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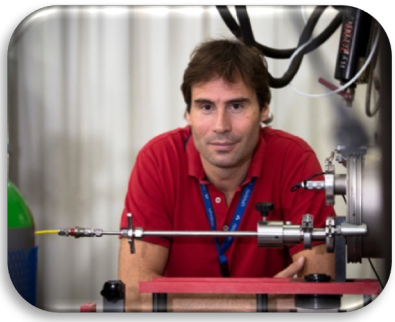
# Unravelling bio-structures and applications: Microwave and Laser spectroscopies



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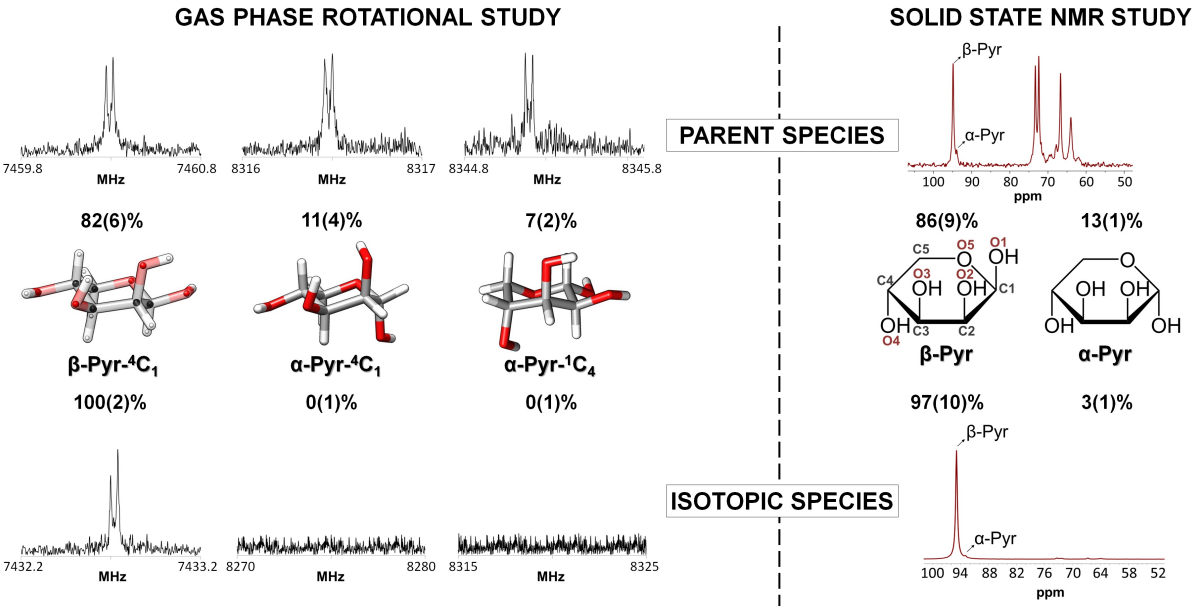
I present several studies on biomolecules (carbohydrates and glycopeptides) and several applications, exploiting an experimental strategy which combines microwave and laser spectroscopies in high resolution, NMR, computation and synthesis. Laser spectroscopy offers high sensitivity and selectivity, making it ideal for studying biochemical systems of medium-large size.[1,2] Moreover, microwave spectroscopy provides higher resolution and direct access to molecular structure. [3,4] This combined approach provides not only accurate chemical insight on conformation, structure and molecular properties, but also benchmarking standards guiding the development of theoretical calculations. In order to illustrate these possibilities, we present the results on the conformational landscape of several carbohydrates, peptides and glycopeptides[2-4] with different biological roles. In addition, others applications of high resolution spectroscopies are presented.[5-6]

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**Biography:**

Emilio J. Cocinero (40 years-old) completed his Ph. D. in Physical Chemistry in 2005 at the University of Valladolid (Spain). In 2008, his thesis work, based on the study of the structure of amino acids by microwave spectroscopy, was recognized with a University prize to best Ph. D. doctoral work conducted at the University of Valladolid. In 2006 he moved to Oxford University and worked with Professor John P. Simons, to join the internationally leading research group studying carbohydrates in the gas phase. In January 2009 he joined the University of the Basque Country, where he leads research focused on solving various structural problems of chemistry at the molecular level, in particular, the study of biomolecules, including sugars, peptides and drugs, generated and stabilized in the gas phase. He has an excellent track record of publications (›100 papers). Several publications in the highest impact factor journals in his field including (1 Nature, 1 Nat. Commun. 9 J. Am. Chem. Soc., 10 Angew. Chem. Int. Ed...). His career has been recognized with several prizes. Finally, Emilio J. Cocinero was elected President of young chemical researchers (JIQ) of the Spanish Royal Society of Chemistry (RSEQ) in 2014-2017.

**Awards:**

*International Dr. Barbara Mez-Starck Prize* (2018)
For his extensive investigations of conformational behaviors and precise molecular structures of amino acids, sugars, alkaloids, anesthetics and nicotinoids.

*Premio Enrique Pérez-Payá (Spanish Biophysical Society)* (2017)
For his remarkable contributions in molecular spectroscopy.

*International Flygare Award* (2015)
For outstanding contributions in molecular spectroscopy by an early career independent scientist.

*Premio SIGMA-ALDRICH a Investigadores noveles de la RSEQ (Roya Spanish Society of Chemistry)* (2012)
The best scientific career of a Spanish young researcher.

*Premio POSTDOC SusChem Jóvenes Investigadores Químicos* (2012)
The best scientific publication in 2011 conducted by a Spanish young researcher.
E. J. Cocinero, P. Çarcabal, T. D. Vaden, J. P. Simons and B. G. Davis Nature, 69, 76-80 (2011).

Extraordinary prize to the best Ph. D. doctoral work conducted at the University of Valladolid (2008)
Ph. D. supervisors: Prof. J. L. Alonso and Prof. A. Lesarri.

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