

PhD Thesis - GIF project

Job title	Study of Brillouin scattering and its applications in photonic micro/nano guides
Job type (PhD, Post-doc, Engineer)	PhD
Contract	36 months 1600 € net/month
Qualifications (Master, Ph.D ...)	Master
Job hours (full time/ part time)	Full Time
Employer	UBFC Université Bourgogne Franche-Comté
Financing Institutions	Graduate School EIPHI & Region Bourgogne Franche Comté
Host Laboratory	FEMTO-ST
URL Host Laboratory	www.femto-st.fr
Address Host Laboratory	INSTITUT FEMTO-ST – DÉPARTEMENT MECANIQUE APPLIQUÉE 24 Chemin de l'Épitaphe - 25000 BESANÇON
Job description	<p>Within micro/nano-fibers with a diameter 50 times finer than a hair (or 100 times finer than a standard optical fiber), we have observed a new mode of light scattering induced by surface waves in optical microfibers [1-2]. By reducing the dimensions of optical fibers to nanometric dimensions, it is possible to confine the light in an extreme way. The strong confinement of light generates an acoustic wave that travels at 3400 m/s along the surface of the microfiber and scatters the light back with a frequency shift in the GHz range. These surface acoustic waves are very sensitive to environmental factors such as temperature, pressure or ambient gas and, as we have recently discovered, to the polarization of light.</p> <p>The objective of this PhD thesis is to design and fabricate new microfibers of micrometer and nanometer sizes at the FEMTO-ST Institute and to study their behavior in a controlled gaseous environment. In particular, we wish to exploit polarization sensitivity to explore new applications. We aim on the long term at applications for telecommunications (optical memory) and sensors for environmental security (toxic particle detector, gas sensor) or for spectroscopy (reference).</p> <p>This multidisciplinary thesis will be at the interface between photonics, acoustics, electronics and micro-nanotechnologies. It therefore requires the exploitation of our experimental platform for the fabrication and study of optical microwires but also the design and building of a new experimental setup. This project will be carried out in partnership with the EPFL, the Max Plank Institute and the ICB.</p> <p>For this thesis, we are looking for a student with knowledge in the field of photonics and signal processing and interested in optical fibers. The financing of this thesis is assured.</p>

	<p>[1] J.-C. Beugnot, S. Lebrun, G. Pauliat, H. Maillotte, V. Laude, et T. Sylvestre, « Brillouin light scattering from surface acoustic waves in a subwavelength-diameter optical fibre », Nature Communications, vol. 5, n° 5242, oct. 2014.</p> <p>[2] A. Godet, T. Sylvestre, V. Pêcheur, J. Chrétien, J.-C. Beugnot, and K. Phan Huy, Nonlinear Elasticity of Silica Nanofiber, APL Photonics 4, 080804 (2019).</p>
Supervisor(s)	Kien Phan Huy, and Jean-Charles Beugnot
Candidate profile	For this thesis, we are looking for a student with knowledge in the field of photonics and signal processing and interested in optical fibers. The financing of this thesis is assured.
Keywords	
Application deadline	15/06/2021
Application Depending on the type of position	<p>The doctoral fellowship is 3-year fellowship funded by EUR-EIPHI and BFC-Region</p> <p>Interested candidates may send their application to kphanhuy@univ-fcomte.fr</p> <p>Applications must contain:</p> <ul style="list-style-type: none"> • An academic CV • A cover letter/statement of purpose • At least two letters of recommendation • A transcript of records for the past two years