

ACOUSTIC INTENSITY AND DIRECTIVITY OF THE MODERN CONCERT HARP

by

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ABSTRACT

The acoustic intensity and directivity of the modern concert harp was investigated in three distinct scenarios. Previous studies have relied on mechanical excitation of the strings. Their findings identify two main sources for acoustic radiation, the soundboard and the soundbox holes, the second of which proved to be the dominant source in three frequency ranges. To gain better knowledge of the acoustics of the harp under natural playing conditions, new measurements were conducted in which a harp player excited the instrument. One particular goal was to demonstrate the effect of the player on the sound radiation by comparing these results with previous studies. The absorption and diffraction introduced by the performer diminished the relative importance of the radiation from the soundbox holes. A detailed description of the acoustic intensity field with and without the player is given. In addition, the acoustic profile of a variety of extended techniques used in contemporary music were investigated. A complete timbral description of these techniques demonstrates the breadth of character the modern harp can produce.