

Intensity-Dependent Refractive Index of an Asymmetric Rectangular Quantum Well

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Abstract— We study the linear and third order nonlinear changes in the refractive index of an asymmetric rectangular quantum well (ARQW). It is shown that the parameters such as the asymmetry and width of the potential well not only shift the peak positions of the refractive index changes but also considerably modify their height. These results suggest that the changes in the refractive index can be easily controlled by the structure parameters of an asymmetric rectangular quantum well. Moreover, the incident optical intensity has a great effect on the changes in the refractive index of ARQW.

Index Terms—Intersubband transitions, nonlinear optics, quantum wells, Refractive index changes.