OZONE : CRITICAL EVALUATION OF THE STATISTICS OF THE DARK STATE ANALYSES VIA NEW OBSERVATIONS

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The analyses of high resolution infrared spectra of ozone very often require the introduction of perturbing rovibrational states for which no corresponding transitions are observed. It is customary to call these bands (respectively states) dark bands (dark states). These bands have weak dipole transition moments, as in the case of ozone, there is no bands forbidden by the symmetry. In consequence, this denomination depends of the signal/noise ratio of the experimental spectra.

Recent progress in the theory and improvements of sensitivity of experiments are continuously achieved, allowing us to assign five B type bands, which were considered as dark in recent previous works. These bands are $3\nu_2+4\nu_3$, $5\nu_1+\nu_2$, $\nu_1+2\nu_2+4\nu_3$ for $^{16}O_3$ and $2\nu_1+4\nu_2+2\nu_3$, $3\nu_1+4\nu_3$ for $^{18}O_3$.

As a lot of information coming from dark states (band centres, rotational constants) is useful for the Potential Energy Surface (P.E.S) determination, one needs realistic error bars to make consistent comparisons. These new data offer excellent opportunities to compare these error bars (now correctly known) with those previously derived from the dark state fits. This is the aim of this presentation.