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David Cruz-Uribe SFO and **Cristian Rios*** (crios@ucalgary.ca), Department of Mathematics, 2500 University Drive NW, Calgary, AB T2N 1N4, Canada. *The Kato problem for A_2 -elliptic operators.*

We establish the Kato square root conjecture, $\|\mathcal{L}_w^{\frac{1}{2}}f\|_{L^2(w)} \approx \|\nabla f\|_{L^2(w)}$ for the elliptic operator $\mathcal{L}_w = -w^{-1}\operatorname{div}\mathbf{A}\nabla$, where the \mathbf{A} is a degenerate elliptic matrix whose degeneracies are controlled by the weight $w \in A_2$. We first establish the analogous result for higher order elliptic operators such that kernels of the associated semigroups satisfy Gaussian bounds. We then apply an interpolation result due to Kato to use this fact to prove the desired result. (Received January 18, 2011)