1056-65-1298 **Yanlai Chen***, 182 George St., Brown University, Box F, Providence, RI 02912, and **Jan S. Hesthaven** and **Yvon Maday**. *Reduced Basis Element Method for 2D Maxwell's Problem.*

We present a reduced basis element method (RBEM) for the time-harmonic Maxwell's equation. The RBEM is Reduced Basis Method (RBM) with a particular parameter, that is, the geometry of the computational domain, coupled with domain decomposition method. The basic idea is to first decompose the computational domain into a series of subdomains that are deformed from several reference domains; then to associate with each reference domain precomputed solutions to the same governing partial differential equation, but with different choices of deformations; finally to seek the approximation on a new shape as a linear combination of the corresponding precomputed solutions on each subdomain. Unlike the pioneering work on RBEM for thermal fin and fluid flow problems, we do not need a mortar type method to "glue" the various local functions. This "gluing" is done "automatically" thanks to the discontinuous Galerkin method we are using. We present the rationale of the method together with numerical results showing exponential convergence. Some theoretical techniques for the *a posteriori* error estimate for RBEM are also discussed. (Received September 21, 2009)