PHONON INDUCED TRANSPORT IN DOUBLE QUANTUM DOTS AND SURFACE ACOUSTIC WAVE FOCUSING

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We discuss recent experiments on semiconductor lateral double quantum dots, demonstrating the occurrence of phonon induced transport through the dots coupled in series. Our lithographically defined double quantum dot devices [1] have integrated on-chip interdigital transducers (IDTs) to generate surface acoustic waves in the double dot environment. At the resonance frequency of our IDT (1.94 GHz) we observe non-resonant tunneling which we ascribe to phonon assisted transport. The experimentally observed phonon assisted tunneling features are in good agreement with our calculations of inelastic current for a weakly coupled double dot [2]. We also have fabricated high-frequency focusing IDTs on GaAs-based heterostructures [3]. Preliminary, though promising results are presented.

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[2] W.G. van der Wiel, T.H. Oosterkamp, S. de Franceschi, C.J.P.M. Harmans, and L.P. Kouwenhoven in *Strongly Correlated Fermions and Bosons in Low-Dimensional Disordered Systems*, I.V. Lerner *et al*. (eds.), pp.43-68, Kluwer Academic Publishers, Boston/Dordrecht/London, ISBN 1-4020-0748-5 (2002).

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