# Geometric inverse problem of determining multidimensional domains

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## Abstract

Last decades, the analysis and solution of inverse problems has increased a lot because of their importance in many applications: elastography and medical imaging, seismology, potential theory, ion transport problems or chromatography and other similar fields.

In this talk we will consider a geometric inverse problem for some linear parabolic systems, where the initial data (and even the coefficients) are unknown and the non-homogeneous part of the equation is expressed as a function of separate space and time variables. The aim of the work presented here will be the identification of a subdomain within a multidimensional set.

We will show the results we have obtained for the uniqueness property by incorporating observations that can be on the boundary or in an interior domain. It will also be observed that, through this process, we derive information about the initial data.

During the talk, it will be seen that the main tools that were required for the proofs of these results include unique continuation, time analyticity of the solutions and semigroup theory.

All the work that will be shown in this talk have been written in a preprint and submitted for publication, https://arxiv.org/abs/2504.10236.

This is a joint research project in collaboration with Anna Doubova, Enrique Fernández-Cara (both from the University of Seville) and Masahiro Yamamoto (from the The University of Tokyo, Japan).