

Nondestructive testing with Terahertz wave

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Terahertz (THz) waves, electromagnetic waves in the range of 0.1 THz to 10 THz, have intrigued much attention due to their potential applications in imaging, spectroscopy, and communications technologies [1,2]. One of the promising industrial applications of THz technology is the non-destructive inline thickness measurement of paint films on automobiles, ships, airplanes, and other vehicles [3]. Unlike conventional eddy currents and ultrasound methods, THz technology could provide non-contact and remote measurements [4]. In this paper, we present our results of THz CW technique using phase shift interferometry for measuring sub-100- μm -thick samples. [1] S. S. Dhillon, M. S. Vitiello, E. H. Linfield, A. G. Davies, M. C. Hoffmann, J. Booske, C. Paoloni, M. Gensch, P. Weightman, G. P. Williams, E. Castro-Camus, D. R. S. Cumming, F. Simoens, I. Escorcia-Carranza, J. Grant, S. Lucyszyn, M. Kuwata-Gonokami, K. Konishi, M. Koch, C. A. Schmuttenmaer, T. L. Cocker, R. Huber, A. G. Markelz, Z. D. Taylor, V. P. Wallace, J. A. Zeitler, J. Sibik, T. M. Korter, B. Ellison, S. Rea, P. Goldsmith, K. B. Cooper, R. Appleby, D. Pardo, P. G. Huggard, V. Krozer, H. Shams, M. Fice, C. Renaud, A. Seeds, A. Stöhr, M. Naftaly, N. Ridler, R. Clarke, J. E. Cunningham, and M. B. Johnston, “The 2017 terahertz science and technology roadmap,” *J. Phys. D Appl. Phys.* 50(4), 043001 (2017). [2] D. M. Mittleman, “Twenty years of terahertz imaging,” *Opt. Express* 26(8), 9417–9431 (2018). [3] S. Krimi, J. Klier, J. Jonuscheit, G. von Freymann, R. Urbansky, and R. Beigang, “Highly accurate thickness measurement of multi-layered automotive paints using terahertz technology,” *Appl. Phys. Lett.* 109(2), 021105 (2016). [4] T. Yasui, T. Yasuda, K. Sawanaka, and T. Araki, “Terahertz paintmeter for noncontact monitoring of thickness and drying progress in paint film,” *Appl. Opt.* 44(32), 6849–6856 (2005)