1003-35-1636 **Lizabeth V Rachele*** (`rachel@rpi.edu`), Department of Mathematical Sciences, Rensselaer Polytechnic Institute, Troy, NY 12180. *The ray transform and inverse problems for elastic media.*
We consider dynamic inverse problems for bounded, three-dimensional isotropic and anisotropic elastic media with smoothly varying density and elastic properties. Surface data for the inverse problem is modeled by the hyperbolic Dirichlet-to-Neumann map on a finite time interval.

In the case of isotropic elastodynamics we show that the propagation of "lower-order polarization" may be described in terms of a ray transform for a tensor field. We apply results of Pestov and Sharafutdinov to invert the ray transform, under certain conditions, up to its potential part. We then conclude that under certain conditions the Dirichlet-to-Neumann map determines the density.

In the case of anisotropic elastic media (in joint work with Anna Mazzucato) we characterize an ambiguity that arises in sensing the material properties of the interior of a bounded anisotropic elastic object, given displacement-traction measurements made at the surface. (Received October 05, 2004)