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Large Eddy Simulations and an Analysis of the Flow Field of a Radially Lobed Nozzle NOUSHIN AMINI, Texas A&M University, AARTHI SEKARAN, Jawaharlal Nehru Center for Advanced Scientific Research — Lobed nozzles have been a subject of regained interest over the past couple of decades owing to their established mixing capabilities. Despite experimental (Hu et al, 1999 and Hu et al, 2008) and limited numerical studies (Boulenouar et al 2011 and Cooper et al, 2005), the exact nature of the jet ensuing from this nozzle is yet to be completely understood. The present numerical study is intended to complement prior experimental investigation, involving the analysis of the flow field downstream of a six lobed nozzle (Amini et al, 2012). Preliminary results (presented at DFD 2014, Amin and Sekaran), which involved three dimensional simulations of the full domain via URANS and Large Eddy Simulations (LES) were used to assess the domain extents and simulation technique. Based on these results it was seen that LES were able to capture the region of interest satisfactorily and a qualitative corroboration with previous studies was obtained. The study is thus extended to analyzing the flow originating from within the nozzle, following it downstream in order to confirm the vortical interaction mechanisms inside the lobed nozzle.

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