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The dynamics of Anderson localization in a quasi 1D system: role of symmetry and topology ESLAM KHALAF, PAVEL OSTROVSKY, Max Planck Institute for Solid State Research, Stuttgart, Germany — Since its discovery 60 years ago, Anderson localization has been an active area of research. Despite this, little is known about the dynamical correlations in Anderson localized systems beyond the strictly 1D case, where effects of symmetry and topology cannot be taken into account. Quasi-1D systems, on the other hand, provide realistic models for Anderson localization, where symmetry and topology play a non-trivial role. The main technical difficulty in computing dynamical correlations in these systems lies in the complicated form of the transfer matrix Hamiltonian derived from the sigma model at finite frequency. We show that the zero mode of this Hamiltonian has a surprisingly simple form, leading to a remarkable identity that enables the computation of any dynamical local correlation function in a quasi-1D system in any of the Wigner-Dyson classes. The result is used to compute the quantum return probability in these classes including the effects of topology for classes A, where an arbitrary number of channels can be topologically protected and AII, where a single channel can be topologically protected. Physical realizations of such systems include the interface between two quantum Hall systems, a Weyl semimetal in magnetic field or the edge of a 2D topological insulator.

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