Inverse problems of determining moving sources in diffusion equations

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Let $\Omega \subset \mathbb{R}^n$ be an open bounded domain with smooth boundary $\partial \Omega$. We consider

$$\partial_t u(x,t) = \Delta u(x,t) + f(x - \alpha(t)), \quad x \in \Omega, \ 0 < t < T.$$  

Let $\Gamma \subset \partial \Omega$ be an arbitrary subboundary, and $\alpha$ be given. Our main inverse problem is

**Inverse moving source problem.**

Determine $f(x)$ by $u, \nabla u$ on $\Gamma \times (0,T)$.

We discuss the uniqueness and the stability for the inverse moving source problem.

One of the main results is the uniqueness in determining $f$, provided that unknown $f$ has compact supports.

This is a joint work with Professor Piermarco Cannarsa (Università degli Studi di Roma "Tor Vergata") and Professor Giuseppe Floridia (Università degli Studi di Napoli Federico II).