Controlling transport properties in dielectric billiards

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The classical ray dynamics of dielectric billiards (cavity + medium) has generically a mixed regular-chaotic phase space. The correspondence with the wave description (resonant cavity modes) exhibits a dynamical transport phenomenon known as chaos-assisted-tunnelling (CAT). However, this mechanism is still not well understood. We have constructed a novel billiard (an integrable cavity geometry with an inhomogeneous refractive index) that displays CAT and allows for its parametric control. This ability is important in the context of optical microcavities.

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