1023-49-897   **Wei Zhu*** (`weizhu@math.rice.edu`), MS136, Rice University, 6100 Main Street, Houston, TX 77005. *A regularity theory for multiple-valued Dirichlet minimizing maps.* Preliminary report.

Multiple-valued Dirichlet minimizing maps are generalizations of single-valued energy minimizing maps (as studied by Schoen and Uhlenbeck) and multiple-valued functions (as studied by Almgren). In the single value cases, such minimizers satisfy some nonlinear PDEs. But in general, there are no equations corresponding to multiple-valued energy minimizers. In this talk, I am going to discuss the regularity of multiple-valued Dirichlet minimizing maps into the sphere. I will show that even at branched point, as long as the normalized energy is small enough, we have an energy decay estimate. Combined with the previous work by Chun-Chi Lin, we get our first estimate that the m-2 dimensional Hausdorff measure of the singular set is zero. Furthermore, by looking at the tangent map and using a dimension reduction argument, we can show that the singular set is at least of codimension 3. (Received September 22, 2006)