

The role of nano-carbon materials in advancing fiber laser technologies

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Abstract

The rising presence of ultrafast fibre lasers in industry and scientific applications can be credited to the impressive pace at which the understanding and harnessing of pulse propagation and the interplay between pulses in optical fibres is developing. Multiple factors have contributed to this advancement in fibre laser technologies, starting from an improved understanding and control over the nonlinearities that govern the propagation dynamics of ultrashort pulses [1], the development of novel purpose-made optical fibres and the development of new interrogation approaches to understand, characterize and design laser pulses. Another aspect that has contributed to the advance of ultrafast fibre laser technologies, both from the industrial and scientific point of view is the advent of a new class of saturable absorbers consisting on nanomaterials such as carbon nanotubes and graphene [2] and the more recent introduction of other 2D layered materials [3]. In this talk, I will discuss the role of these saturable absorbers in advancing the field of ultrasfast fibre lasers. First, I will discuss the role that we envisage these materials may have in facilitating ultrashort pulse generation at wavelength ranges that have traditionally been challenging for fibre laser configurations such as the mid-infrared [4] and the visible [5]. Second, we will discuss the contribution of these saturable absorbers in observing, understanding and controlling nonlinear dynamics in fibre laser configurations [6].

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References

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