



The Modification of Einstein's DMR Relation in Quantum Wire Super Lattices (QWSL) and Study of Shubnikov De Hass Effect in Parabolic Semiconductors: Simplified Theory and Suggestions for Further Experimental Determination in Biomaterials

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Abstract

The semiconductor super lattices (SLS) and nano wires have found wide applications in many electronic device structures and bio devices such as photo detectors, light emitters, avalanche photo diodes, compensatory transistors, tunneling devices, genetic diodes etc. The most extensively studied SL is the one consisting of alternate layers of GaAs and Ga_{1-x}Al_xAs, owing to its fabrication. The GaAs layers form the quantum wells, quantum dots, quantum wires and the Ga_{1-x}Al_xAs layers form the potential barriers. We wish to note that, the aforementioned SLS have been proposed with the assumption that the interfaces between the layers are sharply defined with zero thicknesses so as to be devoid of any interface effects. As the potential form changes from a well (barrier) to a barrier (well), an intermediate potential region exists for the electrons. Thus the influence of the finite thickness of the interface on the carrier dispersion law becomes very important since, the carrier energy spectrum governs all the transport properties. In this paper, we shall investigate the DMR for the most interesting case which occurs in QWSLs of graded interfaces and compare the same with that of the constituent materials by formulating the respective one dimensional electron dispersion laws.

The above mentioned inversion layer (ILs) also produces the well-studied Shubnikov de has effect in different nano structured materials and have been found wide applications in the molecular and cell biology.



Biography:

Sudip Chatterjee is presently working as an Associate Professor in the department of Basic Science at a premier Institute of India. He had received his Ph.D. degree on some electronic transport properties of nanomaterials from Jadavpur University, Kolkata in 2005 and he continued his post-doctoral research at

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Speaker Publications:

1. "Influence of acrylate content on the properties of ethylene methyl acrylate multiwalled carbon nano tube composites"; *Advanced Science letters.* / 2010 / 3 /1-10.
2. "The Study of Einstein relation in quantumdots superlattices (QDSL) of nonparabolic semiconductors : simplified theory and Suggestions for future experimental determination in biomaterials"; / 2020.
3. "Studies on the filler microstructures in thermal and dynamic mechanical property development in ENR based ternary nanocomposites"; *Composites part A* / 2009.

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