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**Maarten de Hoop, Gunther Uhlmann and Yiran Wang\***

(wangy257@math.washington.edu). *Nonlinear responses from the interaction of two progressing waves at an interface.*

For scalar semilinear wave equations, we analyze the interaction of two (distorted) plane waves at an interface between media of different nonlinear properties. We show that new waves are generated from the nonlinear interactions, which might be responsible for the observed nonlinear effects in applications. Also, we show that the incident waves and the nonlinear responses determine the location of the interface and some information of the nonlinear properties of the media. In particular, for the case of a jump discontinuity at the interface, we can determine the magnitude of the jump. (Received February 16, 2018)