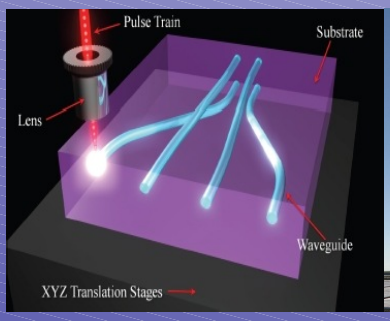
Institute of Applied Physics
Friedrich-Schiller-Universität Jena

seit 1558

Ph.D. position offer:

Ultrafast Laser Inscription in infrared materials for Astrophotonics

Ultrafast Laser Inscription (ULI) is a unique manufacturing technique allowing the fabrication of three dimensional micro-photonic components in a variety of glasses and crystals [1]. While ULI is generally mastered for conventional silica-based glasses, little is know about structural modifications in special glasses suitable for photonic applications in mid-infrared [2] for biophysics and astrophotonics [3].
Especially the latter field, applications of mid-infrared 3D-micro-photonics are particularly interesting for the technique of stellar interferometry [2,4]. Stellar interferometry is an advanced astronomical technique allowing high resolution imaging of astronomical sources by coherent combination of light collected by several separate telescopes.
It has been demonstrated that beam combination of starlight is best achieved in integrated optics components featuring single mode waveguides.



In this context, the Institute of Applied Physics at the University of Jena offers **one Ph.D. scholarship** in the frame of the project ALSI (**Advanced Laser-writing for Stellar Interferometry** – see website: http://stefanominardi.eu/444-2/).
Goals of the research will be: 1) manufacture complex 3D-integrated-optics components for infrared astronomical interferometry, 2) participate in the definition of ULI models in infrared materials,
3) investigate the chemical-physical origin of the laser-induced modifications of infrared glasses.
Besides enjoying the collaborations with the Max Plank Institute for Astronomy (MPIA-Heidelberg) and the 1st Physics Institute of the University of Cologne, the student will be actively involved into the work of a multi-national consortium of scientists and engineers, grouping the most prominent actors of the Astrophotonic research in Europe.

Interested candidates should send a Curriculum Vitae (including Master degree marks) and a short letter of interest to:

Dr. Stefano Minardi (local coordinator ALSI)
stefano.minardi@uni-jena.de
Tel. +49 (0)3641 947 848

The **closing date for application is 01.09.2014**, but applications will be considered until a suitable candidate is identified.

References:
[1] Pertsch et al. Opt. Lett. 29, 468 (2004).
[2] Rodenas et al. Opt. Lett. 37, 392 (2012).
[3] Bland-Hawthorn, Kern Opt. Exp. 17, 1880 (2009).
[4] Minardi, Pertsch Opt. Lett. 35, 3009 (2010).

Ph.D. position in Ultrafast Laser Inscription in infrared materials for Astrophotonics

Ultrafast Laser Inscription (ULI) is a unique manufacturing technique allowing the fabrication of three dimensional micro-photonic components in a variety of glasses and crystals [1]. While ULI is generally mastered for conventional silica-based glasses, little is know about structural modifications in special glasses suitable for photonic applications in mid-infrared [2].
The interest in micro-photonic applications for mid-infrared resides mainly in biophysics and astrophotonics [3]. Especially the latter field, applications of mid-infrared 3D-micro-photonics are particularly interesting for the technique of stellar interferometry [2,4].
Stellar interferometry is an advanced astronomical technique allowing high resolution imaging of astronomical sources by coherent combination of light collected by several separate telescopes. It has been demonstrated that beam combination of starlight is best achieved in integrated optics components featuring single mode waveguides.

In this context, the Institute of Applied Physics at the University of Jena is a partner of the BMBF-funded project ALSI (**Advanced Laser-writing for Stellar Interferometry**) together with the Max Plank Institute for Astronomy (MPIA-Heidelberg), and the 1st Physics Institute of the University of Cologne (coordinator).
One Ph.D. position is offered at our institute in the frame of this project.
The ALSI project is intended at developing new photonic-based solutions (i.e. based on optical fibers and integrated optics components) fabricated by ultrafast laser inscription techniques and which will become the future key components for interferometric facilities such as the VLTI (www.eso.org) or PFI (http://planetformationimager.org/) to implement multi-aperture beam combination and fringe-tracking.

The incumbent will learn how to create waveguides with ULI in infrared materials like GLS and other chalcogenide glasses. He/she will characterize the laser written components with a near-field infrared setup and a Raman confocal microscope and use the results to optimize the ULI technique in infrared materials. Goals of the research will be:

1) to manufacture complex 3D-integrated-optics components for infrared astronomical interferometry
2) participate in the definition of ULI models in infrared materials.
2) investigate the chemical-physical origin of the laser-induced refractive index modification in infrared glasses.

Besides enjoying of the collaborations with the MPIA and the university of Cologne, the student will be actively involved into the work of a multi-national consortium of scientists and engineers, grouping the most prominent actors of the Astrophotonic research in Europe.

Interested candidates should send a Curriculum Vitae (including Master degree marks) and a short letter of interest to:

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