NON LINEAR EFFECT IN SINGLE MODE OPTICAL FIBER

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ABSTRAK

Sifat optik tak-linear telah dipertunjukkan di dalam gentian optik silika terutamanya serakan Raman teransang dengan menggunakan Nd-YAG laser pada 1064 nm dan 532 nm. Serabut optik dalam kajian ini telah dibekalkan oleh Newport dan OPCOM. Beberapa jenis serakan Raman teransang telah diperhatikan, terutamanya serakan Raman teransang tertib pertama yang menjadi sumber pam kepada serakan Raman teransang tertib kedua dan seterusnya tertib kedua ini yang menjadi sumber pam kepada serakan Raman teransang tertib ketiga. 'Walkoff' antara tertib pertama serakan Raman teransang dan pam telah diukur dan dikaji.

'Amplifier' jenis pam hadapan dan jenis pam belakang telah dibina dengan menggunakan gentian optik dari Newport. Sumber pam telah diambil dari harmonik kedua Nd-YAG laser dan isyarat pula diambil dari sebuah dye laser, pada 546 nm. Pembesaran isyarat sebanyak 17 dB telah dicapai. Bandingan kecekapan antara 'amplifier' jenis pam hadapan dan jenis pam belakang telah dikaji. Kajian juga dilakukan untuk mengukur 'Raman gain' untuk gentian optik dan nilai yang diukur itu setanding dengan nilai yang telah dilapurkan untuk gentian optik silika.

ABSTRACT

Non linear effects had been demonstrated in single mode pure silica fibre, in particular stimulated Raman scattering, using Nd-YAG laser as the pump, both at 1064 nm and at frequency doubled 532 nm. The fibres used in this study was supplied by Newport and by OPCOM. Under intense pump power, various stimulated Raman scattering orders had been observed, mainly the first order stimulated Raman scattering pumping the second order and the second order stimulated Raman scattering pumping the third order. The walkoff between the first order stimulated Raman and the intense pump had been measured.

A Raman fibre amplifier had been constructed both in the forward and backward configuration, using the Newport silica fibre. The pump was taken from the second harmonic generation of a Nd-YAG laser. Signal was taken from a dye laser and fixed at 546 nm. Amplification of the signal as high as 17 dB had been recorded. Also measured were the relative efficiencies of both the fibre amplifiers. The Raman gain of the fibre had also been measured and the value tally with previous reported data.

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