Supplementary material for: Interaction between coherent and turbulent oscillations in non-reacting and reacting wake flows

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1. Non-reacting results

1.1. *Wavelet magnitude scalograms for all conditions*

Figure 1 shows the wavelet magnitude scalograms computed at the peak vorticity location. The column on the left represents the low-turbulence condition, where $u'_{in}/\bar{u}_{in} = 5\%$, and the column on the right represents the high-turbulence condition, where $u'_{in}/\bar{u}_{in} = 11\%$. The rows from top to bottom depict the increasing levels of acoustic excitation.

1.2. *Spectral POD mode shapes and eigenvalue spectra for all conditions*

Figure 2 shows the spectral POD eigenvalue spectra and the spatial mode shapes corresponding to the peak frequencies for the first two modes. The column on the left represents the low-turbulence condition, where $u'_{in}/\bar{u}_{in} = 5\%$, and the column on the right represents the high-turbulence condition, where $u'_{in}/\bar{u}_{in} = 11\%$. The rows from top to bottom depict the increasing levels of acoustic excitation. Mode shapes are not provided for modes where there are no discernible peaks in the frequency spectra.

2. Reacting results

2.1. *Wavelet magnitude scalograms for all conditions*

Figure 3 shows the wavelet magnitude scalograms computed at the peak vorticity location. The column on the left represents the low turbulence condition, where $u'_{in}/\bar{u}_{in} = 5\%$ and the column on the right represents the high turbulence condition, where $u'_{in}/\bar{u}_{in} = 11\%$. The rows from top to bottom depict the increasing levels of acoustic excitation.

2.2. *Spectral POD mode shapes and eigenvalue spectra for all conditions*

Figure 4 shows the spectral POD eigenvalue spectra and the spatial mode shapes corresponding to the peak frequencies for the first two modes. Mode shapes are not provided for modes where there are no discernible peaks in the frequency spectra. The column on the left represents the low-turbulence condition, where $u'_{in}/\bar{u}_{in} = 5\%$, and the column on the right represents the high-turbulence condition, where $u'_{in}/\bar{u}_{in} = 11\%$. The rows from top to bottom depict the increasing levels of acoustic excitation.

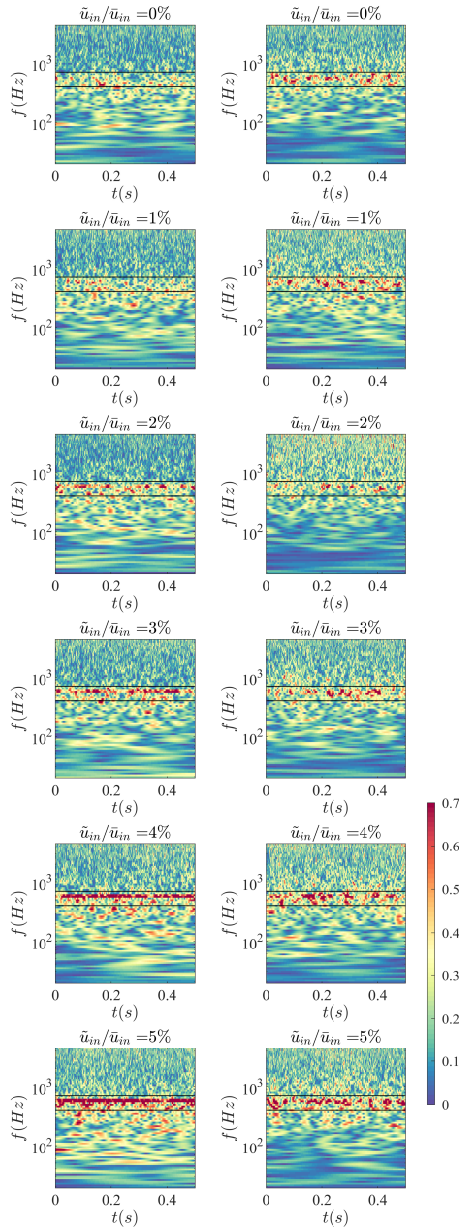† Email address for correspondence: jxo22@psu.edu

