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**Acoustic radiation force expansions in terms of partial wave phase shifts for scattering: Applications**[1] PHILIP L. MARSTON, Washington State University, LIKUN ZHANG, University of Mississippi — When evaluating radiation forces on spheres in soundfields (with or without orbital-angular momentum) the interpretation of analytical results is greatly simplified by retaining the use of s-function notation for partial-wave coefficients imported into acoustics from quantum scattering theory in the 1970s. This facilitates easy interpretation of various efficiency factors [1]. For situations in which dissipation is negligible, each partial-wave s-function becomes characterized by a single parameter: a phase shift allowing for all possible situations. These phase shifts are associated with scattering by plane traveling waves and the incident wavefield of interest is separately parameterized. (When considering outcomes, the method of fabricating symmetric objects having a desirable set of phase shifts becomes a separate issue.) The existence of negative radiation force "islands" for beams reported in 2006 by Marston is manifested. This approach and consideration of conservation theorems [2] illustrate the unphysical nature of various claims made by other researchers. This approach is also directly relevant to objects in standing waves. [1] L. Zhang and P. L. Marston, J. Acoust. Soc. Am. 140, EL178-EL183 (2016). [2] P. L. Marston and L. Zhang, J. Acoust. Soc. Am. 139, 3139-3144 (2016).

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