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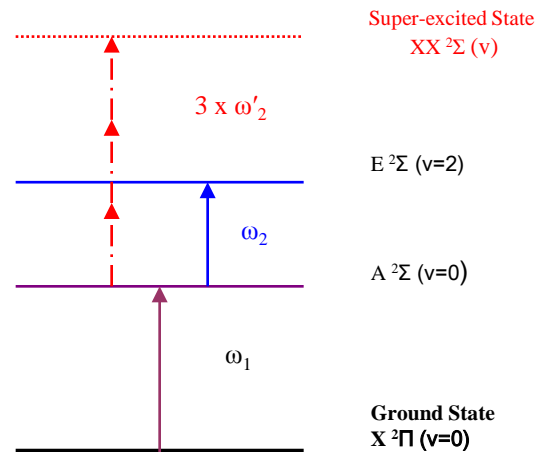
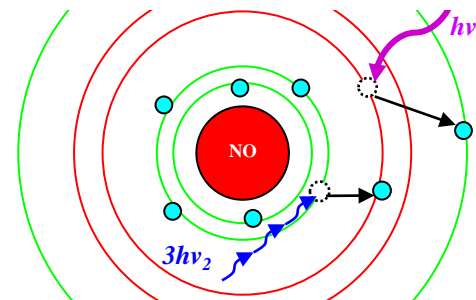
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Laser Spectroscopic Study of Highly Excited States of Molecule NO Using OODR Techniques

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Abstract

This project aims to study the different electronic states of the nitric oxide (NO) in the energy region near 64,000 – 66,500 cm^{-1} , where one can find both Rydberg and valence states. The Optical-Optical Double Resonance Time of Flight (OODR-TOF) spectroscopy technique was modified to have four signal-monitoring schemes to suite the needs for the different spectroscopic situations. Through the combination of these signal-monitoring schemes, we seek to develop a powerful spectroscopic method employing the OODR photoionization technique to grapple with the complicated spectroscopic situations in the diatomic molecules. The core portion of our OODR technique is that the pump laser of a specific wavelength is utilized to pump some molecule population in the ground state into the specific rotational level N' in the intermediate state, and then the probe laser of the tunable frequency is scanned to generate spectra by further exciting the population from the intermediate state into the higher excited states. We focus to investigate the controversial spectral region near the $K2\Pi_r(v=0)$ state of the molecule NO, by recording rotationally-resolved spectra from $N'=0$ up to $N'=20$. Another task is to analyze and assign some unknown extra lines in OODR spectra of the molecule NO.



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2. Wang, Z.B., G.P. Yin, Y.-G. Lin, *Synthesis and characterization of PtRuMo/C nanoparticle electrocatalyst for direct ethanol fuel cell*. *J. Power Sources*. **2007**. **170**(2): p.242-250
3. Lin, Y.G., J.E. Colón-García, C.R. Cabrera, and E. Quiñones, *Access to Super-Excited States of Nitric Oxide Via OODR Multiphoton Excitation Laser Spectroscopy* Oral Presentation at the 61st Southeastern Regional Meeting of the ACS **2009**. in Puerto Rico Convention Center, San Juan, Puerto Rico, October 21-24, 2009.
4. Lin, Y.G., J.E. Colón-García, C.R. Cabrera, and E. Quiñones, *An Exploration of Highly Excited Molecular States of Nitric Oxide with the OODR Laser Spectroscopic Technique*. Poster Presentation at the PR-EPSCoR 2008 Annual Meeting, **2008**. Condado Plaza Hotel, San Juan, April 10-11, 2008.