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Observation of acousto-elastic hysteresis in kinking nonlinear elastic solids PETER FINKEL, AIGUO ZHOU, MICHEL BARSOUM, Drexel University — Using bulk acoustic waves we studied the nonlinear mechanical properties and hysteresis of the acousto-elastic effect in kinking nonlinear elastic, KNE, solids. The experiments reviewed here present direct observation of nonlinear hysteretic scattering and attenuation of ultrasonic waves in Ti_3SiC_2 and Ti_3AlC_2, representatives of KNE solids, as a function of quasi-static cyclic compressive stresses. We attribute this dynamic behavior to the interaction of the acoustic waves with dislocation in incipient kink bands. The relevance of these findings to possible sensor applications of hysteretic KNE solids is briefly discussed.

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