

Lightwave Driven Quantum Dynamics: from molecular movies to Bloch waves

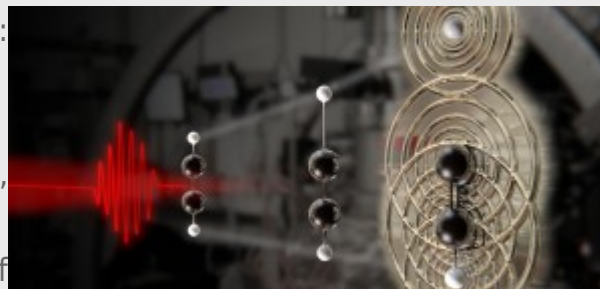
INC COLLOQUIUM - OFFICIAL ANNOUNCEMENT

Title: Lightwave Driven Quantum Dynamics: from molecular movies to Bloch waves.

When: 17 September, 2018, 12h30

Where: Sala de Conferencias, Módulo 00, Faculty of Sciences, UAM.

Speaker: Jens Biegert, ICFO - The Institute of Photonic Sciences, Barcelona - Spain.



Electron recollision in an intense laser field gives rise to a variety of phenomena, ranging from electron diffraction to coherent soft X-ray emission. We have, over the years, developed intense sources of waveform-controlled mid-IR light to exploit the process with respect to ponderomotive scaling, quantum diffusion and quasi-static photoemission. I will describe how we leverage these aspects to “teach” molecules to take a selfie while undergoing structural change. This permits visualizing for the first time, with combined attosecond temporal and atomic spatial resolution, molecular bond breaking and deprotonation. Furthermore, we achieve isolated attosecond pulses in the soft X-ray water window across the oxygen edge at 534 eV. Accomplishing ultrafast temporal resolution in combination with the soft X-ray’s element specificity now provides an entirely new view on the combined electronic and nuclear dynamics in real time. I will show first results in which we resolve the carrier dynamics in a quantum material in real time and within the material’s unit cell.

These results provide first comprehensive insight into the dynamics of molecules and condensed matter, with the future possibility to address fundamental and long-standing questions such as molecular isomerization, phase transitions and superconductivity.

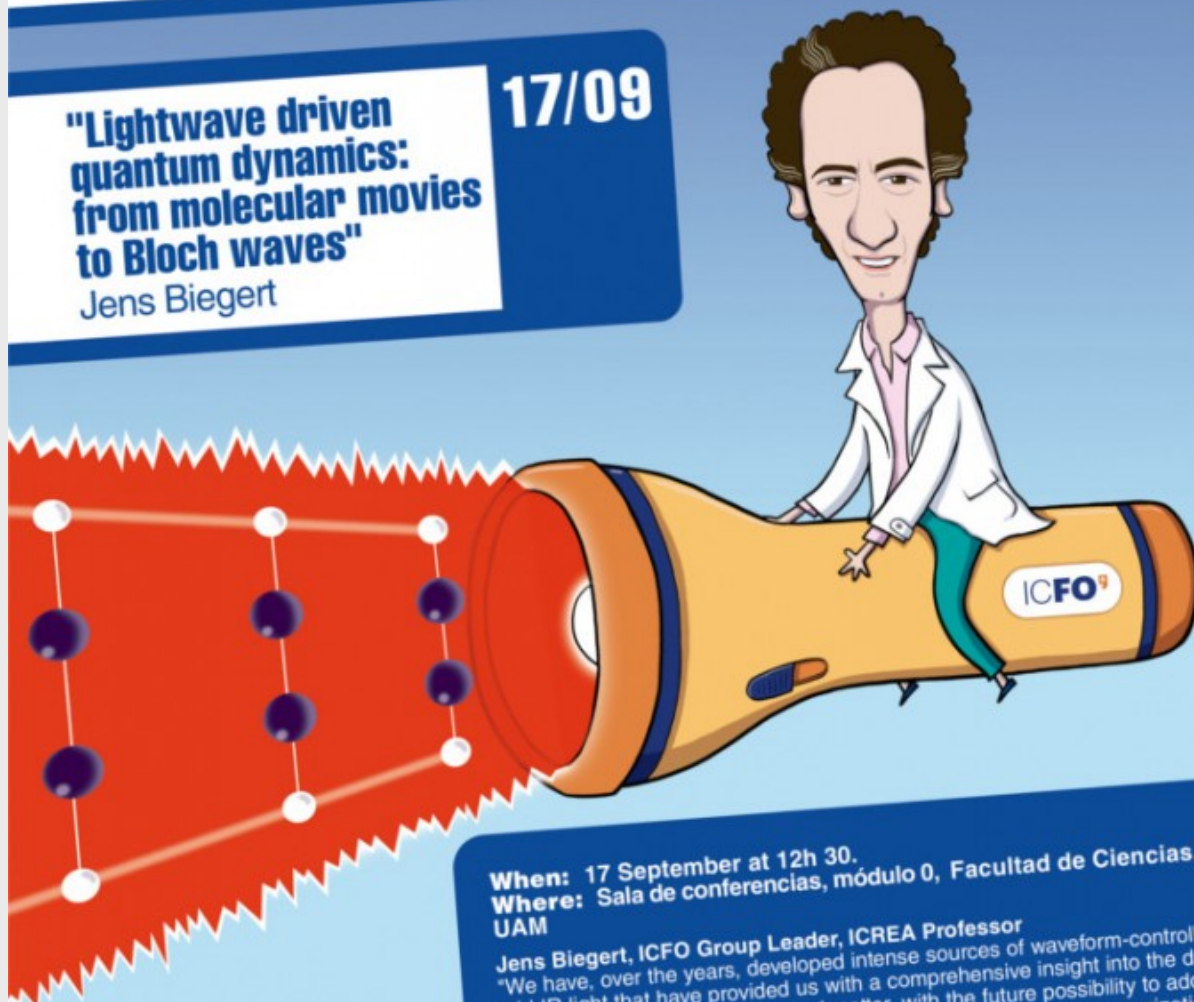
Colloquium Frontiers of Condensed Matter Physics

Dedicated to Prof. Nicolás Cabrera (1913-1989)

2018

"Lightwave driven
quantum dynamics:
from molecular movies
to Bloch waves"
Jens Biegert

17/09



When: 17 September at 12h 30.
Where: Sala de conferencias, módulo 0, Facultad de Ciencias,
UAM

Jens Biegert, ICFO Group Leader, ICREA Professor

"We have, over the years, developed intense sources of waveform-controlled mid-IR light that have provided us with a comprehensive insight into the dynamics of molecules and condensed matter, with the future possibility to address fundamental and long-standing questions such as molecular isomerization, phase transitions and superconductivity. By way of example I will show first results in which we resolve the carrier dynamics in a quantum material in real time and within the material's unit cell."

Instituto Nicolás Cabrera

IfiMAC

UAM Universidad Autónoma
de Madrid



Fundación **BBVA**