

HATANO LAB.

[Theoretical Study of Electronic Conduction of Quantum Dots]

Department of Fundamental Engineering

<http://hatano-lab.iis.u-tokyo.ac.jp>

Many-Body Physics

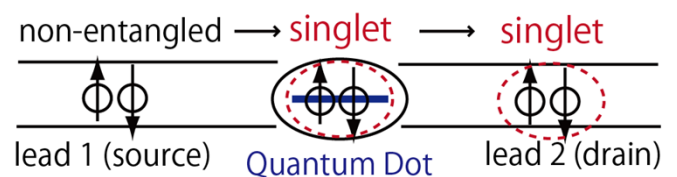
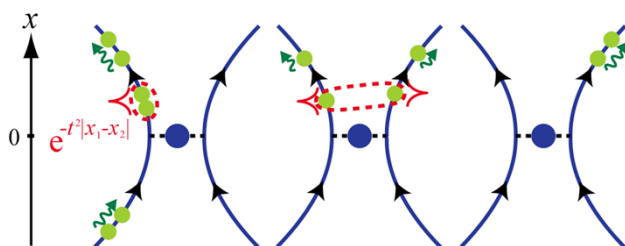
Department of Physics

Entanglement Generation with Quantum Dots

Generating Quantum Entanglement just by Electronic Conduction through Quantum Dots

- ◆ Rigorous Calculation of Scattering State of a Quantum Dot with Interaction
- ◆ A Novel Two-Body Bound State of Electrons after Passing through a Dot
- ◆ Generation of a Singlet of Spins \uparrow and \downarrow after Passing through a Dot

A. Nishino, T. Imamura, N. Hatano: Phys. Rev. Lett. **102**, 146803 (2009); Phys. Rev. B **83**, 035306 (2011);
T. Imamura, A. Nishino, N. Hatano: Phys. Rev. B **80**, 245323 (2009).

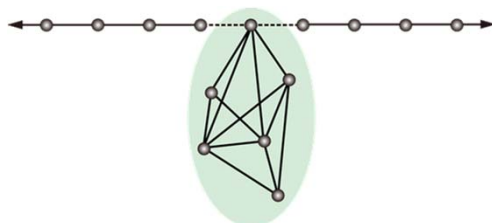


New Conductance Formula of a Quantum Dot

Conductance Formula of a Quantum Dot based on Resonant States

- ◆ A New Expression of Conductance of Quantum Dots of a Generalized Friedrichs Type only in terms of Resonant States and Bound States
- ◆ Fano Asymmetry of Conductance Peaks is due to Interference between Resonant States

K. Sasada, N. Hatano, G. Ordonez: submitted.



$$G = \frac{e^2}{h} \left[1 \pm \sqrt{1 - \left(\frac{\rho_{\text{eigen}}(E)}{\rho_{\text{leads}}(E)} \right)^2} \right]$$

