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Effect of Cavity Width on the Self-sustained Oscillation in a Low-Mach-number Cavity Flow[1] KE ZHANG, AHMED NAGUIB, Mechanical Engineering Department, Michigan State University, MI-48824, USA — Recent unsteady-wall-pressure and velocity measurements (Zhang and Naguib, AIAA paper 4376-2008) in finite-width and azimuthally-uniform cavities showed that a low-Mach-number ($M < 0.1$) cavity has distinct behavior with different width-to-length (W/L) ratios and a turbulent boundary layer at separation. The cavity was defined as a *narrow cavity* if W/L <1 and a *wide cavity* if W/L >1. In the latter case, the self-sustained oscillation was attenuated *and*, instead, low-frequency disturbances became dominant. This effect was more pronounced with increasing Reynolds number. This interesting finding is believed to relate to the recently uncovered three-dimensional instability of the cavity and its interaction with the shear layer (Bres and Colonius *JFM* **599**, 2008). To explore this idea further, the distribution of the unsteady wall pressure along the azimuthal direction and the flow velocity are measured simultaneously. The results give better understanding of the nature of the low-frequency unsteadiness, the three dimensionality of the flow in the cavity and the effect of cavity width on them.

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