1061-47-26 **Hafedh Herichi*** (herichi@math.ucr.edu), Mathematics department, Surge 283., University of California, Riverside, 900 University Ave., Riverside, CA 92521, and **Michel. L. Lapidus**. *On The Spectral Operator and Some Conditions on its Invertibility.*

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 in connection with the question "Can One Hear The Shape of a Fractal String?". The spectral operator is defined on a suitable Hilbert space as the operator mapping the counting function of a generalized fractal string η to the counting function of its associated spectral measure $\nu = \eta * h$, where $*$ is the operation convolution of measures and h is the generalized harmonic string. It relates the spectrum of a fractal string with its geometry. The spectral operator has also an Euler product representation, which provides a counterpart to the usual Euler product expansion for the Riemann Zeta function, but convergent in the critical strip of the complex plane. During this talk, we will be discussing some fundamental properties of this operator as well as its prime-factors, give an analysis of its spectrum, the spectra of its prime factors and present conditions providing its invertibility. (Received February 12, 2010)