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**Experimental Study on Dynamics of $2H_2/O_2/2Ar$ Detonations with a Constant Mass Divergence** QIANG XIAO, Univ of Ottawa, JIAXIN CHANG, Univ of Toronto, MAXIME LA FLECHE, MATEI I. RADULESCU, Univ of Ottawa — Very recently, Borzou and Radulescu (2016) formulated a novel solution allowing for an easy and precise quantification of loss effects during detonation propagation involving an exponentially shaped channel. They found that the detonation dynamics departed from the ZND model predictions, particularly for very unstable detonations. The question arises if the ZND model can predict the dynamics of much less unstable mixtures, in spite of the presence of a cellular structure. The present study focuses on a more stable mixture of $2H_2/O_2/2Ar$ with better known reaction kinetics. The results obtained experimentally for the velocity deficit in terms of the amount of mass divergence were found in excellent agreement with the predictions made with the ZND model, in spite of the detonation reaction zone being organized in strong cellular structures with reactive transverse waves.

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