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Phase correlation in the eigenfunctions of a class of quantum chaotic systems JIAOZI WANG, WENGE WANG, Univ of Sci Tech of China —
The random matrix theory predicts vanishing correlation function for eigenfunctions. In this work, we study an important class of quantum chaotic systems, whose Hamiltonians have a sparse structure in unperturbed bases. It is shown that, contrary to the prediction of the random matrix theory, components of the eigenfunctions in such systems have interesting phase correlations, giving non-vanishing correlation functions. Explicit expressions for some of the correlation functions are derived and checked by numerical simulations. As an application, a relation between a type of transition probability and a survival probability amplitude is derived.

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