Strength Functions in Open Chaotic Systems: Application to Photodissociation

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Abstract

We discuss the statistics of bound-to-continuum strength functions in an open chaotic system characterized by a non-hermitean random Hamiltonian [1,2]. In particular we discuss application to the indirect photodissociation of molecules. In the regime of non-overlapping resonances (weak coupling limit) the spectral autocorrelation function and its time-domain analog – the survival probability – are derived using random matrix theory [2]. The universal autocorrelation function and the probability distribution of the total photodissociation cross-section for an arbitrary coupling strength are derived using supersymmetry [1]. The "correlation hole" that characterizes the spectral autocorrelation in the bound molecule diminishes as the average resonance width increases.

[1] Yan V. Fyodorov and Y. Alhassid, Phys. Rev. A **58**, R 3375 (1998).
[2] Y. Alhassid and Yan V. Fyodorov, J. Chem. Phys. A **102**, 9577 (1998).