1118-35-94 **George Avalos**, **Irena M Lasiecka** and **Roberto Triggiani*** (r.triggiani@memphis.edu), Department of Mathematical Sciences, University of Memphis, Memphis, TN. *Heat-Structure interaction in 2-3 dimension: optimal rational decay rate by micro-local analysis.*

In this paper we consider a heat-structure interaction model (first step toward a fluid-structure interaction model) in 2 or 3 dimensions. It consists of a heat equation defined on an external domain coupled at the interface with a wave equation defined on an internal domain. Boundary coupling involves matching of the velocity of the wave and of the fluid and matching the normal stresses at the interface between the two domains. We take Initial Conditions in the domain of the generator of the strongly continuous contraction semi-group that models the entire coupled system. We then shows that the solutions decay as 1/t, asymptotically, thereby establishing the conjectured optimal decay rate. This improvement of past results is established via two main technical approaches: (i) a recent frequency domain characterization of the rational decay in terms of the resolvent operator evaluated on the imaginary axis; (ii) a microlocal analysis treatment to estimate a critical term involving two problematic boundary traces. (Received January 25, 2016)