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عنوان مقاله:

Effects of Two-Way Turbulence Interaction on the Evaporating Fuel Sprays

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خلاصه مقاله:

This article discusses the importance of using different turbulence modulation models in simulation of evaporating sprays. An in-house CFD code has been modified to take into account the effect of considering turbulence modulation by standard or consistent models. These models may predict an augmentation (consistent model) or a reduction (standard model) in the turbulence kinetic energy of continuous phase. Calculations are done in a Eulerian-Lagrangian framework and the effect of injected droplets on turbulent kinetic energy and its rate of dissipation is included in the equations of the continuous phase. Results are shown to be valid by comparing them to Sandia spray A configuration experimental data. Results show that considering the effect of existing droplets in a turbulent combustion chamber can play a major role in having a more accurate CFD simulation. These models can alter the velocity field drastically when droplets are injected into the chamber with a high velocity. As a result, spray characteristics such as evaporation rate is also altered. It can be concluded that modulation models should be used in the simulation of evaporating sprays in order to attain more accurate and realistic results.

کلمات کلیدی:

Turbulence modulation, Turbulent dispersion, Evaporation rate, Velocity profile alternation

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