1030-32-411 **Der-Chen E. Chang*** (chang@georgetown.edu), Department of Mathematics, Georgetown University, St. Matry's Hall, Rm 339, Washington, DC 20057. *Geometric analysis of the Kohn Laplacian on a family of pseudoconvex hypersurfaces.* Preliminary report.

Let $\Omega_k = \left\{(z_1, z_2) \in \mathbb{C}^2 : \mathrm{Im}(z_2) > |\phi(z_1)|^2\right\}$ where ϕ is a harmonic polynomial of degree k with $\phi(0) = 0$. Obviously, $\mathcal{H}_k = \partial\Omega_k$, $k \in \mathbb{N}$, is a family pseudoconvex hypersurfaces of finite type k in $\mathbb{C}^2$. In this talk, we shall study geometric and analytical problems related to the Kohn Laplacian $\Box_b$. We first study the subRiemannian geometry induced by the operator $\Box_b$. Given two points A and B on $\mathcal{H}_k$, we count the number of geodesics connecting these two points. Then we construct a complex action function. Using this function, one may construct the fundamental solution for the Kohn Laplacian. More precisely, the fundamental solution can be expressed as an action integral over the characteristic variety on the cotangent bundle given by $H(z, t, \xi, \theta) = 0$ with the measure $E_\lambda V_\lambda$. Here $H(z, t, \xi, \theta)$ is the Hamiltonian function of $\Box_b$. E_λ is the associated energy and the volume element V_λ is the solution of a second order transport equation. (Received August 07, 2007)