Brillouin instabilities in high power fiber lasers

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Auteur	Mallek, Djouher [1], Kellou, Abdelhamid [2], Leblond, Hervé [3], Sanchez, François [4]
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Résumé en anglais	With the emergence of rare-earth doped fibers, and especially double-clad fibers, there is a renewed interest in Brillouin effect. First of all, the amplification of a continuous signal in a rare-earth doped fiber amplifier can generate high enough intensities to excite Brillouin effect and then to create a backscattered stokes wave. Such back-reflection is detrimental for amplifier applications and consequently it has been studied theoretically and experimentally. Recently, the low frequency self-pulsing instability resulting from Brillouin backscattering has been theoretically modelled [1]. Our main objective is to present a general model allowing to explain the origin of the dynamic instability arising in a fiber lasers as a consequence of Brillouin effect. The effect of Brillouin back scattering is theoretically analysed by two-coupled modes laser model. We consider the Fabry-Perot fiber laser cavity. The rich and complex dynamic behaviours are observed. In particular the quasi periodic dynamic is identified and studied.
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