Green's function methods for open molecular systems

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Developments of experimental techniques at the nanoscale require corresponding developments in theoretical methods. With the focus of experimental research shifting to open molecular systems, theory must provide methods capable of describing the responses of open nonequilibrium quantum systems while accounting for environmental effects. Nonequilibrium Green's functions provide a convenient theoretical tool that satisfies the requirements above. I will review our recent efforts on the theoretical formulation of optical spectroscopy and quantum control using various nonequilibrium Green's function techniques.

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[5] H. Sun and M. Galperin, APL Quantum 2 (2025) 016134.