

# Theoretical and experimental investigation of the backward beam displacement – new results

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## **ABSTRACT**

The discovery of a backward beam displacement of ultrasound interacting with a periodically corrugated surface, dates back from 1976, when Breazeale and Torbett reported it [M. A. Breazeale and M. Torbett, *Appl. Phys. Lett.* 29, 456 (1976)]. Since 2002 new investigations have been undertaken partially motivated by Breazeale's enthusiasm. An overview is presented of how the phenomenon was first discovered in 1976, how a theoretical explanation was found since 2002 [N. F. Declercq, J. Degrieck, R. Briers, and O. Leroy, *Appl. Phys. Lett.* 82, 2533 (2003); Nico F. Declercq, Joris Degrieck, Rudy Briers, Oswald Leroy, "Theory of the backward beam displacement on periodically corrugated surfaces and its relation to leaky Scholte-Stoney waves", *J. Appl. Phys.* 96(11), 6869-6877, 2004] and what further verifications and discoveries have been made since then [A. Teklu, M. A. Breazeale, Nico F. Declercq, Roger D. Hasse, Michael S. McPherson, "Backward Displacement of Ultrasonic Waves Reflected from a Periodically Corrugated Interface", *J. Appl. Phys.* 97(8), 084904 1-4, 2005]. The main focus of this presentation however is on new research showing the ubiquitous presence of the phenomenon and its importance for nondestructive applications [Sarah Herbison, Nico Declercq, and Mack Breazeale, "Angular and frequency spectral analysis of the ultrasonic backward beam displacement on a periodically grooved solid", in press with *J. Acoust. Soc. Am.*, 2009].