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**Title:** Simultaneous Recovery of Initial Data and Potential in an Anisotropic Wave Equation from a Single Measurement.

**Abstract:** This paper addresses the inverse problem of simultaneously recovering the potential function (which depends on both time and the spatial domain) and unknown initial data for the multidimensional wave equation in anisotropic media from a single passive boundary measurement. Specifically, we establish uniqueness for determining these parameters for a class of hyperbolic problems, where only one such measurement is available. Under suitable assumptions, we show that measuring the corresponding solution over a finite time interval uniquely determines both the potential function and the initial data. Our approach combines an observability result, approximation properties, and complex geometrical optics (CGO) solutions for the wave equation with a potential in anisotropic media.