1041-35-148   **David Cruz-Uribe SFO** and **Cristian Rios*** (`crios@math.ucalgary.ca`), Department of Mathematics and Statistics, 2500 University Drive NW, Calgary, AB T2N 1N4, Canada. *The solution of the Kato problem for degenerate elliptic operators with Gaussian bounds.*

We solve the Kato problem for divergence form degenerate elliptic operators under the assumption that their heat kernels satisfy Gaussian upper bounds. The operators considered are of the divergence form $\mathcal{L}_w = w^{-1}\text{div}\mathbf{A}\nabla$ where w is an A_2 Muckenhoupt weight and $\mathbf{A}$ is a complex $n \times n$ matrix such that $w^{-1}\mathbf{A}$ is bounded and uniformly elliptic. Under the Gaussian property, we establish the weighted Kato square root estimate $\left\|\sqrt{\mathcal{L}_w}f\right\|_{L^2(w)} \approx \|\nabla f\|_{L^2(w)}$. (Received August 09, 2008)