

## Exploring the History of Chinese Music Acoustic Technology through Data Fluctuations

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**Abstract :** The study of extant musical sites can provide a side-by-side picture of historical ethnomusicological information. In their data collection on Chinese opera houses, researchers found that one Ming Dynasty opera house reached a width of nearly 18 meters, while all opera houses of the same period and after it was far from such a width, being significantly smaller than 18 meters. The historical transient fluctuations in the data dimension of width that caused Chinese theatres to fluctuate in the absence of construction scale constraints have piqued the interest of researchers as to why there is data variation in width. What factors have contributed to the lack of further expansion in the width of theatres? To address this question, this study used a comparative approach to conduct a venue experiment between this theater stage and another theater stage for non-heritage opera performances, collecting the subjective perceptions of performers and audiences at different theater stages, as well as combining BK Connect platform software to measure data such as echo and delay. From the subjective and objective results, it is inferred that the Chinese ancients discovered and understood the acoustical phenomenon of the Haas effect by exploring the effect of stage width on musical performance and appreciation of listening states during the Ming Dynasty and utilized this discovery to serve music in subsequent stage construction. This discovery marked a node of evolution in Chinese architectural acoustics technology driven by musical demands. It is also instructive to note that, in contrast to many of the world's "unsuccessful civilizations," China can use a combination of heritage and intangible cultural research to chart a clear, demand-driven course for the evolution of human music technology, and that the findings of such research will complete the course of human exploration of music acoustics. The findings of such research will complete the journey of human exploration of music acoustics, and this practical experience can be applied to the exploration and understanding of other musical heritage base data.

**Keywords :** Haas effect, musical acoustics, history of acoustical technology, Chinese opera stage, structure

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