1072-82-28 **Joe P. Chen*** (joe.p.chen@cornell.edu), Cornell University, Ithaca, NY 14853. *Statistical mechanics of Bose gas in Sierpinski carpets.*

I will discuss the equilibrium thermodynamics of massless and massive bosons confined in generalized Sierpinski carpets (GSCs), a class of infinitely ramified fractals having non-integer dimensions. Based on the uniqueness of Brownian motion on GSCs, as well as the state-of-the-art estimate of the heat kernel trace, we can, for the first time, make concrete calculation of the spectral zeta function, which is then used to construct the grand canonical partition functions. For physical applications, I will describe blackbody radiation and Casimir effect in fractal waveguides, and show that Bose-Einstein condensation exists in the thermodynamic limit iff the Hamiltonian is transient, i.e., the spectral dimension exceeds 2. At the end I will offer a few experimental suggestions to test these results. (Received May 23, 2011)