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Laser-generated narrow-band ultrasonic wave for detection of
subsurface defect

Ran Ding^a and Xiaodong Xu^b

^aNanjing University, P.O.Box44#, Pukou Campus, 210089 Nanjing, China

^bModern Acoustics, Institute of Acoustics, Nanjing University, 210093 Nanjing, China

Laser ultrasonics employs laser beams to excite ultrasound. Spatial and/or temporal modulated intensity of laser on the surface of the specimen (Aluminum) can serve to narrow the band of the generated ultrasound around the desired central frequency and meanwhile obtains higher signal-noise ratio. In the present work, we use Computer Generated Holograms (CGHs) to spatial-modulate the laser beam. CGHs provide flexibility of adjustment of the intensity profile of the laser on the specimen and the online reconstruction of CGHs by digital and electronic devices helps to reduce the complexity of the experimental system and is promising in detection of subsurface defect and depth profiling as the surface acoustic waves penetrate into the solids a depth proportional to the wavelength. Discussion was carried out between experimental results and a theoretical model which based on finite element analysis.