an off-axis ICOS measurement system consisting of an 82-cm long, high-finesse optical cavity bounded by two highly reflective mirrors. The mirror reflectivity was determined by performing cavity-ringdown measurements and observing ringdown times of 220-250  $\mu$ s in a range from 1494 nm to 1512 nm. A diode laser was current tuned, and light exiting the cavity was focused onto an InGaAs detector. The cavity transmission was recorded as a function of laser frequency. Details of the method will be presented as well as the spectroscopic characterization of selected transitions of the (1,0) band of the  $b^1\Sigma_g^+ - a^1\Delta_g$  Noxon system of oxygen (radiative lifetime 160 minutes). Pressure broadening coefficients with helium as the collision partner for selected transitions will also be presented.

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