Fast photorefractive self focusing in InP:Fe semiconductor at near infrared wavelengths

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Résumé en anglais	Self-trapping of optical beams in photorefractive (PR) materials at telecommunications wavelengths has been studied at steady state in insulators such as SBN [1] and in semiconductor InP:Fe [2], CdTe [3]. PR self-focusing and soliton interactions in semiconductors find interesting applications in optical communications such as optical routing and interconnections because of several advantages over insulators: their sensitivity to near-infrared wavelengths and shorter response time. Photorefractive self focusing in InP:Fe is characterized as a function of beam intensity and temperature. Transient self focusing is found to occur on two time scales for input intensities of tens of W/cm2 (one on the order of tens of µs, one on the order of milliseconds). A theory developed describes the photorefractive self focusing in InP:Fe and confirmed by steady state and transient regime measurements. PR associated phenomena (bending and self focusing) are taking place in InP:Fe as fast as a µs for intensities on the order of 10W/cm2 at 1.06 µm. Currently we are conducting more experiments in order to estimate the self focusing response time at 1.55µm, to clarify the temporal dynamic of the self focusing and to build up a demonstrator of fast optical routing by photorefractive spatial solitons interactions.
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