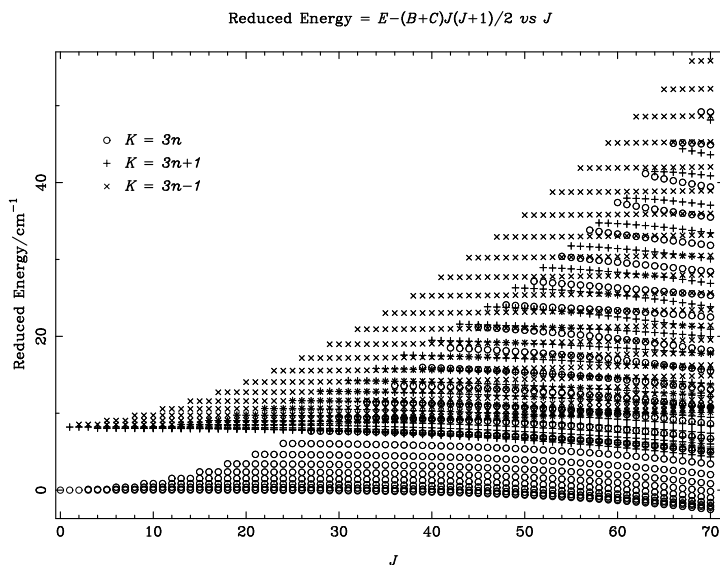


## FURTHER STUDIES OF THE PERCHLORIC ACID ROTATIONAL SPECTRUM

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HClO<sub>4</sub> is a nearly spherical rotor with a moderately low 3-fold barrier to internal rotation, ( $s \approx 5.15$ ). The  $a$  molecular axis is nearly coincident with the internal rotation axis of the OH and ClO<sub>3</sub> groups. Only  $A$  torsional states are allowed. The rotational energies are dominated by the  $K$  dependent solutions of the Mathieu equation and have little resemblance to those of a normal asymmetric rotor. For the HClO<sub>4</sub> ground torsional state, more than 700 features between 52 and 645 GHz with  $J \leq 61$  and  $K \leq 47$  of the two major isotopic species have been assigned and fitted. Because of the unusual distribution of energy levels, these include many perturbation enhanced transitions involving large changes in the  $K$  quantum number. Low lying excited torsional state spectra also have been assigned. Details of the fitting will be shown.



The molecular parameters, which include rotational, centrifugal distortion, quadrupole coupling, torsion-rotation interaction constants and the barrier to internal rotation, will be presented. Structural implications will be discussed.

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