

Update on the simulation of streaming in tapered resonators – Brian C. Tuttle and Victor W. Sparrow

In a previous report [J. Acoust. Soc. Am. 110, 2652 (2001)] the authors described a plan to simulate nonlinear acoustic streaming by way of a MacCormack finite difference scheme running on a cluster-type multiprocessor computer. The object was to investigate how the tapering of a resonator tube affects the acoustic streaming. The experiments of Olson and Swift predict that a temperature dependent viscosity in conjunction with tube geometry can minimize Rayleigh streaming for a particular taper angle. Recent progress in the present research includes a careful perturbation analysis of the model equations to incorporate additional nonlinear terms that are important to simulate flow near a boundary. A modified computational grid necessary to accommodate the tapered domain as well as the refined boundary layer is discussed. The method of driving the tube and issues arising in the simulation starting conditions are also described. [Work supported in part by the Office of Naval Research.]

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