2005 Vol.44 No.6 pp.1095-1098 DOI:

Interaction of a Surface Acoustic Wave with a Two-dimensional Electron Gas

YANG Shi-Jie,[1] ZHAO Hu,[1] and YU Yue[2]

[1] Department of Physics, Beijing Normal University, Beijing 100875, China
[2] Institute of Theoretical Physics, the Chinese Academy of Sciences, P.O. Box 2735, Beijing 100080, China
(Received: 2005-5-26; Revised:)

Abstract: When a surface acoustic wave (SAW) propagates on the surface of a GaAs semiconductor, coupling between electrons in the two-dimensional electron gas beneath the interface and the elastic host crystal through piezoelectric interaction will attenuate the SAW. The coupling coefficient is calculated for the SAW propagating along an arbitrary direction. It is found that the coupling strength is strongly dependent on the propagating direction. When the SAW propagates along the [011] direction, the coupling becomes quite weak.

PACS: 73.40.Kp, 77.65.Dq, 73.50.Rb

Key words: surface acoustic wave, piezoelectric coupling