

**OPTIMAL REGULARITY AND NONDEGENERACY FOR  
MINIMIZERS OF AN ENERGY RELATED TO THE FRACTIONAL  
LAPLACIAN**

RAY YANG

Courant Institute of Mathematical Sciences-USA

We obtain optimal regularity and nondegeneracy of an energy related to the fractional Laplacian. The optimal regularity is obtained by construction of a special type of barrier for the free boundary problem. This work is related to, but addresses a different problem from, recent work of Caffarelli, Roquejoffre, and Sire. A variant of the boundary Harnack inequality is also proved, where it is no longer required that the function be 0 along the boundary, which may be of more general interest.