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On non-uniqueness for the anisotropic Calderón's problem

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In this talk we present some recent non-uniqueness results for the anisotropic Calderón's problem. First, we show that there is generically non-uniqueness when the Dirichlet and the Neumann data are measured on disjoint sets of the boundary of a given smooth compact connected Riemannian manifold (M, g) of dimension $n \geq 3$. More precisely, we show that there exist in the conformal class of g an infinite number of Riemannian metrics such that their corresponding DN maps with data on disjoints sets coincide. The conformal factors that lead to these non-uniqueness results satisfy a nonlinear elliptic PDE of Yamabe type.

Secondly, for more singular Riemannian metrics in dimension $n \geq 3$, we show that there is also non-uniqueness when the Dirichlet data and the Neumann data are measured on the same set. We provide simple counterexamples in the case of cylindrical Riemannian manifolds with boundary (M, g) having two ends. The coefficients of these metrics are smooth in the interior of the manifold and are only Hölder continuous at the end where the measurements are made. More precisely, we show that there exist in the conformal class of g an infinite number of Riemannian metrics such that their corresponding partial DN maps at one end coincide. The corresponding smooth conformal factors are harmonic with respect to the metric g and do not satisfy the unique continuation principle.

This is a joint work with Thierry Daudé (Cergy-Pontoise University) and Niky Kamran (McGill University).

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