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Electron relaxation through multiphonon processes in a double quantum dot VASILIOS STAVROU, Dept. of Physics and Astronomy, University of Iowa, Iowa City, IA 52242-1479, XUEDONG HU, Department of Physics, State University of New York at Buffalo, NY 14260-1500 — We theoretically study the relaxation of the electron orbital states of a double quantum dot system due to two-phonon processes. In particular, we calculate how the relaxation rates depend on the separation distance between the quantum dots, the strength of quantum dot confinement, and the lattice temperature. Our results show interesting crossovers in the relative strength of different scattering channels as temperature is varied. Furthermore, although at low temperatures two-phonon processes are much weaker compared to one-phonon processes in relaxing electron orbital states, at room temperature they are as important as one-phonon processes.

Vasilios Stavrou
Dept. of Physics and Astronomy, University of Iowa, Iowa City, IA 52242-1479

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