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Leigh L. Noble* (noble@leighnoble.org). *A non-destructive measurement scheme for depth dependent crystallographic texture coefficient functions in cubic metal sheets.*

Through-thickness crystallographic texture differences in rolled sheet metals affects various mechanical behaviors of the sheets. An effective process control mechanism would reduce waste and increase product quality. One technique for quantitative nondestructive evaluation during processing is ultrasound resonance spectroscopy (URS) which measures the resonance spectrum of a sample. In a homogeneous elastic sheet, the resonance spectrum of each wave mode is expected to be a multiple of the fundamental frequency. In practice, however, resonance frequencies are shifted away from the expected multiple. This paper develops a thorough understanding of the mathematical theory explaining how the through-thickness texture gradient gives rise to such shifts and how measuring resonance shifts can be used to recover two texture coefficients as functions of depth. This recovery scheme for two through-thickness texture functions is tested on rolled copper samples. (Received January 25, 2010)