Quantum Dot based mode locked lasers for optical frequency combs

Mots clés :

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Résumé du projet de recherche (Langue 1)

After the burst of the internet bubble, the optical communication and component industries are in a process of consolidation and cost reduction. The drastic increase of the internet traffic requires the development of high bandwidth high bit rate optical networks. Strategic stakes in particular imply the ability to achieve low cost and small foot print optical components while simultaneously enhancing their performances. For the last decade, Quantum Dot (QD) based lasers and devices have been the subject of considerable interest owing to expected unique properties that result from the 3-D confinement of charge carriers. Enhanced non-linear effects have also allowed the generation of subpicosecond pulses in single section InAs/InP QD mode locked lasers. The research activity will be focused on the optimization of mode locked lasers emitting in the 1.55 µm window for frequency comb generation compatible with the ITU grid. Engineering of QD nanostructures and growth optimisation will be carried out to achieve wide optical bandwidth of the emission spectrum of QD based mode-locked lasers. In the present research project InAs/InP based lasers will be investigated for 1.55 µm emission and implementation of comb generation using mode-locked lasers for modulation at 10 Gb/s per channel, with 100 GHz channel spacing for the C wavelength window. Radio-over-fiber activities will include indoor applications where low noise 60 GHz radio signals will be generated using QD mode locked lasers. This implies design and fabrication of single mode devices and their full assessment including temporal and phase properties, noise characteristics,…followed by 10 Gbit/s transmission in collaboration with partners from the Marie Curie Initial Training Network PROPHET (Postgraduate Research on Photonics as an Enabling Technology). These devices will also be used for the generation of low noise 60 GHz radio signals for radio-over-fiber applications.