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Reduced-Density-Matrix Description for Multi-Photon Processes in Quantized Electronic Systems[1] VERNE JACOBS, ALEX KUTANA, Naval Research Laboratory — A reduced-density-matrix description is developed for multi-photon processes in quantized many-electron systems, taking into account environmental electron-photon and electron-phonon interactions. Using a perturbation expansion of the frequency-domain Liouville-space self-energy operator, the spectral-line widths and shifts are evaluated in the isolated-line and short-memory-time (Markov) approximations. Applications of interest include spectral simulations for single-photon and two-photon absorption processes in atomic, molecular, and solid-state systems.

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