1056-35-1089 **George Avalos** and **Daniel Toundykov*** (dtoundykov@math.unl.edu), University of Nebraska-Lincoln, Department of Mathematics, P.O. Box 880130, Lincoln, NE 68588. *Boundary stabilization of nonlinear structural acoustic interactions with interface on a Reissner-Mindlin plate.*

We address observability and energy decay for a structural-acoustics model comprised of a wave equation coupled with a Reissner-Mindlin plate. Both components of the dynamics are subject to localized boundary damping: the acoustic dissipative feedback is restricted to the flexible boundary and only *a portion* of the rigid wall; the plate is likewise damped on a segment of its boundary.

The derivation of the "coupled" stabilization/observability inequalities requires weighted energy multipliers related to the geometry of the domain, and special tangential trace estimates for the displacement and the filament angles of the Reissner-Mindlin plate model. The behavior of the energy at infinity can be quantified by a solution to an explicitly constructed nonlinear ODE. The nonlinearities in the feedbacks may include sub- and super-linear growth at infinity, in which case the decay scheme presents a trade-off between the regularity of solutions and attainable uniform dissipation rates of the finite-energy. (Received September 22, 2009)