

Erratum: Interaction of an inner-scaled Helmholtz resonator with boundary-layer turbulence [Phys. Rev. Fluids 9, 114610 (2024)]

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In the original version of this paper, the phase of the inverse impedance shown in Fig. 2(b) was incorrect. At resonance, the phase $\angle(Z_{\text{HR}})^{-1}$ is π , not 0 as originally shown. Although this correction does not affect the conclusions of the paper, several figures have been updated to maintain

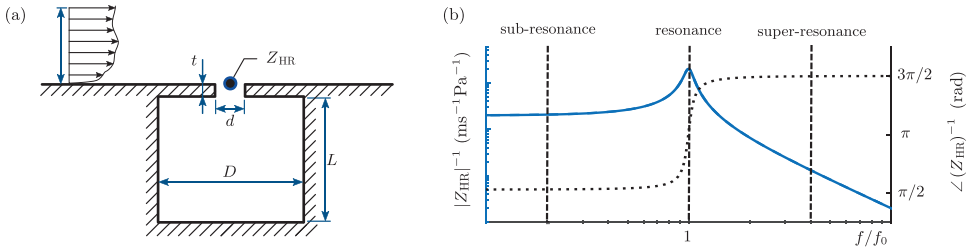


FIG. 2. (a) Schematic of a cylindrical Helmholtz resonator (HR) beneath a grazing TBL flow. (b) Gain curve (solid) and phase curve (dotted) of the acoustic impedance-inverse of a single HR.

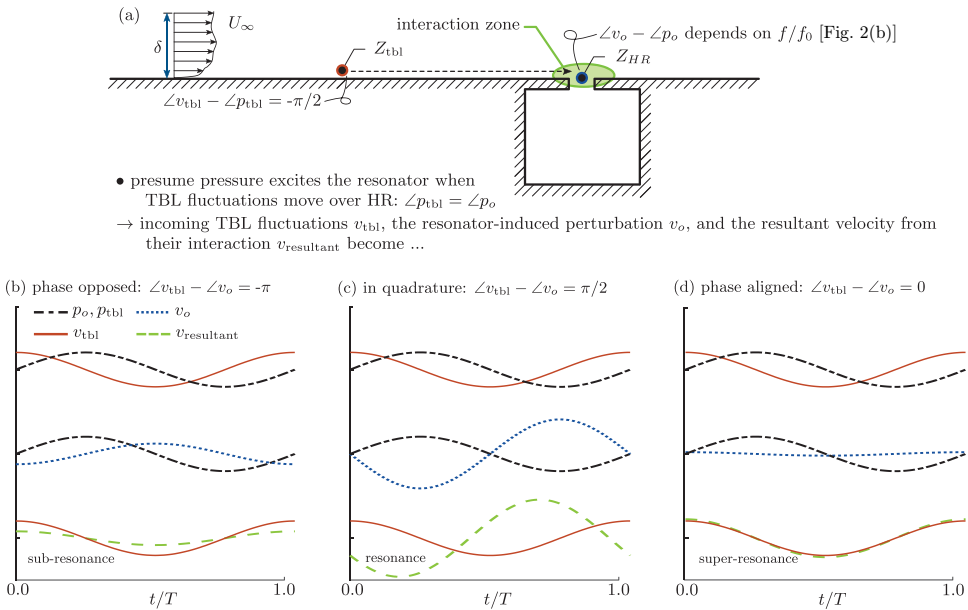


FIG. 18. (a) Schematic of the incoming TBL (with impedance relation Z_{tbl}) and the wall-embedded HR (impedance relation Z_{HR} at the orifice) over which the resonator-turbulence interaction occurs. (b)–(d) Illustrations of harmonic fluctuations over one period (p_{tbl} , v_{tbl} , v_o , $v_{\text{resultant}}$) for a frequency residing at sub-resonance, resonance, and super-resonance; note that T denotes the wave-period of each respective case.

