

NanoforumEULA stimulates Dutch-Mexican fiber optics research cooperation

In Spring of 2008, Dr Jose Alfredo Alvarez-Chavez, of the Centro de Investigacion e Innovacion Tecnologica del Instituto Politecnico Nacional – MEXICO visited the Optical Sciences Group at Twente University in the Netherlands. He specializes in research on high-power fiber lasers and amplifiers.

What have you worked on during your visit?

We have worked on the design and implementation of two double clad, medium power, CW, Ytterbium-doped fiber lasers in the 1 μ m (micrometer) region and a 1064nm power amplifier chain. This amplifier chain will be used to generate and amplify a 1060nm laser signal. This will be used in synchrony with an 860nm laser signal from a Ti:Shapire laser to scan biological samples without a label in a coherent anti-Stokes Raman Spectroscopy set-up.

Why is that important for your research and for progress in nanotechnology?

High and medium power fiber lasers in the 1 μ m region are now effectively competing with their traditional counterparts, such as Ti:Shaphire and Nd:Yag. The new high and medium power lasers offer advantages such as higher quantum efficiency, better beam quality, and smaller foot print; relatively at the same cost. As a fiber laser researcher, it was a great opportunity for me to take advantage of resources at the highest level at UTwente, which I normally do not have in my home country. As for nanotechnology, it takes advantage of new laser sources with the aforementioned advantages.

Why did you come to this European research centre to do this project?

I know Dr. Ir Herman Offerhaus since 1998 when we worked together on Ytterbium-doped large mode area fiber lasers, while at the Optoelectronics Research Centre of the University of Southampton (ORC) in the UK. We have collaborated in that lab for about 4 months and published our work in international journals and conferences. We kept in touch after Dr. Offerhaus left the ORC; where he worked as Post-Doc. Some time ago he mentioned NanoforumEULA and Mesa+. He mentioned they needed a fiber laser person, so it was a great experience to work again with him and the whole Optical Sciences Group (OS) at UTwente.

What are the results?

During my stay at UTwente, two high-power, CW, diffraction-limited, fiber lasers at 1064nm, with a slope efficiency of 74% and 70%, respectively were designed and implemented in the

OS labs for their Coherent Anti-Stokes Raman Scattering (CARS) experiments. We also worked on the design of a 1064nm amplifier chain that will be implemented soon using the same Yb³⁺-Yb-doped, octagonal-clad fibers.

How will you disseminate these results?

We have already submitted an abstract to the “Third Mexican Workshop on Nanostructured Materials”, which will take place in Mexico City this year:

<http://www.cinvestav.mx/workshop08/>

Also, we are working on writing a journal paper in which the 1064nm amplifier chain design and results would be described. Finally, CIITEC – IPN will promote more activities in the Nanotechnology area among its researchers and graduate students, taking advantage of my experience at OS UTwente.

Is this the first contact between both organizations or is your visit part of existing collaboration?

It's the first stage of what we hope to be a long collaboration between our organizations

What are the plans for future collaboration?

CIITEC – IPN has already sent a Memorandum of Understanding to OS – UTwente for them to study it and decide whether it is convenient. On it, we would like to explore the possibility of a long term academic, scientific collaboration by promoting the exchange of research fellows and graduate students.

Do you intend to apply for funding in the EU 7th Framework Programme for RTD?

Yes, that one thing we are aiming for. We are a rather small research centre and looking for funding in our areas of expertise is of paramount importance. We believe that we have the background and enough experience at high-level in order for us to be able to perform scientific research and development in Nanotechnology.

What are your plans for disseminating the results of your visit outside the research community in your country?

Well, there is a continuous education journal open to the public; it is even sold at news stands in kiosks etc. so we will write an article so that people outside our academic circle can find out about the benefits that our work on Nanotechnology in collaboration with OS-UTwente has produced.

Identification:

- Name and disciplinary background of researcher: Jose Alfredo Alvarez-Chavez, PhD in: High-power fiber lasers and amplifiers at the Optoelectronics Research Centre University of Southampton. Research and development of rare-earth (Ytterbium, Neodymium, Erbium/Ytterbium, Thulium) very high power fiber lasers in continuous wave (CW) and pulsed (Q-switch) regimes, in different configuration such as free-running lasers, Master-Oscillator Power Amplifiers, tunable, single polarization, double and single clad, core and inner cladding pumped, etc.

- Employer organization in Latin America: Centro de Investigacion e Innovacion Tecnologica del Instituto Politecnico Nacional – MEXICO. www.ciitec.ipn.mx
- Host organization in Europe: Optical Sciences Group Twente University: <http://os.tnw.utwente.nl/>

About NANOFORUMEULA

This Specific Support Action Nanoforum EU Latin America is funded by the European Union under the Sixth EU Framework Programme for Research and Technological Development; Nanotechnologies and Nanosciences, Knowledge Based Multifunctional Materials and New Production Processes and Devices (FP6, NMP), from 1 December 2006 until 30 November 2008. See <http://cordis.europa.eu/nanotechnology>. The project aims to foster lasting research relations between European research organisations and research organisations in Latin America specialising in nanotechnology. We subsidise exchange visits for some twenty Latin American researchers to four European research organisations specialising in nanotechnology. Professor Aviles Cetina is one of these visiting researchers. We also organise two workshops and fact finding missions in Mexico (held in August 2007) and Brazil (4-13 September 2008) enabling European researchers and industrialists to identify opportunities for establishing working relations.

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