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A Nonlinear Optical loop Mirror enhanced three wavelengths Erbium doped fiber laser

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Abstract content
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A three wavelengths Erbium doped fiber laser source is developed. The configuration is a unidirectional ring cavity with a 2.5 meter of Erbium doped fiber as a gain medium. The emission wavelength selective components are Bragg gratings printed in photosensitive fiber. Erbium doped fiber is a homogeneously broadened gain medium at room temperature, as a result, simultaneous wavelength oscillation affects the wavelength and power stability of the laser, due to cross gain saturation that causes wavelength competition such that one wavelength oscillation at a time can be supported. This has a detrimental effect in Wavelength Division Multiplexing systems in which multi-wavelengths Erbium doped fiber lasers are predominantly applicable. To suppress the wavelength competition thereby enhancing the laser wavelength stability, a Nonlinear Optical Loop Mirror is incorporated in the laser cavity. A series of experiments to determine the optimum length of the Loop Mirror at which the stability for the three wavelengths laser is at maximum have been performed. The experimental characterization has shown that at 2.5 km Loop length, the stability of both the wavelengths and output power of the laser is achieved. The laser has emission at 1540nm, 1547 nm and 1555 nm with an average of 1 mW of optical power level in each oscillation wavelength.

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MSc

Main supervisor (name and email)
and his / her institution

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