

# Turkish Journal of Physics

Turkish Journal

of

Physics


Single Si  $\delta$ -Doped GaAs Investigations by New Photothermal Wavelength Modulated Photocurrent Technique

Fikret HAJIEV, Yener ÖZKAN

TUBİTAK-UEKAE, The National Institute of Electronics,  
P.O Box 21, 41470, Gebze, Kocaeli-TURKEY

M. Çetin ARIKAN

Faculty of Sciences, University of İstanbul, Vezneciler,  
34459, İstanbul-TURKEY

 [Keywords](#)

 [Authors](#)



[phys@tubitak.gov.tr](mailto:phys@tubitak.gov.tr)

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**Abstract:** New Photothermal Wavelength Modulated Photocurrent (PWMP) technique is reported. This technique is used for investigation of the MBE grown p-GaAs sample in which a single Si-layer was embedded with a  $\delta$ -type profile. Two spectral features were observed at 1.5137 eV and 1.5115 eV at 20 K. These peaks were attributed to the ( $D^0, X$ ) and ( $A^0, X$ )-excitons bound to neutral donors and acceptors, respectively. We studied the temperature dependence of these excitonic peaks positions at temperatures between 20-90 K. Additionally, we demonstrate a blue shift of photocurrent spectra under a low level illumination intensity. PWMP technique and the nature of the registered signals were explored in detail. The dependence of the excitonic peaks on the chopping frequency and the intensity are discussed.

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Turk. J. Phys., **23**, (1999), 689-700.

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