Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

A simulation of a bluff-body stabilized turbulent premixed flame using LES-PDF JEONGLAE KIM, STEPHEN POPE, Cornell University — A turbulent premixed flame stabilized by a triangular cylinder as a flame-holder is simulated. The computational condition matches the Volvo experiments (Sjunnesson *et al.* 1992). Propane is premixed at a fuel lean condition of $\phi = 0.65$. For this reactive simulation, LES-PDF formulation is used, similar to Yang *et al.* (2012). The evolution of Lagrangian particles is simulated by solving stochastic differential equations modeling transport of the composition PDF. Mixing is modeled by the modified IEM model (Viswanathan *et al.* 2011). Chemical reactions are calculated by ISAT and for the good load balancing, PURAN distribution of ISAT tables is applied (Hiremath *et al.* 2012). To calculate resolved density, the two-way coupling (Popov & Pope 2013) is applied, solving a transport equation of resolved specific volume to reduce statistical noise. A baseline calculation shows a good agreement with the experimental measurements in turbulence statistics, temperature, and minor species mass fractions. Chemical reaction does not significantly contribute to the overall computational cost, in contrast to non-premixed flame simulations (Hiremath *et al.* 2013), presumably due to the restricted manifold of the purely premixed flame in the composition space.

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Date submitted: 24 Jul 2013 Electronic form version 1.4