SPECTRAL FLUCTUATION RAMAN SPECTROSCOPY (SFRS)

Tech ID: 32999 / UC Case 2023-058-0

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2025/058659	03/20/2025	2023-058

BRIEF DESCRIPTION

Our ability to experimentally measure the biomacromolecular structure of proteins and their complexes down to the atomic scale has progressed at a staggering pace in recent years. However, the dynamical conformational changes that affect, to name a few examples, DNA transcription, energy-transfer in photosynthesis and enzyme activity, and the transition from healthy to diseased states, remain difficult to capture. A non-perturbative, label-free approach that is sensitive to individual conformational states is single-protein Raman spectroscopy. However, the time resolution of single-protein Raman spectroscopy is typically limited to milliseconds (10^{-3} sec), limited by inherent signal strength. Protein conformational dynamics occur over a timescale ranging from tens of seconds down to microseconds (10^{-6} sec) or even nanoseconds (10^{-9} sec).

To address these challenges UC Berkeley researchers have developed a novel, high-temporal dynamic range Raman spectrometer capable of measuring sub-microsecond, and even nanosecond, fluctuations in single- and few-molecule spectra. The available dynamic range can be used to study and control of biomolecular dynamics as related to protein-protein interactions, drug discovery, validating computational biophysics capabilities, and many other additional applications.

SUGGESTED USES

- Multi-timescale, single-molecule Raman spectroscopy
- Sub-microsecond resolution, down to picosecond scale
- Label-free characterization of protein conformational states

ADVANTAGES

- Experimental measurement of protein dynamics and protein-protein interactions
- Drug discovery
- Advancing computational biophysics
- Materials science, surface science, analytical chemistry, catalysis, and biomedical diagnostics

RELATED MATERIALS

CONTACT

Sabrina N. David
sabrina.david@berkeley.edu
tel: .

INVENTORS

» Utzat, Hendrik

OTHER INFORMATION

KEYWORDS

Protein structure, Protein folding, DNA sequencing, Raman spectroscopy, Biomoleculat dynamics, Spectroscopy

CATEGORIZED AS

» **Optics and Photonics**
» All Optics and Photonics
» **Biotechnology**
» Bioinformatics
» Genomics
» Health
» Proteomics
» **Imaging**
» Medical
» Molecular
» **Medical**
» Diagnostics
» Imaging
» Research Tools
» **Nanotechnology**
» NanoBio

» **Research Tools**

» Bioinformatics

» Nucleic Acids/DNA/RNA

RELATED CASES

2023-058-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Nanophotonic Perovskite Scintillator For Time-Of-Flight Gamma-Ray Detection

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University of California, Berkeley Office of Technology Licensing
2150 Shattuck Avenue, Suite 510, Berkeley,CA 94704
Tel: 510.643.7201 | Fax: 510.642.4566
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