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Nonlinear Acoustics at the Air-Water Free Surface[1] SETH PREE, BRIAN NARANJO, SETH PUTTERMAN, Univ of California - Los Angeles — According to linear acoustics, airborne sound incident on a water surface transmits only a tenth of a percent of its energy. This difficulty of transmitting energy across the water surface limits the feasibility of standoff ultrasound imaging. We propose to overcome this long standing problem by developing new methods of coupling into the medium at standoff. In particular, we believe that the acoustic nonlinearity of both the air and the medium may yield a range of effects in the vicinity of the surface permitting an efficient transmission of ultrasound from the air into the medium. The recent commercial availability of parametric speakers that deliver modulated 100kHz ultrasound at 135dB to nonlinearly generate music at 95dB provides an interesting platform with which to revisit the transmission of sound across acoustic impedance mismatches. We show results of experimental studies of the behavior of the air-water free surface when subjected to large amplitude acoustic pressures from the air.

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