EFFECT OF NANOPARTICLES ON ALTERNATIVE FUEL SPRAYS AT HIGH-PRESSURE CONDITIONS

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Goals and Objectives:

Nanotechnology
- For jet fuels

Test it on conventional and alternative jet fuels
- Jet A1
- GTL

Nanoparticles at different concentrations
- 0 wt.%
- 2 wt.%
- 4 wt.%

Mixture physical properties
- Density
- Viscosity
- Surface tension
- Refractive index

Ambient conditions (inert gas)
- 900 kPa
- 500 kPa
- 100 kPa
- 400 K

Non reactive spray performance
- Cone angle
- Breakup distance
- Liquid sheet velocity

Shadowgraph image
Achievements:

Undergraduate Research Thesis:


Honor:

- Medallion was awarded for the University level distinction from the main campus: Texas A&M University, College Station, TX, U.S.A at the graduation ceremony.
Outcomes:

International Conferences:


- Kumaran Kannaiyan, and Reza Sadr, “Effect of nanoparticles on the spray characteristics of jet fuels at elevated ambient conditions”, *71st Annual Meeting of the APS Division of Fluid Dynamics*, Atlanta, Georgia, 18-20 Nov., 2018. Abstract # KP1.00130 (Poster)

- A research paper is under review for publication in a journal
Post Projects Plans

1. Use nozzles with different geometries.

2. Elaborate testing on spray’s cone angle near the nozzle.

3. Elevate the experimentation from spray to combustion phase.

Thank you!