PRODUCTION OF A BEAM OF HIGHLY VIBRATIONALLY EXCITED CO USING PERTURBATIONS

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For many experimentalists (especially those, who are not spectroscopists), molecular pertubations are a curse, as they make assignments and analysis of spectral data more difficult. Nevertheless, they can also be a boon!

In this talk we will show how a molecular beam of CO in high vibrational states ($v = 17, 18$) can be prepared by an optical pumping scheme that we call PUMP-PUMP-PERTURB and DUMP (P^3D). P^3D exploits the loaning, via spin-orbit perturbations, of the large oscillator strength of the 4th positive system, $A^1\Pi \leftarrow X^1\Sigma^+$, to the triplet manifold. This allows some nominally spin-forbidden transitions to be exploited in multistep optical pumping schemes.

The ability to *state-selectively* prepare CO in high vibrational states opens up new opportunities for molecular beam scattering experiments.