1072-46-241 **Hafedh Herichi***, 900 University Ave, Riverside, CA 92521, and **Michel. L. Lapidus**, 900 University Ave, Riverside, CA 92521. *On a Reformulation of the Riemann hypothesis within the Theory of Complex Dimensions in Fractal Geometry.*

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. It relates the spectrum of a fractal string with its geometry. During this talk, we will be discussing some fundamental properties of this operator and provide a condition ensuring its invertibility which is related to the Riemann hypothesis. (Received June 29, 2011)