

# Observation of Sound Fields in Transient Radiation from the Concentric Annular Piston Transducer

Kazuhiko Imano, Yasuo Yoshida and Daitaro Okuyama

Department of Electrical & Electronic Engineering, Mining College, Akita University,  
1-1 Tegata Gakuen-machi, Akita City 010, Japan

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The transient acoustic field of the concentric annular transducer is briefly described and observed using the time transition pattern method. It is revealed from the experiments that the sound field on the axis of the transducer consists of only edge waves. In the case of two concentric annular transducers, the focus can be formed by adjusting the excitation timing of both transducers. The property of variable focus of the multiple annular transducer can be regarded as the result of edge wave contribution; this is clarified from the time transition pattern method.

## 1. Introduction

Application of pulsed ultrasonic waves has recently made progress in ultrasonic nondestructive inspection and ultrasonic diagnosis. In these fields, in order to obtain a higher time resolution, a very short ultrasonic wave pulse including impulsive sound is required. When using a short ultrasonic pulse, the observation of these sound fields is indispensable to the examination of the performance of the system.

The method for observing the transient field radiated from a plane and a concave transducer was previously developed and reported by the authors, using the time transition pattern method.<sup>(1,2)</sup>

In this report, the acoustic transient from a concentric annular piston transducer will be described, and the focus, which consists of edge waves, will be newly revealed by experiments utilizing impulsive ultrasound and the time transition pattern method.