1128-35-249 **Hart F Smith*** (`hfsmith@uw.edu`), University of Washington, Box 354350, Seattle, WA 98195-4350. *On the trace of Schrödinger heat kernels and regularity of potentials.*

We consider the Schrödinger operator $-\Delta_{\mathrm{g}}+V$ on a complete Riemannian manifold (M,g), with a bounded real potential V of compact support, and establish a sharp equivalence between Sobolev regularity of V and the existence of finite-order asymptotic expansions as $t\to 0$ of the relative trace of the Schrödinger heat kernel. Precisely, under the hypothesis $V\in L^\infty_{\mathrm{comp}}(M)$ is real valued, then $V\in H^m(M)$ if and only if there are constants c_j so that

$$\mathrm{tr}\Big(e^{-tP_V}-e^{-tP_0}\Big)=(4\pi t)^{-\frac{n}{2}}\Big(c_1t+c_2t^2+\cdots+c_{m+1}t^{m+1}+\mathcal{O}(t^{m+2})\Big).$$

As an application, we generalize a result of Sà Barreto and Zworski on the existence of resonances on compact metric perturbations of three-dimensional Euclidean space, to the case of bounded measurable potentials. (Received February 27, 2017)