-INSTITUTO DE ALTA TENSION Y TRANSMISION DE ENERGIA “Prof. G.Gotter” – IATTE-UNT

-CENTRO DE METODOS NUMERICOS Y COMPUTACIONALES EN INGENIERIA - CEMNCI-UNT

-PROGRAMA ARFITEC 13-17

INVITAN :

MARTES 2 DICIEMBRE 2014 - 10:30 hs.

SALA DE AUDIOVISUALES DE LA FACET (Block 3, 1er piso)

1-PRESENTACION DE LA ECOLE SUPERIEURE DES SCIENCES ET TECHNOLOGIES DE L´INGENIEUR DE NANCY, ESSTIN - UNIVERSITE DE LORRAINE (Francia)

Prof. Jean R. Roche
Université de Lorraine

2-CONFERENCIA CIENTIFICA

“Domain Decomposition for Full-Wave Simulation in a Tokamak Plasma”

Prof. Jean R. Roche
University of Lorraine

ABSTRACT: Fusion has the potential to play an important role as part of a future energy mix for our planet. It has the capacity to produce energy on a large scale, using plentiful fuels and releasing no carbon dioxide or other greenhouse gases.
The experimental machine is based on the 'tokamak' concept of magnetic confinement, in which the plasma is contained in a doughnut-shaped vacuum vessel.
We present a non-overlapping domain decomposition method to compute an approximate solution of a time harmonic Maxwell equation in an arbitrary cross section of a tokamak. This equation arises in the full wave model of propagation of lower hybrid electromagnetic waves in cold plasma. For simulation purpose a mixed augmented variational formulation is considered. A non-overlapping domain decomposition method is presented in order to handle large size problems. Details about interface condition are provided and a mixed method to handle this interface conditions is presented. The discretization of the mixed augmented variational formulation on each sub domain is carried out using Taylor-Hood $ P_2-iso-P_1$ finite element. We give some indications about the computation of the entries of the stiffness matrix and how to solve the linear system. Several examples are presented for different wave frequencies.