

Abstract Submitted
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Rotationally resolved fluorescence spectroscopy of molecular iodine CHRISTOPHER LEMON, SEBASTIAN CANAGARATNA, JEFFREY GRAY, Ohio Northern University — Vibration-electronic spectroscopy of I₂ vapor is a common, important experiment in physical chemistry lab courses. We use narrow bandwidth diode-pumped solid state (DPSS) lasers to excite specific rotational levels; these lasers are surprisingly stable and are now available at low cost. We also use efficient miniature fiber-optic spectrometers to resolve rotational fluorescence patterns in a vibrational progression. The resolution enables thorough and accurate analysis of spectroscopic constants for the ground electronic state. The high signal-to-noise ratio, which is easily achieved, also enables students to precisely measure fluorescence band intensities, providing further insight into vibrational wavefunctions and the molecular potential function. We will provide a detailed list of parts for the apparatus as well as modeling algorithms with statistical evaluation to facilitate widespread adoption of these experimental improvements by instructors of intermediate and advanced lab courses.

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