**Meeting:** 999, Nashville, Tennessee, SS 9A, Special Session on Inverse Problems

999-53-57 **Anna L Mazzucato\*** (`alm24@psu.edu`), Department of Mathematics, Penn State University, University Park, PA 16802, and **Lizabeth V Rachele**. *Nonuniqueness in the parameter identification for anisotropic elastodynamics.*

We study the problem of unique identification of smoothly varying material parameters for anisotropic hyperelastic media by dynamic displacement-to-traction measurements made at the boundary. We show that the dynamic Dirichlet-to-Neumann map may determine the material parameters only up to diffeomorphisms that fix the boundary. We adapt the covariant formulation of the system of elastodynamics as discussed by Marsden and Hughes from Eulerian to Lagrangian coordinates, so that the underlying balance laws are respected. We then study the orbits of elasticity tensors under the action by pullback via diffeomorphisms. We give a partial, point-wise characterization of such orbits employing a canonical representation of fourth-order symmetric tensors in term of harmonic and Cartan decompositions. For example, uniqueness in the parameter identification for isotropic materials gives rise to partial uniqueness for certain anisotropic (possibly composite) media. This is joint work with Lizabeth Rachele. (Received July 31, 2004)