



## METHODS AND SYSTEMS FOR COHERENT MULTIDIMENSIONAL SPECTROSCOPY

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### The Invention

A UW-Madison researcher has developed an improved method and associated system for coherent multidimensional spectroscopy (CMDS). CMDS is based on the formation of Schrödinger cat states by exciting multiple vibrational and electronic states in a target entity on time scales (e.g., picoseconds, femtoseconds) that are short (or comparable) to the timescale over which multiple quantum coherences (MQCs) decay. This is accomplished by temporally and spatially overlapping ultrafast coherent excitation beams in a sample containing the target entity. The central feature of this discovery is synchronized scanning of all the coherent excitation sources so that the phase matching does not change or drift. Essentially, the system will be capable of independently modulating the wavelengths of each light source, so that an increase in one can be offset by a reduction in another.

Using this method of synchronized scanning, CMDS-derived spectra could be acquired using a series of correlated scans of multiple wavelengths such that the resulting data set would define the response of a sample to all combinations of the wavelengths. The resulting spectra could be interpreted in a traditional manner while providing enhanced resolution.

### Additional Information

#### For More Information About the Inventors

- [John Wright](#)

#### Tech Fields

- [Analytical Instrumentation, Methods & Materials : Spectroscopy.](#)

For current licensing status, please contact Michael Carey at [mcarey@warf.org](mailto:mcarey@warf.org) or 608-960-9867