NEXT/NanoX Invited Scientists

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Guest name **Lucas Alonso ROCHA**

Position Professor

Affiliation Universidade de Franca
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Host laboratory in NEXT/NanoX CEMES (UP CNRS-8011)
Team : M3

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Dates of stay 1month from November to December 2020

Brief Biodata

Professor Lucas Rocha from Franca University in Brazil, works more particularly on the lanthanide niobiates of $LnNbO_4$: $Nd^{3+}/Yb^{3+}/ Tm^{3+}$ compositions. He is author or co-author of numerous international publications relating to the preparation and characterization of nanoparticles or fluorescent thin films of these materials. Applications include light-emitting diodes (LEDs), solar cells, bioluminescent markers, hydrophobic persistent luminescence materials, waveguides and controlled release of active ingredients. Accredited as a research director, he currently directs three PhDs and two Masters students. He was visiting professor at the Clermont-Ferrand National School of Chemistry in June 2015. Author of 54 publications, Professor Rocha is fluent in English and French.

Research project during the visit at NEXT

Descriptive Title

Time resolved Raman spectroscopy on $LaNbO_4$: Ln^{3+} nanoparticles.

During the last 10 years, particular attention has been paid to the development of new luminescent nanomaterials for biomedical imaging applications. Among the various families of compounds studied, there are particularly distinguished those based on certain lanthanide ions, offering excellent photo-physical stability and a spectral zone compatible with the transparency window of biological media (700 - 1100 nm). Nanoparticles synthesized by Pr Rocha's team have interesting emission properties at 802nm thanks to the doping of niobiate matrices by Nd^{3+}, Yb^{3+} and Tm^{3+} ions. The recent results obtained on the mechanism of the luminescence excitation within a crystal of $LnNbO_4$: $Nd^{3+}/Yb^{3} /Tm^{3+}$ will be completed at the CEMES by experiments on our Raman spectrometer equipped with a synchronous detection system (resolved in time) allowing the fluorescence lifetime determination of this infra-red transition at 802 nm under excitation at 808nm. Similarly, a systematic study of the luminescence properties as a function of the doping level will make it possible to compare the efficiency of these new tri-doped materials under 808nm excitation compared to the better known dual-doped material (without Nd^{3+}) under-excitation at 980nm.