1120-60-91 **Rodrigo Banuelos*** (banuelos@math.purdue.edu), Department of Mathematics, Purdue University, West Lafayette, IN 47907. *Lévy processes, nonlocal operators, and spectral/heat asymptotics.*

Hermann Weyl's 1911 celebrated result, commonly referred to as *Weyl's Law*, asserts that if $N_D(\lambda)$ is the number of eigenvalues of the Dirichlet Laplacian not exceeding λ in a planar region Ω of area $|\Omega|$, then $N_D(\lambda) = \frac{|\Omega|}{4\pi}\lambda + o(\lambda)$, as $\lambda \to \infty$. Weyl's theorem has been extended and refined in many directions with connections to many areas of pure and applied mathematics. In this talk we first give an overview of some of the classical results on spectral and heat asymptotics motivated by Weyl's law and discuss the elegant connections to Brownian motion first explored by Mark Kac and others in the 1950s and 1960s. We then consider problems that arise when Brownian motion, which "goes" with the Laplacian, is replaced by other stochastic processes that share several basic properties with Brownian motion. These processes, called Lévy processes after Paul Lévy who introduced them in the 1920s, give rise to a rich collection of nonlocal operators that generalize, in a probabilistically natural way, the Laplacian. While many questions on spectral and heat asymptotics remain quite open in this setting, there is some progress to report. We shall do this maintaining technicalities at a minimum. (Received February 15, 2016)