

## SEMINAIRE D'ANALYSE

➤ **VENDREDI 7 OCTOBRE 2016 à 15h30 - salle MED2 1522**



*Docteur* **Valentin Vinales** (EPFL, Suisse) donnera une conférence sur le thème:

### **« Wave propagation in negative index metamaterials in the time domain »**

**Abstract:** In the first part we discuss the modeling of Negative Index Metamaterials (NIMs) in the time domain using dispersive models. In particular, we describe what are the permittivities and permeabilities that are allowable both from physical and mathematical point of view. We show how these models can produce backward waves and negative refraction indexes. The second part concerns the Perfectly Matched Layers (PMLs) in such media. The classical PMLs are unstable due to the presence of backward waves therefore we propose new PMLs for which we perform a stability analysis. It allows use to construct stable PMLs. Finally, in a third section, we study the long time behavior of a transmission problem between the vacuum and a NIM. We discuss the fact that the limit amplitude principle can not hold because of interface resonances. This is linked to the fact that the corresponding problem in the frequency domain has a kernel of infinite dimension. All our statements are illustrated numerically.

Lausanne, le 29 septembre 2016  
BD/HMN/MM