1056-65-1623   **Wei Wang*** (`weiwang1@stanford.edu`), 119 Quillen Ct, Apt 1015, Stanford, CA 94305, and **Johnny Guzmán** and **Chi-Wang Shu**. *The Multiscale Discontinuous Galerkin Method for Solving a Class of Second Order Elliptic Problems with Rough Coefficients.*

We develop a multiscale discontinuous Galerkin method for solving a class of second order elliptic problems. The main ingredient of this method is to use a non-polynomial multiscale approximation space in the DG method to capture the multiscale solutions using coarse meshes without resolving the fine scale structure of the solution. Theoretical proofs and numerical examples will be shown both in one and two dimensions. (Received September 22, 2009)