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Large-eddy simulation of pulverized coal swirl jet flame MASAYA MUTO, Kyoto University, HIROAKI WATANABE, Central Research Institute of Electric Power Industry, RYOICHI KUROSE, SATORU KOMORI, Kyoto University, SARAVANAN BALUSAMY, SIMONE HOCHGREB, University of Cambridge
— Coal is an important energy resource for future demand for electricity, as coal reserves are much more abundant than those of other fossil fuels. In pulverized coal fired power plants, it is very important to improve the technology for the control of environmental pollutants such as nitrogen oxide, sulfur oxide and ash particles including unburned carbon. In order to achieve these requirements, understanding the pulverized coal combustion mechanism is necessary. However, the combustion process of the pulverized coal is not well clarified so far since pulverized coal combustion is a complicated phenomenon in which the maximum flame temperature exceeds 1500 degrees Celsius and some substances which can hardly be measured, for example, radical species and highly reactive solid particles are included. Accordingly, development of new combustion furnaces and burners requires high cost and takes a long period. In this study, a large-eddy simulation (LES) is applied to a pulverized coal combustion field and the results will be compared with the experiment. The results show that present LES can capture the general feature of the pulverized coal swirl jet flame.

Masaya Muto
Kyoto University

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