FIGURE 1. Wavelet magnitude scalograms for all non-reacting conditions. The conditions with low turbulence intensity ($u'_{in}/\bar{u}_{in} = 5\%$) are shown on the left and the conditions with high turbulence intensity ($u'_{in}/\bar{u}_{in} = 11\%$) are shown on the right.
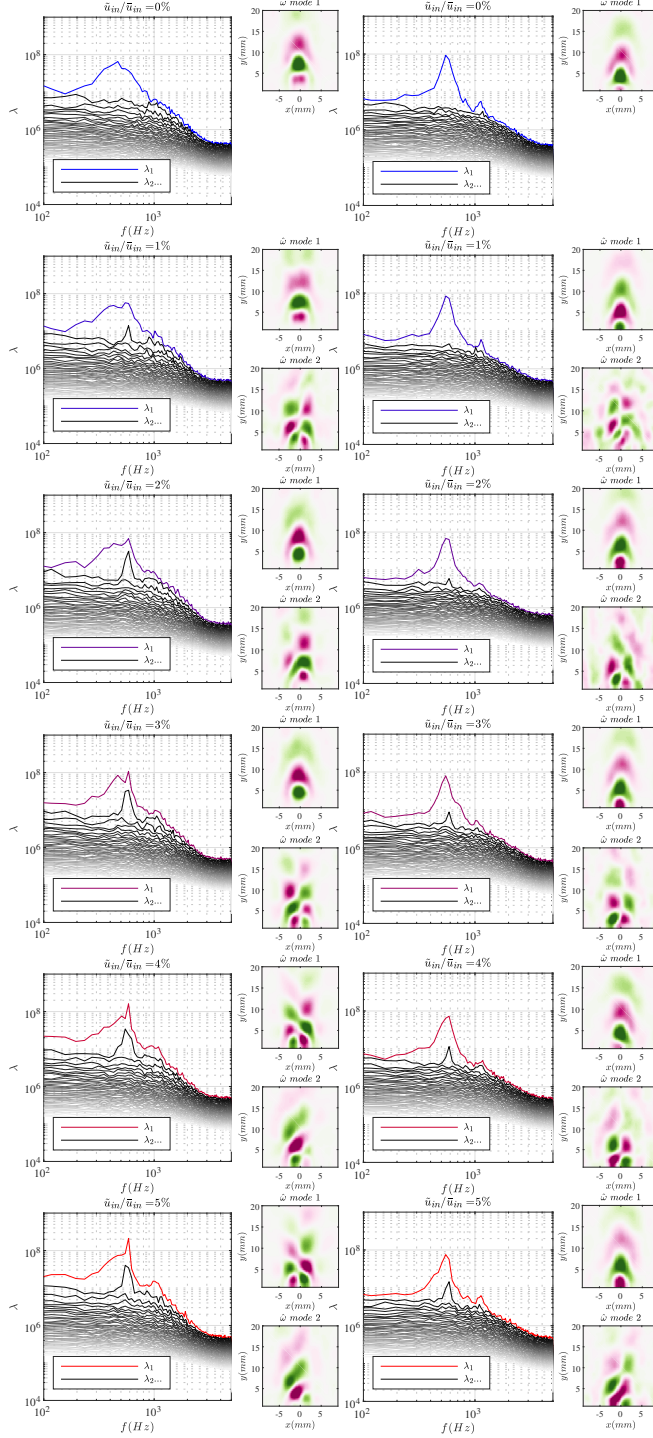
FIGURE 2. Spectral POD eigenvalue spectra and spatial mode shapes extracted at the peak frequency for the first two leading modes for the non-reacting conditions. The conditions with low turbulence intensity ($u'_{in}/\bar{u}_{in} = 5\%$) are shown on the left and the conditions with high turbulence intensity ($u'_{in}/\bar{u}_{in} = 11\%$) are shown on the right.
