



Photon-phonon interactions in optical microfibers and nanofibers

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Abstract

Subwavelength-diameter optical fibers, also known as optical fiber micro and nanofibers, are the tiny cousins of standard optical fibers. These hair-like slivers of glass, manufactured by tapering optical fibers down to a size hundred times smaller than a strand of hair, have a number of optical and mechanical properties that make them very attractive for both fundamental physics and technological applications. In addition to providing strong light confinement and enhanced nonlinear optical effects, optical microfibers also exhibit a large evanescent field, enabling applications not currently possible with comparatively bulky optical fibers.

In this talk, I will review our recent works on a new type of Brillouin light scattering arising from the interaction between guided light and surface acoustic waves. I will further show that this effect may prove interesting for applications to optical sensing that exploit surface acoustic waves, or for precise metrology of optical microfibers.

Thibaut Sylvestre (Research Director, CNRS) is leading the nonlinear photonics group at FEMTO-ST research institute, in Besançon, France. He is supervising both theoretical and experimental studies of fundamental nonlinear effects that occur in optical fibers and other tiny optical waveguides (photonic crystal fibers, optical micro and nanofibers, and resonators), with the aim of investigating potential applications to ultrafast signal processing, fiber-based telecommunications, fiber lasers and optical fiber sensors. He has broad expertise in nonlinear fiber optics and related fields and he has done many scientific achievements in the fields of broadband fiber-based parametric amplification, pulsed and

cw-pumped supercontinuum generation, high-power Raman fiber lasers, passive mode-locking of fiber lasers through dissipative four-wave mixing, and Brillouin light scattering in specialty optical fibers. He co-authored more than 100 publications in scientific journals and as many conference papers, and hold two patents. For all those contributions, he has been awarded with the Fabry-Gramont Prize from the French Optical Society in 2012. He is a member of The Optical Society of America and of the IEEE Society and the French society of optics (SFO).