1068-46-117 **Hafedh Herichi*** (herichi@math.ucr.edu), Department of Mathematics, University of California, Riverside, 900 University Ave, Riverside, CA 92521, and **Michel. L. Lapidus** (lapidus@math.ucr.edu), Department of Mathematics, University of California, Riverside, 900 University Ave, Riverside, CA 92521. *On the spectral operator and the convergence of its Euler product in the critical strip.*

The spectral operator was introduced for the first time by M. L. Lapidus and his collaborator M. van Frankenhuijsen in their theory of complex dimensions in fractal geometry. The corresponding inverse spectral problem was first considered by M. L. Lapidus and H. Maier in their work on a spectral reformulation of the Riemann hypothesis. The spectral operator is defined on a suitable Hilbert space as the operator mapping the counting function of a generalized fractal string to the counting function of its associated spectral measure,

$$a(f)(t) = \zeta(\partial)(f)(t) = \prod_{p \in \mathbf{P}} (1 - p^{-\partial})^{-1}(f)(t),$$

where f is the counting function of the generalized fractal string, ζ is the Riemann zeta function and $\mathbf{P}$ is the set of prime numbers. It relates the spectrum of a fractal string with its geometry. The spectral operator also has an Euler product representation, which provides a counterpart to the usual Euler product expansion for the Riemann zeta function, but is convergent in the critical strip of the complex plane. During this talk, we will be discussing some fundamental properties of this operator and present conditions ensuring convergence of its Euler product. (Received January 17, 2011)