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A Study of Turbulence-Chemistry-Soot-Radiation Interaction in Luminous Turbulent Jet Flames[1] SOMESH ROY, DANIEL HAWORTH, Mechanical and Nuclear Engineering Dept., Pennsylvania State University — A detailed soot model based on method of moments with interpolative closure (MOMIC) is used in RANS simulations of luminous turbulent jet flames using OpenFOAM. A detailed chemical mechanism has been used to describe the chemistry of key soot precursors, and a transported probability density function (tPDF) method has been used to capture the turbulence-chemistry-soot-radiation interactions. The results from the detailed soot model have been compared with those from a semi-empirical, two-equation soot model for accuracy and performance. The effects of turbulence-chemistry-radiation interactions on soot dynamics are isolated and quantified.

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