Progress in the Computational Modeling and Understanding of Gaseous and Liquid-fueled Detonation Engines

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Abstract

Detonation engines, using continuous spinning or rotating waves, are finding use in a broad spectrum of propulsion applications. While research in this area span more than five decades, details of the complex detonation process have been emerging only in the last couple of decades. Such engines involve the three-dimensional interplay of flow geometry and unsteady fuel/air injection, stratified mixtures, and complex wave dynamics including multiple and even counter-propagating structures. Due to the multiscale nature of these problems, computational modeling using even the most powerful computing systems still remains a challenge. In this talk, progress in the detailed representation of single and two-phase detonation configurations, insights learnt, and key challenges are discussed.

Biography

Venkat Raman received his PhD from Iowa State University in 2003 in the department of chemical engineering. He was a NASA/Center for Turbulence Research Postdoctoral Fellow at Stanford University from 2003-2004, and a research associate in the Center for Integrated Turbulence Simulations from 2004-2005. From 2005-2014, he was on the faculty of Aerospace Engineering and Engineering Mechanics Department at The University of Texas at Austin, initially as an assistant professor (2005-2011) and later as tenured associate professor (2011-2014). Raman received an NSF CAREER award in 2008, a distinguished paper award at the International Combustion Symposium in 2013, and the Moncrief Grand Challenge Award in 2013. He held the Eli. H and Ramona Thornton Centennial Fellow in Engineering at UT Austin from 2013-2014.

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