Combustion of petroleum-based transportation fuels and their blends with biofuels: a new approach for developing surrogates and understanding the effects of blending

Goals

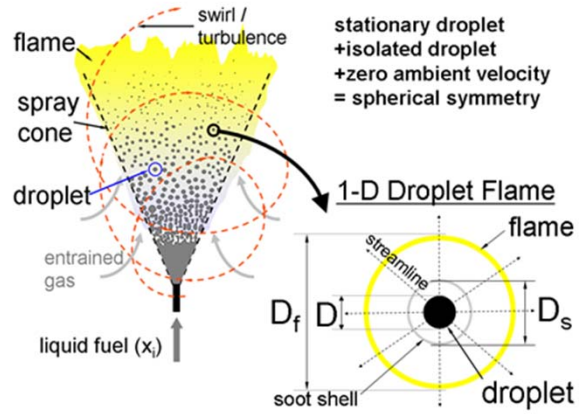
- Develop data and a detailed numerical model for a liquid fuel burning configuration to validate kinetics and property databases for predicting performance of combustion engines

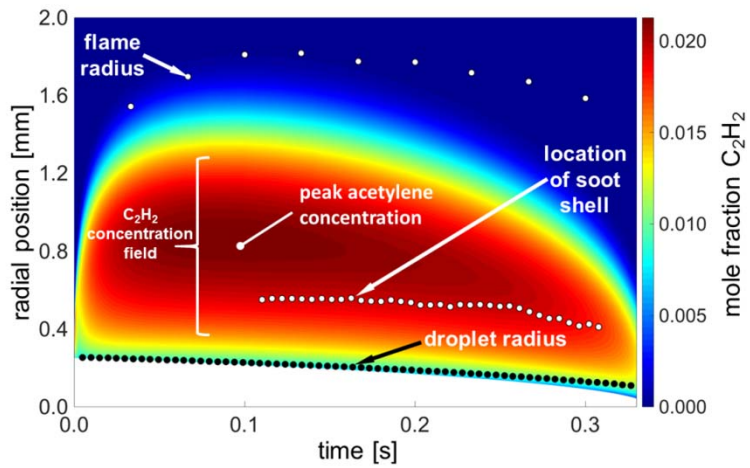
Approach

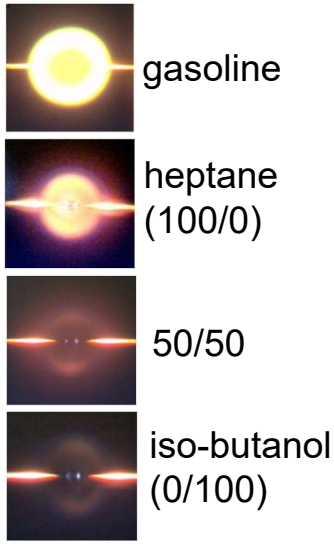
- Use 1-D droplet combustion configuration as platform to provide data to develop and validate surrogate and kinetic mechanism of gasoline/biofuel blends
- Adapt an ab-initio model of liquid fuel burning to gasoline surrogate/biofuel blends to enable validation and development process.

Potential Impact on Co-Optima Goals

- Predict fundamental fuel performance metrics for ACI design (ignition, burning, blending for gasoline/biofuel surrogate systems)
- Validate kinetic mechanisms to enable design of ACI systems fueled by biofuel blends.
- Develop understanding of biofuel additives on combustion performance.







Models with Predictive Capabilities

Diesel/Biofuel Surrogates

Enhanced Understanding of Multiphase Combustion Physics

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