

ACOUSTICS2008/1915
Diffraction effects on speech phonemes during phonation

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In this paper we will show how the ventricular fold modifies speech phonemes and also causes the shimmering of speech. Diffraction of sound waves at the ventricular fold which can be considered as a circular aperture, can modify the vocalized glottal sound spectrum reaching the pharynx. Thus during phonation, speech phoneme spectra are essentially enveloped by Bessel functions. Since Bessel beams are known to be nondiffracting, this step ensures that the phonemes do not undergo further diffraction effects which can destroy the unique harmonic structure of the phonemes. Note that the wavelengths of sound waves and the dimensions of the human vocal tract appendages are of the same order of magnitude which mean that diffraction should be commonplace in the vocal tract if not for the initial packaging of the speech phoneme at the ventricular fold.