

## **The scar phenomenon revisited**

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Localization effects due to scarring constitute one of the clearest indications of the relevance of interference in the transport of quantum probability density along quantized closed circuits in phase space.

The corresponding path can be obvious, such as it is the scarring periodic orbit itself which produces time recurrences at multiples of the period.

However, there are others more elaborate which only close asymptotically, for example, those associated with homoclinic and heteroclinic orbits.

In this paper, we demonstrate that these circuits are also able to produce recurrences but at (semiclassically) longer times, of the order of the Ehrenfest time.

The most striking manifestation of this phenomenon is the accumulation of quantum probability density along the corresponding circuits.

The discussion is illustrated with an example corresponding to a typical periodic orbit of the quartic two dimensional oscillator.