Integrated Nozzle Flow, Spray, Combustion, and Emission Modeling

Using KH-ACT Primary Breakup Model & Detailed Chemistry

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Sponsor: DOE Vehicle Technologies Program Office
Program Manager: Mr. Gurpreet Singh
Petrodiesel vs. Biodiesel

Influence of Physical and Chemical properties of fuel

- KH-ACT primary breakup model: Aerodynamics, Cavitation, Turbulence
- Validation against x-ray radiography data
- Detailed Chemistry:
  - n-heptane: Diesel surrogate
  - Methyl Butanoate
  - Methyl Decanoate: Biodiesel Surrogate
- Validation against flame lift-off data
- Poorer atomization characteristics for biodiesel
- Spray - flame interaction
- NOx vs. Soot trade-off

Conceptual Combustion Model from Sandia National Laboratory

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