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Fractal Weyl law in an open, chaotic Hamiltonian system[1] JORDAN RAMILOWSKI, DAVID FARRELLY, USU, SANDRA PRADO COLLABORATION, FLORENTINO BORONDO COLLABORATION — The original Weyl law states that the number of quantum bound states, up to some energy E, scales as $\hbar^{-d}$, where d is the (integer) dimension of the system. Recently, several open quantum maps have been found to obey a *fractal* version of this law, i.e., the number of quasibound states (resonances) scales as $\hbar^{-d}$, but with d a non-integer. The fractal dimension can be traced to the localization of the resonances on a fractal classical phase-space object - the repeller: the repeller is the intersection of two fractal sets of classical trajectories which remains trapped in the infinite past and the infinite future. Here fractal Weyl law behavior is demonstrated numerically in an open *Hamiltonian* system – rather than in a map. The system, a rotating version of the Henon-Heiles problem, supports a large number of above-barrier resonances. Fractal Weyl behavior is found to hold far from the classical limit and, as in maps, the complex resonance wave functions are localized on a classical repeller whose structure is elucidated. Implications of these findings for physical problems of current interest are discussed - e.g., for the chaotic ionization of the hydrogen atom by a circularly polarized microwave field.

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Jordan Ramilowski
USU

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