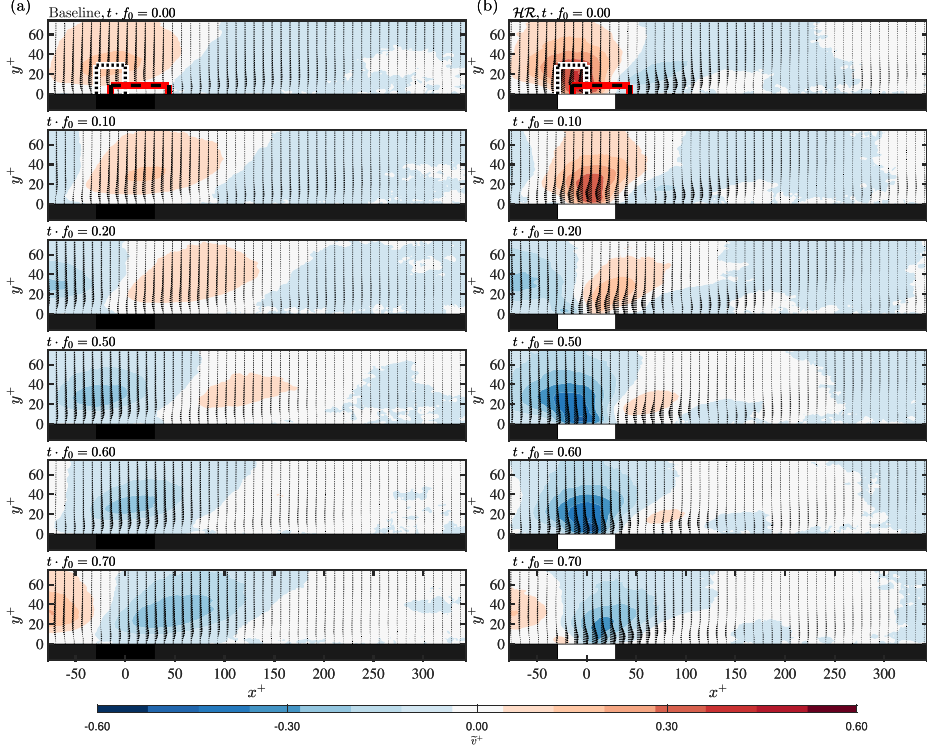


FIG. 19. Six instances of the conditionally averaged streamwise velocity fluctuation around resonance ($f_0^+ = 0.04 \pm 0.0024$) for (a) the baseline case in the left column, and (b) the HR case in the right column. The dotted box indicates the position of the box-average signal used for conditioning the conditional average, and the dashed red box indicates the averaging area of wall-normal velocity fluctuation for generating the plots in Fig. 21.

correctness throughout the manuscript. In Fig. 18(c), v_o and $v_{\text{resultant}}$ have been updated to reflect the corrected phase of Z_{HR} . Accordingly, the phase difference $\angle v_{\text{tbl}} - \angle v_o$ has been updated to $\pi/2$. Consequently, the location of the red box in Fig. 19, corresponding to the averaging area of the wall-normal velocity fluctuation used to generate the plots in Fig. 21, has been shifted upstream in order to capture the correct phase. The updated averaging region is now defined as $x^+ \in [0.25d, 1.25d]$ and $y^+ \in [0, 0.15d]$. In the original version, the authors mistakenly assumed that at the resonance frequency, a finite streamwise extent was required for the phase shift to establish itself. Hence, the region where the interaction was assessed appeared slightly downstream of the resonator orifice in the original version. The experimental results shown in Fig. 21 are now consistent with Fig. 18.

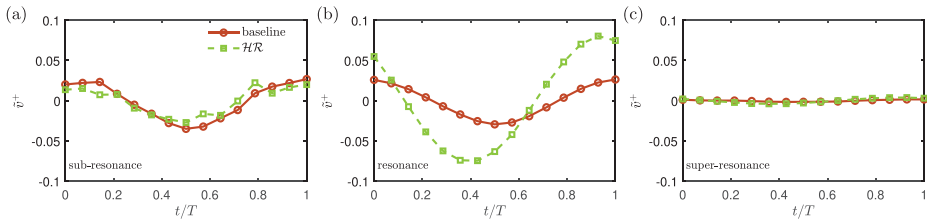


FIG. 21. Conditionally averaged wall-normal velocity fluctuation, spatially averaged over the red box indicated in Figs. 19(a) and 19(b). For each plot, one period in time is considered for fluctuations of a frequency residing at (a) sub-resonance, (b) resonance, and (c) super-resonance.