



# PADERBORN PHOTONICS LECTURE

WEDNESDAY, JANUARY 18TH 2023 | 15:30 H

## DR. ALEJANDRO MANJAVACAS

LECTURE HALL A.1

### Collective response of periodic arrays of nanostructures

Periodic arrays of metallic nanostructures are able to support collective modes known as lattice resonances. These excitations occur at wavelengths commensurate with the periodicity of the array and give rise to very strong and spectrally narrow optical responses. Thanks to these exceptional properties, periodic arrays are being exploited in a wide variety of applications, including ultrasensitive biosensing, nanoscale light emission, and color printing, to cite a few.

In this lecture, we will discuss some recent theoretical advances on the topic of lattice resonances. In particular, we will explain how the interplay between the response of the individual constituents of the array and their collective interaction determines the ultimate limits of the near-field enhancement provided by a lattice resonance as well as its quality factor.

We will also discuss the response of arrays with multi-particle unit cells using an analytical approach based on hybridization theory, which provides a simple and efficient way to design periodic arrays with engineered properties. Finally, we will explore how the response of a periodic array is affected by the characteristics of the source used to excite it.



Dr. Alejandro Manjavacas