

Abstract Submitted
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Effective Mass Density of Fluid-Solid Composites JUN MEI, Department of Physics, Hong Kong University of Science and Technology, Hong Kong, China, ZHENGYOU LIU, Department of Physics, Wuhan University, Wuhan, China, WEIJIA WEN, PING SHENG, Department of Physics, Hong Kong University of Science and Technology, Hong Kong, China — We show through rigorous derivation and experimental support that the dynamic effective mass density of an inhomogeneous mixture, used in the prediction of wave velocities in the long wavelength limit, can differ from the static version—the volume average of the component mass densities. The physical reason for this difference is explained. The dynamic mass density expression, first derived by Berryman more than two decades ago, is shown to give a closer correspondence between the acoustic and electromagnetic metamaterials by allowing for negative mass densities at frequencies around resonances.

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