Electric field effects in Fibonacci superlattices

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Abstract-

We present a thorough study of transmission and localization properties of Fibonacci superlattices, both in flat band conditions and subject to homogeneous electric fields perpendicular to the layers. We use the transfer matrix formalism to determine the transmission coefficient and the degree of localization of the electronic states. We find that the fragmentation pattern of the electronic spectrum is strongly modified when the electric field is switched on, this effect being more noticeable as the system length increases. We relate those phenomena to field-induced localization of carriers in Fibonacci superlattices.

Index Terms- semiconductor superlattice, bloch oscillations, gaas