CiQUS Lecture

Unveiling Molecular Aggregates and Chirality through Rotational Spectroscopy

Dr. Cristóbal Pérez

Centro de Innovación en Química y Materiales Avanzados (CINQUIMA)
Universidad de Valladolid

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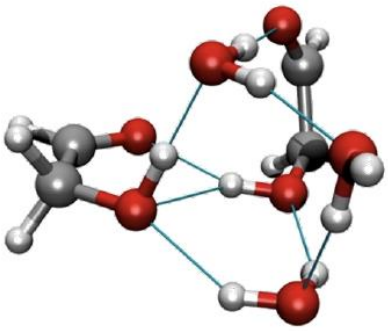
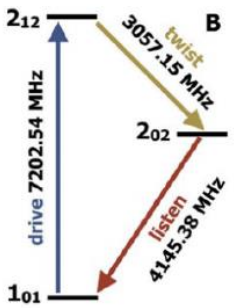
11:15 AM - CiQUS Seminar Room

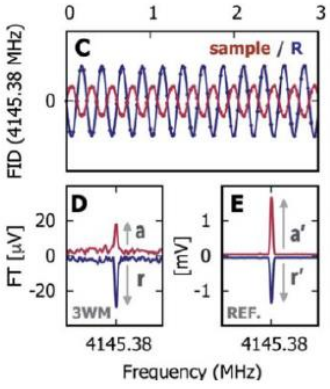
Dr. Cristóbal Pérez Cuadrado
Departamento de Química Física y Química Inorgánica
Centro de Innovación en Química y Materiales Avanzados (CINQUIMA)
Universidad de Valladolid

Abstract

Rotational spectroscopy has emerged as a powerful tool for elucidating the structures of molecular aggregates of increasing size. This talk will explore the principles and applications of rotational spectroscopy in studying molecular aggregates, focusing on how it provides detailed insights into their geometric configurations and intermolecular interactions. Through a series of case studies and recent advancements, we will demonstrate the versatility and accuracy of rotational spectroscopy in advancing our understanding of complex molecular systems. Additionally, we will comment on the role of rotational spectroscopy in chirality determination, highlighting its ability to distinguish between enantiomers and analyze chiral mixtures. In particular, the three-wave mixing and chiral-tagging approaches will be introduced.







Biosketch

Cristóbtal Pérez obtained his PhD in Chemistry from the University of Valladolid in 2011, studying the gas-phase structure of biologically relevant molecules using microwave spectroscopy and laser ablation techniques. From 2011 to 2014, he worked as a postdoctoral researcher at the University of Virginia (USA) in Prof. Brooks H. Pate's group, focusing on developing instrumentation for broadband rotational spectroscopy and its application to microsolvated water molecular aggregates.

In 2014, he joined Prof. Melanie Schnell's group in Hamburg (Germany), where he developed experimental techniques for detecting molecular chirality using rotational spectroscopy through "Three-wave mixing" and "Chiral tagging" experiments. In 2021, he joined the University of Valladolid as a Beatriz Galindo Senior Researcher in the Department of Physical Chemistry and Inorganic Chemistry.

He has received several prestigious fellowships, including the Juan de la Cierva, Ramón y Cajal, Ikerbasque Research Fellow, and Alexander von Humboldt fellowship. In 2023, he was awarded the ERC Consolidator Grant HydroChiral to expand his studies on water and chirality.