Supplementary Material:
Estimating Hydrogen/Air Flame Acceleration Induced by 3D Flame Instabilities from 2D Simulations

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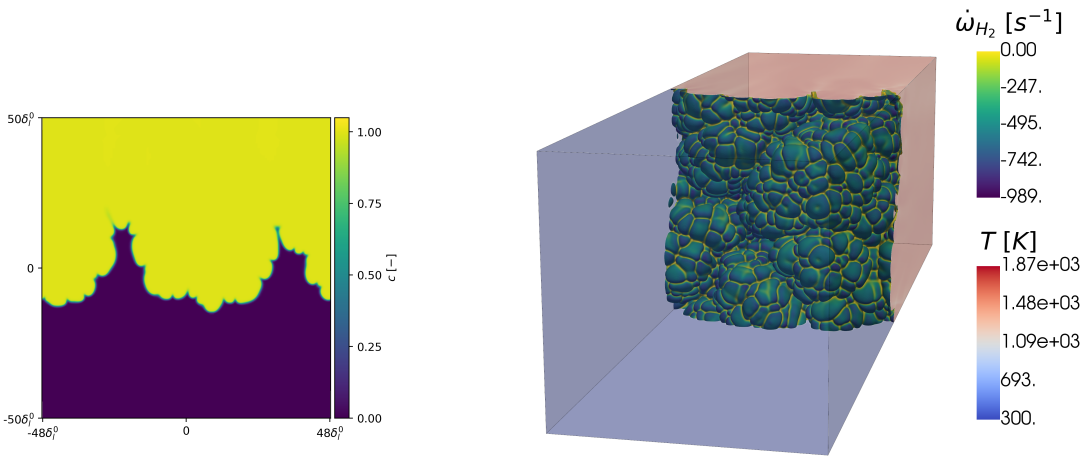
Supplementary Figures

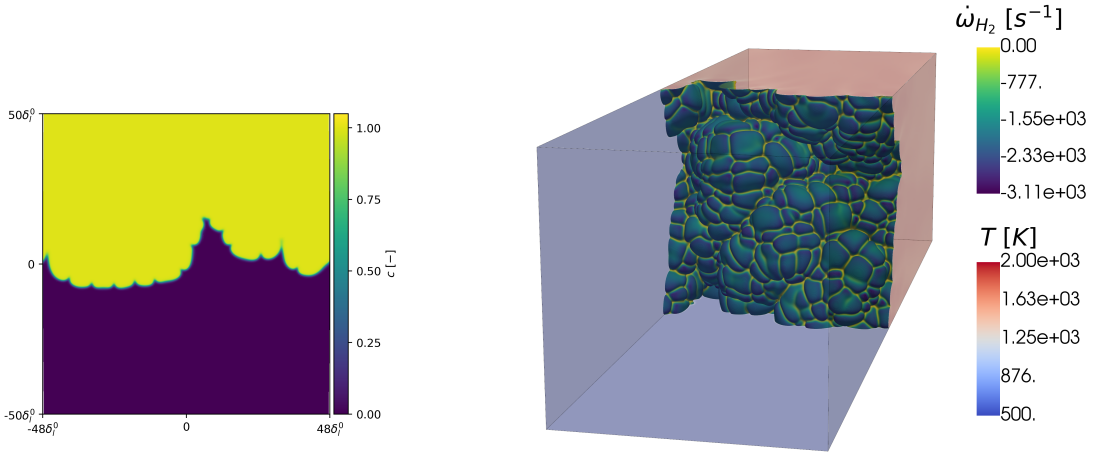
Additional figures for the unstable flame cases not shown in the main article are provided in this supplementary material. This includes instantaneous visualization of the 2D and 3D flames, and the temporal evolution of the flame wrinkling factor and the stretch factor. Readers are referred to Table 1 of the paper for the naming of the cases.

