SEMINAR
CENTER FOR APPLIED MATHEMATICS AND SCIENCE
DEPARTMENT OF MATHEMATICS
UNIVERSITY OF WEST GEORGIA

1:00 PM, THURSDAY, FEBRUARY 25th, 2016, BOYD 306

Speaker: **Dr. Amin Boumenir, Department of Mathematics, UWG**

Title: **An inverse problem in magnetohydrodynamics**

Abstract: A tokamak is a toroidal magnetic reactor that holds plasma together to enable fusion reactions to occur and produce clean energy. The simplified equation of an equilibrium of plasma in a tokamak, as treated by Demidov and Moussaoui, is given by

$$\begin{cases} \Delta u = au + b \geq 0 \quad on \;\; \Omega \subset \mathbb{R}^n, \; n \geq 2 \\ u = 0 \quad and \;\; (\partial_n u = \Phi) \quad on \; \partial\Omega \in C^{1,1} \end{cases} \tag{1}$$

where Ω is an open bounded connected domain in $\mathbb{R}^n$. The inverse problem is to find the values of the constants a and b from a single reading of the outer normal derivative given on the boundary, i.e. $\partial_n u = \Phi \in L^1(\partial\Omega)$. We shall refer to Φ as an observation, as admissible data should come from a solution generated by actual constants a and b. We show that the solution is among the first eigenvalues of a family of Laplacians with a mixed boundary condition, and then show how it can be selected and computed.

All are welcome.