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Thermal entanglement in two double quantum dots LESVIA-DEBORA CONTRERAS-PULIDO, CICESE, FERNANDO ROJAS, Theoretical Physics Department, CCMC-UNAM — Entanglement has become an important resource in quantum information processing, it is important to quantify the degree of entanglement between two qubits at a finite temperature [1]. As charge qubits realized in double quantum dots are promising solid state candidates for both qubit and entangled states realization, we explore theoretically the non-zero entanglement generation between two charge qubits surrounded by a thermal environment and under the effect of an external asymmetric electric field. The qubits array is described by a Hubbard-type Hamiltonian which is diagonalized in order to calculate the equilibrium thermal density matrix, used to quantify the entanglement by Wootters' concurrence. We find that the qubits exhibit thermal entanglement that vanishes at finite temperature and we show that concurrence depends on both tunneling and the external potential. The critical value for which concurrence vanishes presents a parabolic dependence with the external potential, which is a controllable parameter in quantum dots through gate voltages. We acknowledge support from projects DGAPA-IN114403 and CONACyT -43673-F. [1]. Arnesen et al., Phys.Rev.Lett 87,017901 (2001) [2]. Wootters Phys. Rev. Lett. 80, 2245 (1998)

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