

Abstract Submitted  
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**Power Flow in Phonation**<sup>1</sup> LUCY ZHANG, FEIMI YU, Rensselaer Polytech Institute, MICHAEL KRANE, Pennsylvania State University — The control volume analysis of power flow during sustained phonation is performed using results of a fully-coupled aeroelastic-aeroacoustic simulation. The control volumes consist of the laryngeal region, and the larynx and the vocal tract. Two cases are considered: an effectively infinite length vocal tract, where sound produced in the larynx radiates away and is not reflected back, and a constant-area vocal tract of normal adult human dimensions, in which phonatory sound resonates before radiating from the mouth opening. In both cases the lungs are modeled to absorb all incident sound, while providing a constant volume flow toward the larynx. Control of the acoustic boundary conditions is accomplished using perfectly matched- layers, and flow from the lungs is provided by a source distribution near the entrance to the trachea region. For both cases the power flow for the larynx and larynx plus vocal tract control volumes are computed using the integral form of the mechanical energy equation, expanded to consider power exchanges between slightly compressible flow in the larynx and the acoustic fields in the vocal tract and trachea.

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