Abstract Submitted
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Acoustic radiation force and scattering series expansions for spheres at low frequencies.[1] PHILIP L. MARSTON, Washington State University — Even in the case considered here where spheres are taken to be in inviscid fluids and all mechanisms for power absorption are neglected, it can be helpful to consider leading-order corrections to Rayleigh scattering. Using series expansions of scattering partial-wave phase shifts (that depend on material properties) quantities of interest can be expanded in powers of kR where k is the acoustic wave number and R is the sphere radius. This has been accomplished in a unified way for several cases, though it is necessary for kR to be below all resonances in each case. Situations considered include fluid and solid spheres and empty elastic shells in traveling and standing acoustic plane waves [1, 2]. The method is easily generalized to spheres in certain acoustic beams. There has also been renewed interest in low kR expansions of the quadrupole projection of the acoustic radiation stress based on Rayleigh scattering since that is relevant to the equilibrium shape of nearly-spherical acoustically-trapped objects [3]. [1] P. L. Marston, J. Acoust. Soc. Am. 145, EL39–EL44 (2019). [2] P. L. Marston, J. Acoust. Soc. Am. 146 (accepted). [3] P. L. Marston et al., J. Acoust. Soc. Am. 69, 1499-1501 (1981).

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