Towards new photonics sources based on carbon nanotubes

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The particular stability of carbon nanotubes (CNT) light emission with temperature [1] confers them great potential for future ultra stable active sources. This behavior should be attributed to the original 1D-excitonic properties of these nanomaterials and should overcome the difficulties with current photonics sources based on 2D-nanomaterials, like quantum wells, which deviate with temperature according to Varshni's law [2]. In this context, we are developping a novel structure of electrically-pumped active source based on CNT, for future optoelectronic applications. Furthermore, such CNT-laser diode offers an excellent platform to study optical phenomena in one-dimension, where for example, a precise analysis of excitonic energy transfer between CNT should be investigated in order to get inversion population at 1D. Thus, we will present our research studies on passive [1,3,4] as well as active photonics devices based on CNT for photonics applications.

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