

SOLVAY COLLOQUIUM



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Beyond Nanostructures: Will Chiral and Magnetic Fields Transform Clean Energy Technologies?

The transition to a sustainable energy landscape requires a shift from fossil fuels to renewable energy sources. Central to this shift is the development of efficient, earth-abundant catalysts capable of either converting chemical energy into electricity or using electrons to drive chemical reactions at catalytic interfaces. Recent in-situ and operando studies at electrified interfaces have provided critical insights, allowing us to characterize and control catalytic processes down to the atomic scale. These advances are essential for improving key reactions towards CO₂ valorization, green hydrogen production, and oxygen oxidation and reduction. While optimizing nanostructures has been the focus of many researchers over the past years, the role of the electron spin in influencing catalytic activity and selectivity remains largely unexplored.

This colloquium will begin by examining the atomic-scale processes occurring at catalytic interfaces, followed by an exploration of two innovative approaches that dramatically enhance the efficiency and selectivity of 2D catalysts. The first approach involves incorporating chiral molecules to produce spin-polarized currents that direct reaction pathways at the interface. The second approach uses magnetic fields to control both the catalytic interface and the movement of electrolyte species around the active surface. By exploring and comparing the fundamental phenomena in both approaches, we will offer a versatile framework for implementing spin-selective solutions across diverse catalytic systems, supporting the broader goal of reducing dependency on critical materials for sustainable energy applications.

Tuesday 12 November 2024 at 4:30 P.M.

COFFEE AND TEA WILL BE SERVED AT 4:15 P.M IN FRONT OF THE SOLVAY ROOM

UNIVERSITÉ LIBRE DE BRUXELLES
CAMPUS PLAINE - BOULEVARD DE LA PLAINE
ACCESS 2 - 1050 BRUSSELS
Quartier Jaune - Building N.O. - 5th Floor - Solvay Room

