SEMINARIO DEPARTAMENTO DE QUÍMICA FÍSICA
Universidad Complutense de Madrid

Lunes 20 de febrero de 2023 – 11:30 h
Sala de Grados Edificio A (Antigua capilla)

MEASURING AND CONTROLLING MOLECULE-SURFACE COLLISIONS USING PICO-eV COHERENT MANIPULATIONS OF MOLECULAR ROTATIONAL ORIENTATION

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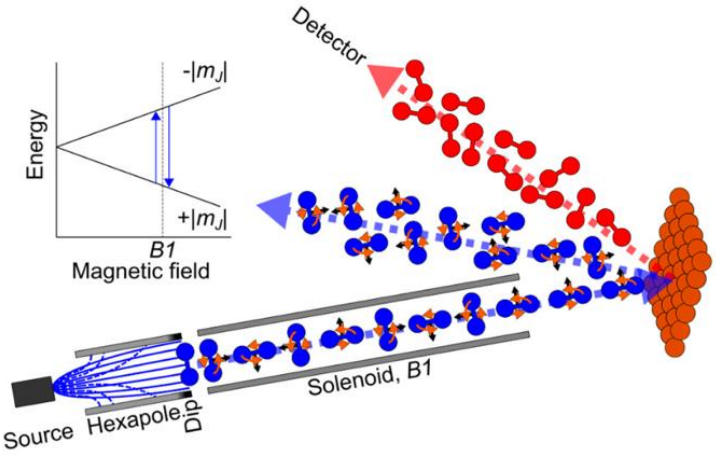

In this seminar I will present results from two recent research projects, both of which make use of magnetic fields to coherently manipulate the rotational and spin quantum states of a molecule during a molecule-surface collision. In one project, magnetic manipulations performed on a molecular beam of H2 colliding with a salt surface, were used to extract an empirically derived scattering matrix, the elements of which describe changes to the molecular wavefunction (magnitude and phase) during the scattering event [1].

In the second project, coherent manipulation of a D2 molecular beam was used to change the rotational orientation of the molecules before they reach a copper surface, and alter the probability of a rotational de-excitation collision J=2->J=0 [2]. In this case a manipulation scheme which is based on pico-eV energy splitting, controls the outcome of a rotational energy loss process which is 9 orders of magnitude larger. Both projects provide challenging and important benchmarks for theoretical modelling of molecule-surface interactions.

Finally, I will briefly describe some future applications of our magnetic manipulation technique both in the field of surface science and in the field of gas phase molecular collisions.

[1] Alkoby et al. Nat. Comms. 11, 3110 (2020)
[2] Chadwick et al. Nat. Comms.13, 2287 (2022)

Se ruega enviar un correo a ncaselli@ucm.es si se está interesado en acceder vía telemática.