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Unsteady flow motions in the supraglottal region during phonation HAOXIANG LUO, HU DAI, Vanderbilt University — The highly unsteady flow motions in the larynx are not only responsible for producing the fundamental frequency tone in phonation, but also have a significant contribution to the broadband noise in the human voice. In this work, the laryngeal flow is modeled either as an incompressible pulsatile jet confined in a two-dimensional channel, or a pressure-driven flow modulated by a pair of viscoelastic vocal folds through the flow–structure interaction. The flow in the supraglottal region is found to be dominated by large-scale vortices whose unsteady motions significantly deflect the glottal jet. In the flow–structure interaction, a hybrid model based on the immersed-boundary method is developed to simulate the flow-induced vocal fold vibration, which involves a three-dimensional vocal fold prototype and a two-dimensional viscous flow. Both the flow behavior and the vibratory characteristics of the vocal folds will be presented.

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