POLYTECHNIQUE MONTRÉAL

LE GÉNIE EN PREMIÈRE CLASSE

SÉMINAIRE DU DÉPARTEMENT DE GÉNIE PHYSIQUE

Jeudi 24 septembre 2020 – 10h30

Vidéconférence sur Zoom, cliquez ici pour y accéder :

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Meeting ID: **934 5267 2421**

Passcode: **1xe3PF**

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Nondestructive femtosecond laser lithography

Femtosecond laser interactions with magnetic materials result in an immense variety of physical phenomena from different area of physics: nonlinear optics, magnetism, spintronics, acoustics, physics of shock waves and/or laser-induced phase transitions [1]. After a general introduction to destructive fs-laser laser interactions with materials I am going to talk about the extreme nonlinear acoustics under conditions leading to the thermo-mechanical spallation and nondestructive reshaping of ferromagnetic thin films at a nano-scale. The letter technique that we denote as a nondestructive lithography, does not imply any "laser-assisted drilling of holes" and can provide the previously inaccessible control over the dynamics of fs-laser-induced phase transitions and produce exotic nanostructures for future applications in nanomagnetism and nanoscience in general, including toxic materials. Some freshly measured physical properties (morphological, acoustic and magneto-optical) of fs-laser-produced magnetic spallation cavities in ferromagnetic nickel [2] will be discussed at elementary level along with their future applications.

[1] V.V. Temnov et al., Nature Phot. 6: 728, 2012; Nature Comm. 4: 1468, 2013 ; J. of Optics 18, 0903002, 2016.

[2] V.V. Temnov et al., https://arxiv.org/abs/2006.11661

Vasily Temnov obtained Master's degree in Physics from Nizhny Novgorod State University (Russia) in 1999 and Diploma degree in Physics from University of Duisburg-Essen (Germany) in 1999. He obtained his doctorate in Physics from the University of Duisburg-Essen in 2004. Following postdoctoral fellowship at Technical University of Dortmund (Germany, 2005-2008) and DFG-Research fellowship at Massachusetts Institute of Technology (USA, 2008-2011), he obtained his Habilitation degree with a topic "Ultrafast acousto-magneto-plasmonics" from Universite du Maine in 2012, where he holds position of a CNRS researcher since 2011. From 2015 to 2016, he was a Humboldt Research Fellow at the Fritz Haber Institute (Germany). Since 2020 Vasily Temnov is an Associate Professor at Ecole Polytechnique, Palaiseau and a visiting Research Professor at ITMO University St. Petersburg (Russia, 2019-2020). Prof. Temnov is a world-renowned specialist working at the intersection of acoustics, plasmonics, phononics and magnonics, he is an author of over 60 publications on these subjects with 3000+ citation record.

Vous êtes tous les bienvenus.

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