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Holographic Visualization of Vibration in a Moist Clarinet Reed
JASON BOSTRON[1], MARK SHARNOFF, Department of Physics, University of Delaware — We have extended the work of Pinard et al (J. Acoust. Soc .Am. 113, 1376 (2003)) [see also Facchinetti et al (ibid, p. 2874)] on dry clarinet reeds to permit the modes of moisture-saturated reeds to be visualized. By means of an artificial embouchure, nitrogen gas at 96% relative humidity was passed into a clarinet whose reed was normally attached at the ligature, but free of other constraint. An image of the reed was focused upon a CCD upon which was incident also a collimated reference wave. Just beyond the clarinet's bell was a loudspeaker which excited the clarinet's air column and reed into vibration. The reed's motion could be analyzed from the fringes visible in single-exposure, time-averaged interferograms. When dry, our reeds exhibited low compliance except in the vicinity of sharp resonances whose frequencies, extending upwards from ca. 2.2 kHz , all lay above the fundamentals of the clarinet's musical voice. By contrast, moist reeds were easily excited at any frequency within our clarinet's playing range, which extended downward to D3 at 147 Hz. At almost any frequency, the vibrations of the moist reed were strong mixtures of the flexing and torsional modes exhibited separately in the resonances of the dry reed.

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