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Experimental study on spray characteristics of alternate jet fuels using Phase Doppler Anemometry[1] KUMARAN KANNAIYAN, REZA SADR, Texas A&M University at Qatar — Gas-to-Liquid (GTL) fuels have gained global attention due to their cleaner combustion characteristics. The chemical and physical properties of GTL jet fuels are different from conventional jet fuels owing to the difference in their production methodology. It is important to study the spray characteristics of GTL jet fuels as the change of physical properties can affect atomization, mixing, evaporation and combustion process, ultimately affecting emission process. In this work, spray characteristics of two GTL synthetic jet fuels are studied using a pressure-swirl nozzle at different injection pressures and atmospheric ambient condition. Phase Doppler Anemometry (PDA) measurements of droplet size and velocity are compared with those of regular Jet A-1 fuel at several axial and radial locations downstream of the nozzle exit. Experimental results show that although the GTL fuels have different physical properties such as viscosity, density, and surface tension, among each other the resultant change in the spray characteristics is insignificant. Furthermore, the presented results show that GTL fuel spray characteristics exhibit close similarity to those of Jet A-1 fuel.

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Kumaran Kannaiyan
Texas A&M University at Qatar

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