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Coherency for a better detection

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Several scientific domains including defense, metrology, aerospace, and telecommunications require low frequency and intensity noise sources. Coherent lasers could improve detection and could offer new perspectives in the fields of instrumentation for high-speed optical telecommunications, microwave-photonics systems and highly sensitive sensors. If very coherent lasers have been realized in metrology or following fundamental studies (for examples, Menlo systems), their cost or complexity is prohibitive and there is a need for compact, low-cost coherent lasers (~Hz linewidth). We propose to use multi-stokes Brilouin lasers to reach such a goal. Generation of multiple Stokes orders with a single pump enables to filter out the pump noise as many times as the number of nonlinear components, which leads to a drastic reduction in the frequency noise, accompanied by a reduction in the intensity noise. We give for the first time frequency and intensity noise measurement for high-order Stokes components for Brillouin fiber lasers. We discuss future improvements and the impact of such low-cost, compact lasers.

Biography

Besnard Pascal has completed his PhD degree in Physics from University of Rennes and Postdoctoral studies at Ontario Lightwave and Laser Research Center, Toronto, ON, Canada. He is Professor at ENSSAT and was the Head of the Optronics department during 6 years and at the Head of the Laser Physics Group from 2000 to 2012. Since 2012 he is the Director of the unity CNRS Foton (optical Functions for the sciences of communication). His principal research interests include laser physics, noise, optical injection, optical feedback, and mode-locked lasers using semiconductor and fiber technology for optical communications and sensors.

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