Tunneling through a barrier under transverse magnetic field and I-V characteristic

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Abstrak

We report the effects of a transverse magnetic field (JB) on the conductivity of quantum well tunneling structures based on AlGaAs/GaAs/AlGaAs quantum wells. The current voltage characteristics in the positive differential resistance regime show negative magnetoconductance for all values of B. The peak bias voltage increases monotonically with increasing B. For B6 T there is a decrease in the peak tunneling current, but then it increases for B6 T. The data also show dramatic magnetic field induced changes in the negative differential resistance (NDR) features. The behavior of the NDR changes from sharp hysteretic bistable like transitions to astable NDR transitions. Both the valley current and its bias voltage position increase with increasing magnetic field. This behavior is described by a simple model that includes magnetic field effects across the barriers.