



# Applied Mathematics



## McGill-CRM Applied Mathematics Seminar

Nov. 9, 2006, 4:00 pm Thursday (note special time)

At McGill, Burnside Hall 920

**“ hp-FINITE ELEMENTS FOR MAXWELL EQUATIONS  
Discrete Compactness and hp-Convergence for Maxwell Eigenvalues .”**

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*Coffee and refreshments will be served after the seminar*

### **Abstract:**

We will present the Finite Element discretization of time-harmonic Maxwell equations. We shall start with a variational formulation, and discuss the so-called stabilized formulation that reveals that we are dealing with a mixed problem. The satisfaction of two Brezzi's inf-sup conditions leads then to the discrete exact sequence property, and the analysis of the corresponding Maxwell eigenvalue problem. We shall introduce then the Kikuchi's idea of discrete compactness property, and discuss how it implies the convergence of the Maxwell eigenvalues. Finally, we will present a proof of the discrete compactness for a two-dimensional hp-method based on Nedelec's rectangle of the first kind. The result is a joint work with D. Boffi, M. Dauge and M. Costabel, see [2, 1]. References [1] D. Boffi, M. Dauge, M. Costabel, and L. Demkowicz. Discrete compactness for the hp version of rectangular edge finite elements. SIAM J. on Numer. Anal., 2005. accepted, see also ICES Report 04-29. [2] D. Boffi, L. Demkowicz, and M. Costabel. Discrete compactness for p and hp 2D edge finite elements. Math. Models Methods Appl. Sci., 13(11):16731687, 2003.