Carl von Ossietzky
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PHYSICAL COLLOQUIUM

INVITATION

Monday, 11.07.2022, 4.15 p.m.,
via video conference: https://meeting.uol.de/b/anj-2vc-j6s-fwe

speaks

Ass. Prof. Dr. Carlos-Andres Palma
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about

"Topological dynamics and reactions: From supramolecules to eigenstates in phononics and cycloadditions"

Keywords: Low-temperature scanning probe microscopy, molecular dynamics, dynamical matrix, condensed matter physics and chemistry, thermodynamics, azomethine ylides

Under well-defined geometrical constraints, the operator or eigenfunction space of a dynamical system can be defined, and classified by differential geometry or algebraic topology. This poses advantages for the study of dynamic phases and their unconventional properties such as anholonomy, nonreciprocity and the lattice bulk-boundary correspondence. In this regard, molecular systems at well-defined interfaces bear untapped potential for the design of exotic physical properties and reactions1. In the first part of this talk, I will introduce topological tools for the classification of the dynamics of supramolecular systems2, mechanical molecular wires and cycloaddition reactions3. In the second part I will introduce the bulk-boundary correspondence together with molecular dynamics and scanning probe studies of molecular lattices4 and axial (coordination) lattices5. Finally, I'll set the scene for the realization of quantum valley Hall effect phonon analogues in axial lattices6 and motivate the field of Fermionic quantum simulators7 with (dipolar) adsorbate lattices at interfaces under thermal fluctuations.

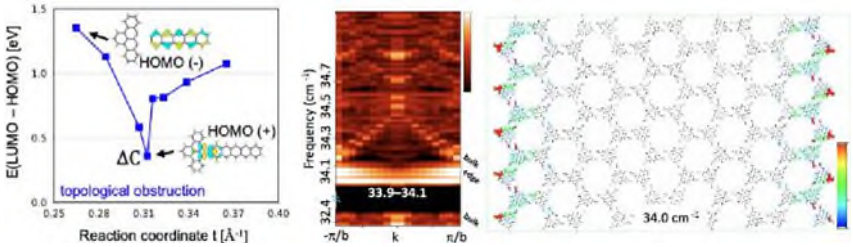

Figure 1. Topological classification of eigenstates in reactions3 and supramolecular lattices[4]

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Carlos-Andres Palma is associate professor of physics at the Institute of Physics, Chinese Academy of Sciences (CAS) and leads a joint lab for molecular device microscopy at the Humboldt-Universität zu Berlin. Prior to joining CAS, he worked at the TU Munich, the Max-Planck Institute for Polymer Research and the University of Strasbourg, completing his PhD in 2010. His group's interests lie in the field of chemical physics and instrumentation at well-defined molecular device interfaces, with a focus on mass spectrometry, low-temperature probe and photoelectron microscopies.

All interested persons are cordially invited.

Prof. Dr. Caterina Cocchi