

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electron-Photon interaction associated Uncertainty Relation based Tunneling in a Parallel Double Quantum Dot System KAO-CHIN LIN, Department of Electrophysics, National Chiao Tung University, Hsinchu, Taiwan, DER-SAN CHUU COLLABORATION — A new mechanism of electron-photon interaction in a parallel double quantum dot (DQD) system is studied. The electron is allowed to transit between dots due to the electron-photon interaction. When the electron in quantum dot m (QD m) transits to the adjoining QD $m(m, m1, 2$ and $mm)$, it is allowed to tunnel into lead m , which is connected to QD m , via energy-time uncertainty relation in a very short time interval. Like the Kondo resonant peak in Anderson model, the new mechanism of the electron-photon interaction exhibits peaks which depends logarithmically on temperature. The character temperature obtained is found to be higher than the Kondo temperature in some situations. Unlike the Kondo effect, the quantum mechanical tunneling associated the electron-photon interaction is not always on resonance.

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Date submitted: 26 Nov 2006

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