

## PHYSICS COLLOQUIUM

*Speaker:* **Prof. Michaël Lobet**  
Physics department – Unamur, Belgium, and  
Harvard University, USA



*Topic:* **Shedding light on near-zero refractive index photonics**

*Time and place:* Tuesday, July 2, 2024, **2:50 pm** – hybrid event  
**The colloquium will be held in REC/C213.**

Online participation possible:

Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PC-SoSe24

<https://tu-dresden.zoom-x.de/j/63138178900?pwd=am9nSzYyeUh3SWxMdnNBWkpUaXI5UT09>

*Host:* Prof. Lukas M. Eng

*Abstract:* What are the classical bounds of the refractive index? Usually, one would say between 1 (air) and 2.4 for materials such as diamond. This statement is true in the visible range. Some may say it is about 3 for semiconductors in the near-infrared. But have you ever wondered about the possibility of having negative values? Or just in-between, near-zero refractive index values? This Physics Colloquium aims at presenting the unique features that differentiate near-zero refractive index materials from other structured materials. We will focus on the study of light-matter interactions in the presence of materials/artificial structures in which one or more of the constitutive parameters are near-zero. It can be either the relative permittivity or the relative permeability or both. Consequently, a decoupling of electricity and magnetism is present, the wavelength is stretched, the phase distribution of electric and magnetic field is nearly constant, and this is just the beginning of the astonishing properties this part of photonics offers. Being passionate about active and innovative teaching methodologies, Dr Michaël Lobet will use some peer instruction & generative IA pedagogical techniques for presenting the above-mentioned concepts.

*Bio:* Recently appointed FNRS research associate at the Physics department of the University of Namur (Namur is the capital of the French speaking part of Belgium, in the South), Dr. Michaël Lobet is also associate with Harvard (Eric Mazur's group). His work mainly focuses on theoretical and numerical simulations in photonics. He is passionate about understanding light propagation inside structured materials. Therefore, his research interests span over metamaterials, photonic crystals, light trapping management for photovoltaic systems, plasmonics, 2D materials, nonlinear optics... Moreover, Michaël is keen on science of teaching and learning and his interests are mainly active pedagogy and use of generative IA in teaching.

**Get-Together:**

The colloquium will be followed directly by a Get-Together with Prof. Michaël Lobet in REC/B101 (around 4:00 p.m.). All students and staff are invited to talk to the speaker and discuss perspectives on the academic career, work-life balance and the professional life as a scientist.