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Study of quantum coherence through optical line shape of an extended excitonic system BIMAN BAGCHI, RAJESH DUTTA, Indian Institute of Science, KAUSHIK BAGCHI, Ohio State University — We address the effects of quantum coherences on optical line shape of an exciton in presence of dynamic disorder. We consider a one dimensional excitonic system consisting of two levels, placed at regular intervals, coupled to a stochastic bath. An exact solution of the line shape is obtained by using Kubo's stochastic Liouville equation when bath jumps between two states obeying Poisson statistics. We utilize the fact that in site representation the system Hamiltonian with constant off-diagonal coupling J is a tridiagonal Toeplitz matrix (TDTM) with order equal to the number of sites. This is particularly useful for long chains where the exactly known eigen values help explaining the crossover between static and fast modulation limits. In the slow modulation limit effects of spatial correlation are not negligible. The line shape is also broadened and number of peak increases than that of obtained from TDTM (constant off-diagonal coupling element J and no fluctuation). However, in the fast modulation limit when the bath correlation time is small, the spatial correlation is less important. The two limits affect the line shape differently because of quantum coherence. (R Dutta and B. Bagchi, J. Chem. Phys. 145, 164907 (2016); R Dutta, K Bagchi and B Bagchi, [arXiv:1612.09409].)

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