VIBRATIONALLY EXCITED PRODUCT DISRIBUTION OF ClO PROBED IN "HYPER-ROVIBRONIC" DETAIL FOLLOWING THE MODE-SPECIFIC PHOTODISSOCIATION OF OClO

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Recently, in our lab at UNCG we have reported detecting "hyper-rovibronic" structure in ClO ($^2\Pi_{\Omega=3/2,1/2}$, v = 0-8, J = $1^1/_2$-$7^1/_2$, Λ, F) via direct mm / submm-wave absorption in a pulsed slit jet molecular beam following the mode-specific photodissociation of OClO (A $^2A_2 \leftarrow$X $^2B_1$, ν_1=14-15) [a]. In this present work, we have adapted the instrument to quantitatively extract the relative product state distributions at a hyperfine level of detail. One of the more important changes to the instrument has involved programming peak-hopping software which allows the user to jump between catalogued frequencies, so that relative signal intensities are measured and extensive signal averaging may be used to uncover weaker transitions. In the present case of ClO, our earlier work identifying the transition frequencies of vibrationally excited ClO is used to direct these new peak-hopping scans [b]. The relative lambda doublet populations in both spin-orbit Ω = 3/2, and 1/2 states are monitored as a function of product vibration and parent OClO mode-specific excitation (A $^2A_2 \leftarrow$X $^2B_1$, ν_1=14-16).

[a] Liam M. Duffy, Rev. of Sci. Inst., Vol. 76, 2 September 2005, p. 093104.

[b] The authors are grateful to Edward A. Cohen for frequency predictions based on these measurements.