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**How Should We Think About Plasma-Catalysis?
Insights from Experiments and Simulations**

Plasma-catalysis is an emerging field of plasma science and engineering where non-equilibrium plasmas are coupled with catalytic materials to more effectively drive chemical reactions. The field holds significant promise, with the potential to overcome existing challenges for many industrially-relevant processes, such as the reforming of natural gas or the synthesis of ammonia. However, plasma-catalysis systems are extremely complex, consisting of a wide variety of chemical and physical processes that can both synergistically work together and function in opposition to each other. While plasma chemistry and catalysis are both well studied fields in their own right, when they are coupled, the question arises: How should we think about these systems? That is, should we think about them as catalysis systems that are enhanced by a plasma or a plasma system that is enhanced by a catalyst? Or should we think about them in a completely different way?

At the University of Notre Dame, an interdisciplinary team with expertise in plasma science, catalysis, surface science, and atomistic modelling have been trying to answer these questions both at a fundamental level and for what they imply for engineering plasma-catalysis systems. This colloquium talk will present a holistic perspective on our team's work in this area. I will discuss how our findings have shown how plasma-catalysis diverges from 'conventional' thermal catalysis, how plasmas can drive chemical conversion 'beyond equilibrium', and the evidence we have that molecular processes – rather than macroscopic effects – help drive these behavior. This talk will set the stage for understanding how to design both catalysts and reactor systems that capitalize on the non-equilibrium conditions in a plasma to enhance chemical conversion.

Informationen zu allen Kolloquium Vorträgen und Zugangslink:

<https://www.physik.uni-kiel.de/de/veranstaltungen/physikalisches-kolloquium>