



DEPARTAMENTO DE  
ANÁLISIS MATEMÁTICO Y  
MATEMÁTICA APLICADA



# SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

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## **The loss of mass for the heat equation in an exterior domain with general homogeneous boundary conditions**

One of the main properties of the heat equation in the entire space is that the mass of the solution (its integral in space) is conserved during the temporal evolution. In bounded domains, the situation is different, and depends on the specific boundary conditions under consideration. For instance, when subject to homogeneous Dirichlet boundary conditions, the mass exponentially decays to 0, while under Neumann boundary conditions, it is conserved.

In this talk, we will study the phenomenon of loss of mass in somehow intermediate domains between the two examples above: exterior domains, i.e. the complementary of a compact set. With elementary tools such as comparison principles or classical estimates for elliptic equations, we will characterize the asymptotic mass depending on the shape of the domain, its dimension and the boundary conditions we are considering. We will also be able to obtain convergence rates.

The talk is based on a joint work with Aníbal Rodríguez-Bernal to be published in 2024.

**Organized by: Departamento de Análisis Matemático y Matemática Aplicada and Instituto de Matemática Interdisciplinar (IMI)**

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**Place: Room 222**

**Facultad de CC. Matemáticas, UCM**