Instantaneous visualization of 2D and 3D unstable flames



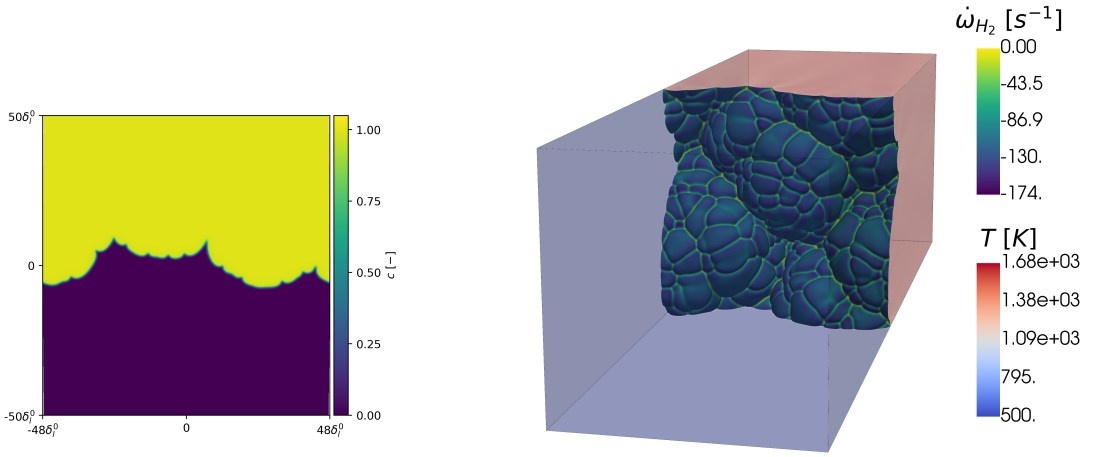
(a) 2D case (b) 3D case

Figure 1: Visualization of instantaneous solutions for the 2D and 3D unstable flames in conditions phi05_p5_T300_B. Left: field of progress variable c for the 2D case. Right: progress variable isosurface ($c = 0.8$) colored by the fuel reaction rate $\dot{\omega}_{H_2}$.



(a) 2D case (b) 3D case

Figure 2: Visualization of instantaneous solutions for the 2D and 3D unstable flames in conditions phi05_p10_T500_B. Left: field of progress variable c for the 2D case. Right: progress variable isosurface ($c = 0.8$) colored by the fuel reaction rate $\dot{\omega}_{H_2}$.



(a) 2D case (b) 3D case

Figure 3: Visualization of instantaneous solutions for the 2D and 3D unstable flames in conditions phi04_p1_T500_B. Left: field of progress variable c for the 2D case. Right: progress variable isosurface ($c = 0.8$) colored by the fuel reaction rate $\dot{\omega}_{H_2}$.

Evolution of Ξ and I_0 in time

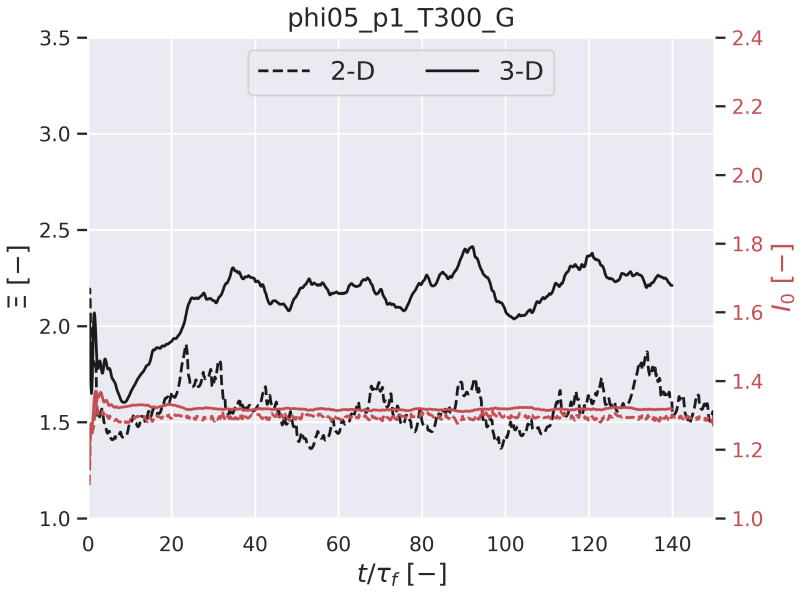


Figure 4: Temporal evolution for case phi05_p1_T300_G of flame wrinkling Ξ (black) and stretch factor I_0 (red) for 2D (dashed lines) and 3D (plain lines).

