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Quantifying real-gas effects on a laminar n-dodecane – air premixed flame ABISHEK GOPAL, University of Maryland, College Park, SHASHANK YELLAPANTULA, GE Global Research Center, Niskayuna, NY, JOHAN LARSSON, University of Maryland, College Park — With the increasing demand for higher efficiencies in aircraft gas-turbine engines, there has been a progressive march towards high pressure-ratio cycles. Under these conditions, the aviation fuel, Jet A, is injected into the combustor at supercritical pressures. In this work, we study and quantify the effects of transcriticality on a 1D freely propagating laminar n-dodecane – air premixed flame. The impact of the constitutive state relations arising from the Ideal Gas equation of state(EOS) and Peng-Robinson EOS on flame structure and propagation is presented. The effects of real-gas models of transport properties, such as viscosity on laminar flame speed, are also presented.

Abishek Gopal
University of Maryland, College Park

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