

## **Simulation of Primary Breakup for Diesel Spray with Phase Transition**

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### **Abstract**

A continuum formalism for describing the behavior of primary atomization with phase transition is presented, which includes the effects of heat and mass transfer of the two phase flow, the formation of ligaments and droplets, surface tension force and turbulence. Simulation of liquid jet primary atomization given by Marcus Herrmann (A balanced force refined level-set grid method for two-phase flows on unstructured flow solver grids, Journal of Computational Physics 2008) is extended to include the effects of evaporation and its relative motion of the interface between gaseous and liquid phase. It is shown that the phase transition process can be modeled by introducing a laminar surface regression velocity, which is derived from the temperature boundary layer. It is shown that the phase transition effect has a big impact on the the spray primary breakup processes.

Key words: primary breakup diesel spray phase transition

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