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Mapping the acoustic scattering behavior of spherical microbubble clouds MIGUEL A. PARRALES, JUAN M. FERNANDEZ, MIGUEL PEREZ-SABORID, Dept. Ingenieria Aeroespacial y Mecanica de Fluidos, Universidad de Sevilla, Spain — Sound scattering and acoustic propagation through bubbly liquids have been studied deeply in the last decades. The main reason for these studies was to explain and analyze the high impact of gas bubbles on sound propagation: the compressibility missmatch and the resonant behavior make the bubble a very efficient sound scatterer, changing appreciably the acoustic properties of the biphasic medium. Here we propose a numerical analysis, based on the self-consistant multiple scattering approach, to compute the linear acoustic response of spherical microbubble clouds while excited by an external ultrasonic wave. The calculations have been done for a wide range of the cloud void fraction β. By varying the excitation frequency ω_o, we are able to map the total scattering intensity from the cloud in a $(\beta - \omega_o)$ phase space. The localization of the collective resonant modes on this map finally reveals the different scattering regimes. Furthermore, the total pressure field is obtained both inside and outside the cloud, being possible to visualize the acoustic wave propagation in each scattering regime.

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