

## THE ROTATIONAL SPECTRUM OF IODINE DIOXIDE, OIO

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OIO is an asymmetric prolate rotor ( $\kappa = -0.690$ ) with a  ${}^2B_1$  electronic ground state. It was formed initially from the products of a microwave discharge in  $O_2$  passing over molecular iodine and later with greater yield in a DC discharge through a mixture of  $O_2$  and  $I_2$  vapor. Although the experiment was hampered by copious solid deposits and apparently inefficient production of OIO, the rotational spectrum was quite prominent in survey scans in the millimeter and submillimeter regions. Facilitated by predictions of fine and hyperfine patterns from ESR results,<sup>a</sup> it was eventually possible to identify high  $J$ ,  $R$  branch transitions with  $K_c \approx J$ . Over 550 ground state transitions and over 160 transitions of the excited bending state have been included in the fits. The transitions cover a wide range of rotational quantum numbers and permit the accurate determination of an extensive set of molecular parameters. The parameters will be compared to those recently published for  $OBrO$ <sup>b</sup> and  $OCIO$ <sup>c</sup> and will be interpreted in terms of the molecular geometry, harmonic force field, and electronic structure.

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<sup>a</sup>J.R. Byberg, *J. Chem. Phys.* **85**, 4790-4793 (1986).

<sup>b</sup>H. S. P. Müller, C. E. Miller and E. A. Cohen, *J. Chem. Phys.* **107**, 8292 (1997).

<sup>c</sup>H. S. P. Müller, G. O. Sørensen, M. Birk, and R. R. Friedl, *J. Mol. Spectrosc.*, **186**, 177 (1997).