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Free-Carrier Absorption in Quantum Well Structures for Alloy-Disorder Scattering

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**Abstract:** A free-carrier absorption theory is given for quantum wells structures in III-V semiconducting materials, for the case when the carriers are scattered by alloy-disorder. It is found that absorption coefficients due to alloy-disorder and to phonons are of the same order. Results are shown that the absorption coefficient decreases with increasing photon frequency and increases with increasing temperature. It is also shown that the absorption coefficient increases with decreasing layer thickness. We also found that absorption in quantum wells structures is enhanced by going to quantum wells of smaller thickness over its value in the bulk III-V semiconducting materials.



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