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K A Montgomery* (K.Montgomery@utah.edu), University of Utah, 155 South 1400 East, Room 233, Salt Lake City, UT 84112. *Multifrequency Forcing of a Nonlinear Oscillator Model of the Inner Ear*. Preliminary report.

When the cochlea is stimulated by a sound, it not only records the sound but also actively emits sounds called otoacoustic emissions. The source of otoacoustic emissions has not been conclusively determined, but one theory is that they originate from the active motion of cells called hair cells. Hair cells are cells in the inner ear that translate sound-induced mechanical motion into an electrical signal that can be detected by the auditory nerve. The hair bundles of the hair cells have been shown to respond actively to stimuli near their preferred frequency. Interestingly, physiologically based models for the hair bundle motion have been shown to be poised near a Hopf bifurcation. By considering a generic system poised near a supercritical Hopf bifurcation, I will show that the otoacoustic emissions resulting from multifrequency forcing experiments can be explained as generic properties of a system near a Hopf bifurcation. This evidence supports the idea that hair bundle oscillations may be the source of otoacoustic emissions. (Received September 28, 2005)