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LES/PDF Approach for Modeling Soot Formation in Turbulent Flames PRATIK DONDE, VENKAT RAMAN, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, MICHAEL MUELLER, Department of Mechanical Engineering, Stanford University, HEINZ PITSCH, Institute for Combustion Technology, RWTH Aachen University — In large eddy simulation based modeling of soot evolution in turbulent flames, the correlations between the gas phase scalars and the soot particles need to be modeled. Typically, the soot population is described in terms of a number density function, which is further parameterized using a finite set of moments. Modeling soot-gas phase correlations essentially implies modeling of the one-time one-point probability density function (PDF) of gas phase scalars and the soot moments. Typically, presumed functional forms for this joint-PDF are used. In this work, a transport equation for the PDF is directly evolved using a Monte-Carlo approach. Simulation of experimental flame configurations including a piloted methane flame and a bluff-body stabilized flame are used to compare the full PDF approach with presumed PDF models.

Pratik Donde
Dept of Aerospace Engineering and Engineering Mechanics,
The University of Texas at Austin

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