1016-35-287 **Arshak Petrosyan***, Department of Mathematics, Purdue University, West Lafayette, IN 47907, and **Henrik Shahgholian**, Department of Mathematics, Royal Institute of Technology, 100 44 Stockholm, Sweden. *On Geometric and Energetic Criteria for the Regularity of the Free Boundary in an Obstacle-type Problem.*

We consider an obstacle-type problem which originates in potential theory in connection with harmonic continuation of potentials. The qualitative difference between this problem and the classical obstacle is that the solutions here are allowed to change the sign.

Using geometric and energetic criteria in a delicate combination we show the $C^{1,1}$ regularity of the solutions, and the regularity of the free boundary, below the Lipschitz threshold for the right hand side. (Received February 14, 2006)