UNIVERSITÄT DUISBURG ESSEN

PHYSIK E=

Physikalisches Kolloquium

Mittwoch, 18.06.2025
13:00 Uhr
MC 122 und Zoom

https://uni-due.zoom-x.de/j/64228670246?pwd=RjVQeFNIUkRKRkpiNVpKYXhJaFNLdz09 (gilt für alle Vorträge)

Atomically-controlled fluorescence and photochemistry

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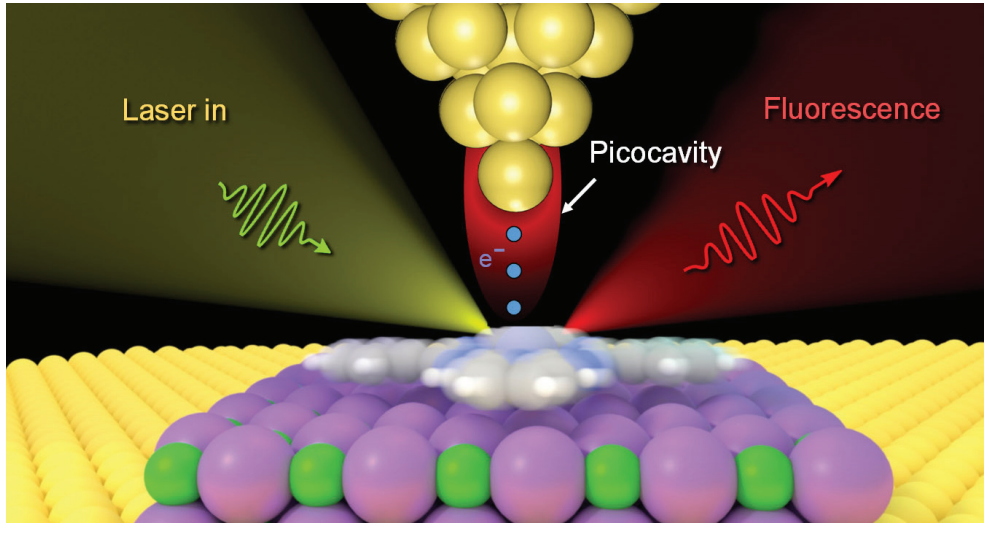

Figure: Tip-induced phototautomerization and enhanced photoluminescence of a free-based phthalocyanine molecule decoupled from Ag(111) by few layers of NaCl.

Pushed to their limit, tip-enhanced photoluminescence and electroluminescence can be used to generate sub-molecularly resolved fluorescence maps of simple molecules adsorbed on thin insulating layers. These techniques are in principle not suited for the investigation of “on-surface synthesized” (OSS) molecular structures, as the direct molecule-metal contact quenches emission properties. In a recent work [1] we developed a strategy allowing us to transfer OSS graphene-nanoribbon from a Au(111) surface to a decoupling NaCl layer and to study their atomic-scale fluorescence properties. An alternative approach would consist in synthesizing a targeted molecule directly on the insulating NaCl layer. Controlling chemical reaction on insulating surface is notoriously challenging. In this context, we recently reported [2] on the use of tip-enhanced light excitation to control, with sub-molecular precision, a basic chemical reaction for a molecule adsorbed on NaCl.

References

[1] S. Jiang et al. Science 379, 1049 (2023)
[2] A. Rosławska et al. Nature Nanotechnol. 19, 738 (2024)