

SHARP ESTIMATES OF THE TRANSMISSION BOUNDARY VALUE
PROBLEM FOR DIRAC OPERATORS ON NON-SMOOTH DOMAINS

Qiang Shi

Dr. Marius Mitrea, Dissertation Supervisor

ABSTRACT

This thesis derives the sharp estimates for the transmission boundary value problems (TBVP) for Dirac operators in Lipschitz domains in the three dimensional setting.

Most of the transmission problems considered in the literature fall under several categories, depending on the nature of the domain and solution. First, there is the class of problems in domains with sufficiently smooth boundaries. Second, there is the class of problems in domains with isolated singularities. Weak (variational) solutions for transmission problems in Lipschitz domains and strong solutions in Dahlberg's sense for transmission problems in Lipschitz domains were discussed in various literatures. Compared to previous work on transmission problems, our results are the first to establish well-posedness and *optimal* estimates in arbitrary Lipschitz domains. Applications to the transmission boundary value problems of the system of Maxwells equations are also presented in the last chapter of this thesis.