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POD Analysis of Subsonic Cavity Flow Fields LAWRENCE UKEILEY, University of Florida, NATHAN MURRAY, Harding University, GEORGE SHUMWAY, University of Florida — Subsonic flow over an open cavity with a length to depth ratio of 6 is studied experimentally using the Proper Orthogonal Decomposition of two-component PIV measurements. Over 1000 velocity field snapshots were acquired at 5 different free stream Mach numbers ranging from 0.2 through nearly 0.75 for the analysis. These Mach numbers had different features of the surface pressure which evolved from completely broad band to being dominated by Rossiter mode 2 and 3. Additionally there were significantly differences in mean flow recirculation patterns which evolved from a single bubble in aft part of the cavity to one approaching the center of the cavity. Although there were drastic differences in those properties the dominant POD modes have many similarities. In the presentation quantitative analysis of the differences in the POD modes will be discussed along with a discussion of the development of a set of modes which are valid over the full range of Mach numbers studied.

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