1062-35-194   **Umberto Mosco*** (`mosco@wpi.edu`), Department of Mathematical Sciences, 100 Institute Road, Worcester, MA 01609-2280, and **Maria Agostina Vivaldi** (`vivaldi@dmmm.uniroma1.it`), Dipartimento Me.Mo.Mat., Via A. Scarpa 1, I-00161 Roma, Italy. *Vanishing viscosity for fractal sets.*

We address the question whether bulk energy from a surrounding medium can be absorbed into a lower-dimensional fractal set. We consider an array of thin conductive fibers in an open domain of the plane with small viscosity. The resulting composite medium is described by a second order elliptic operator in divergence form with discontinuous singular coefficients. We study the asymptotic spectral behavior of the operator when, simultaneously, the viscosity vanishes and the fibers develop fractal geometry. We prove that the spectral measure of the operator converges to the spectral measure of a self-adjoint operator associated with the fractal limit of the fibers. Our approach is of variational nature and relies on Hilbert space convergence of quadratic energy forms. (Received August 08, 2010)