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Novel Detectors and Lasers for Telecommunications

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Abstract: For the most part the field of optoelectronics has been dominated by the pn junction for both detector and laser applications. This domination will probably hold true for laser applications for many more years although the simple forward biased junction may be challenged by other novel approaches as increased complexity is required such as multi-wavelength emission, wavelength conversion, and THz operation. The first real novel use of the pn junction was developed by Balkan et al. [1]. Their HELLSH device paved the way for novel approaches in the use of the pn junction. In this paper I shall introduce another novel use of the pn junction for light emission. Monte Carlo and Drift Diffusion modelling of the device will be presented as will our first experimental results. The applications of the device in telecommunications will be outlined which include multi-wavelength lasers and wavelength converters. In the field of detectors the pn junction has now a number of rivals. The main contenders are the MSM photodetector, the BG-MSM photodetector and the Low-Temperature (LT) family of MSM detectors. A brief overview of these devices will be given along with our experimental results on the BG-MSM device.

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