1077-76-2796 **Michael I Weinstein*** (miw2103@columbia.edu), 212 SW Mudd Building, Columbia University, New York, NY 10027. *Radiative decay of bubble oscillations in a compressible fluid.*

We consider the dynamics of a gas bubble in an unbounded, inviscid and compressible fluid with surface tension. Kinematic and dynamic boundary conditions couple the dynamics of bubble surface deformations to the dynamics of waves in the fluid. This system has a spherical equilibrium state, resulting from the balance of pressure at infinity and the gas pressure within the bubble. We study the linear decay estimates near this state. The analysis makes use of a general result on the Neumann to Dirichlet map for the wave equation, exterior to the sphere. Local energy decay is exponential in time, exp(-Gamma t). The rate is determined by scattering resonances, solutions to a non-selfadjoint spectral problem. The scattering resonances which limit the time-decay rate are of a high order multipole character, whose decay rate, Gamma, is exponentially small in the Mach number, epsilon, as epsilon tends to zero. In contrast the decay rate for spherically symmetric solutions is linear in epsilon, for epsilon small. This is joint work with A.M. Shapiro. (Received September 22, 2011)