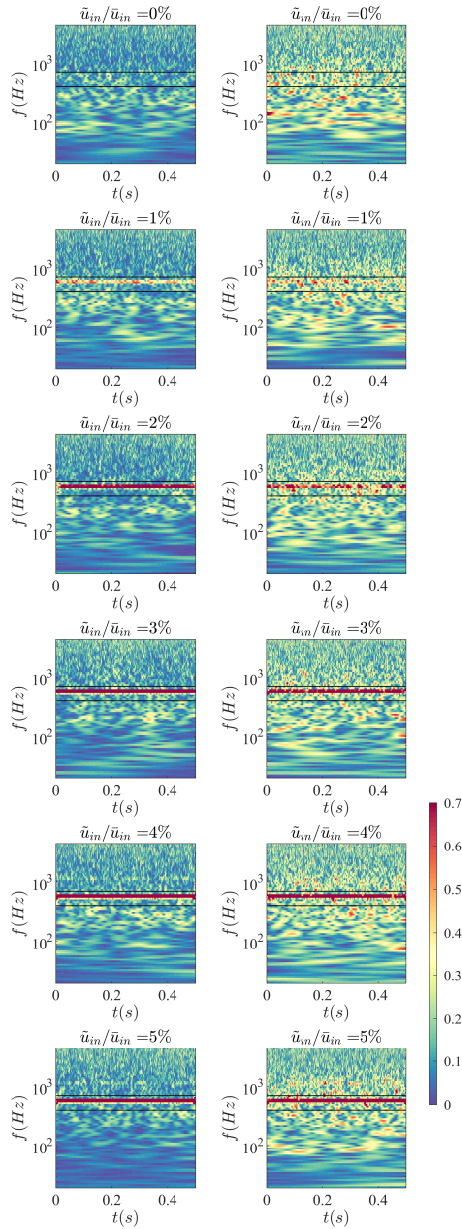
FIGURE 3. Wavelet magnitude scalograms for all reacting conditions. The conditions with low turbulence intensity ($u'_{in}/\bar{u}_{in} = 5\%$) are shown on the left and the conditions with high turbulence intensity ($u'_{in}/\bar{u}_{in} = 11\%$) are shown on the right.
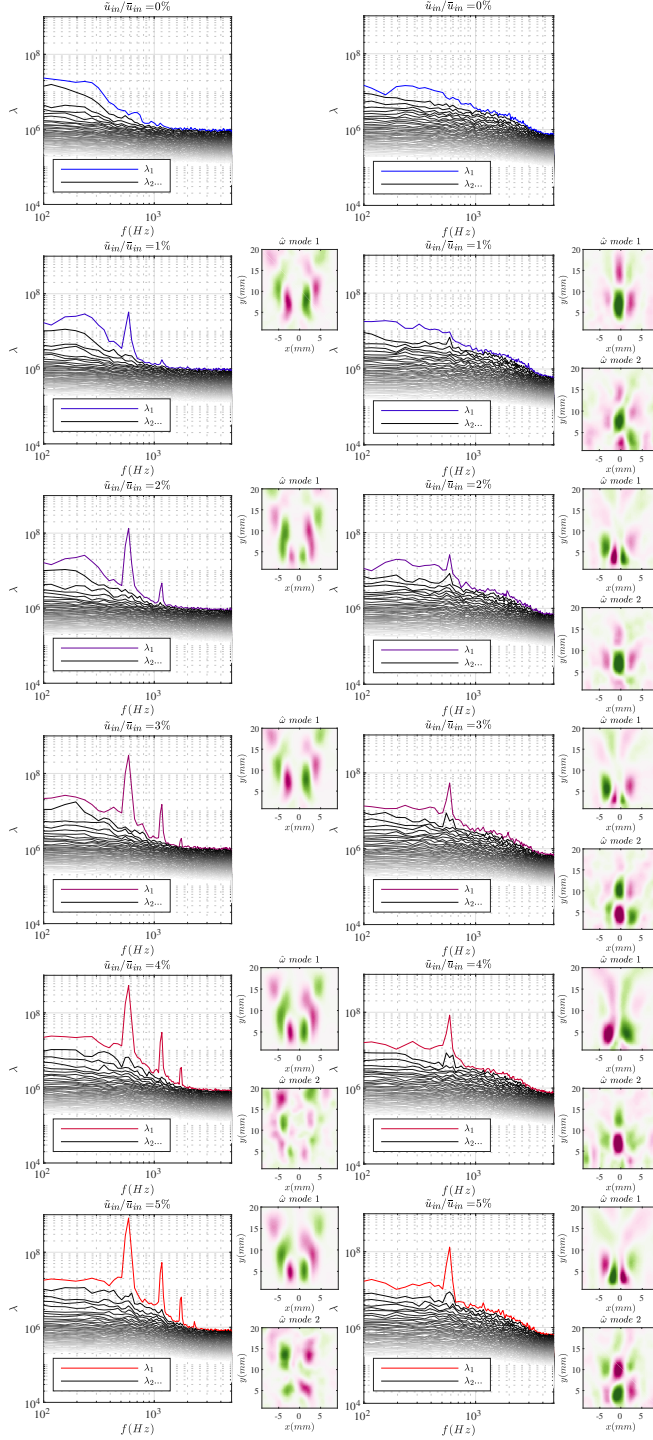
FIGURE 4. Spectral POD eigenvalue spectra and spatial mode shapes extracted at the peak frequency for the first two leading modes for all reacting conditions. The conditions with low turbulence intensity ($u'_{in}/\bar{u}_{in} = 5\%$) are shown on the left and the conditions with high turbulence intensity ($u'_{in}/\bar{u}_{in} = 11\%$) are shown on the right.