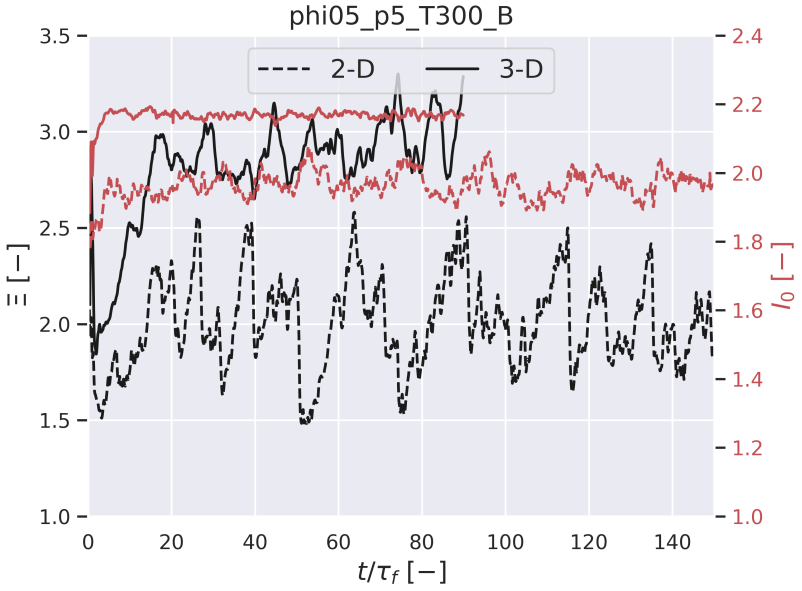


Figure 5: Temporal evolution for case phi05_p5_T300_B of flame wrinkling Ξ (black) and stretch factor I_0 (red) for 2D (dashed lines) and 3D (plain lines).

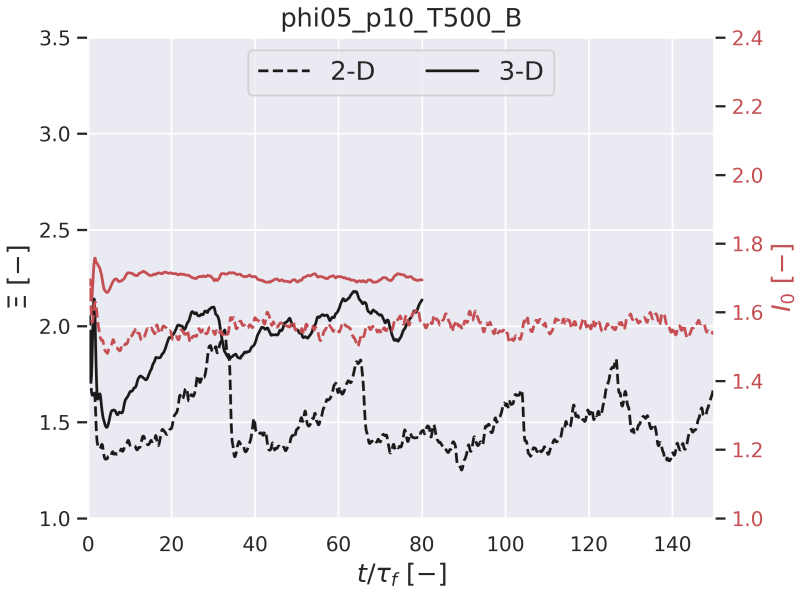


Figure 6: Temporal evolution for case phi05_p10_T500_B of flame wrinkling Ξ (black) and stretch factor I_0 (red) for 2D (dashed lines) and 3D (plain lines).

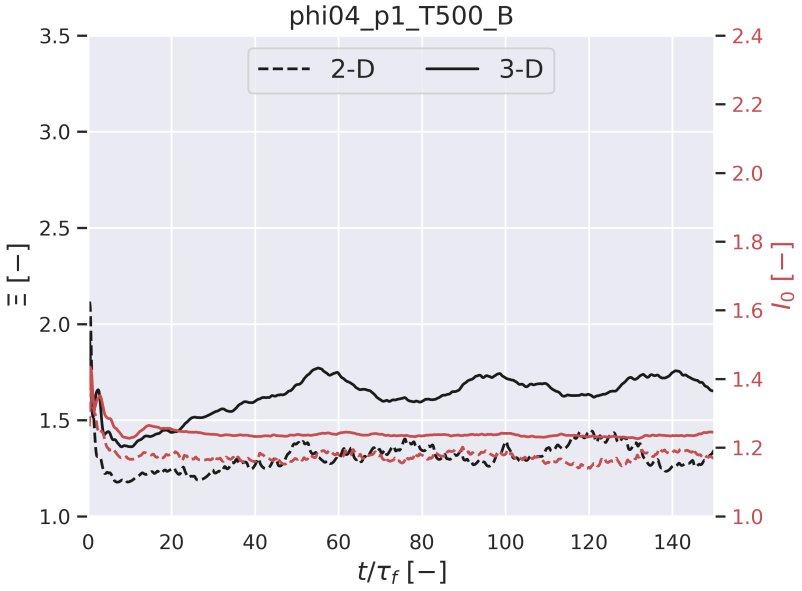


Figure 7: Temporal evolution for case phi04_p1_T500_B of flame wrinkling Ξ (black) and stretch factor I_0 (red) for 2D (dashed lines) and 3D (plain lines).