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plasmaFoam: An OpenFOAM framework for computational plasma physics and chemistry AYYASWAMY VENKATTRAMAN, ABHISHEK KUMAR VERMA, University of California Merced — As emphasized in the 2012 Roadmap for low temperature plasmas (LTP), scientific computing has emerged as an essential tool for the investigation and prediction of the fundamental physical and chemical processes associated with these systems. While several in-house and commercial codes exist, with each having its own advantages and disadvantages, a common framework that can be developed by researchers from all over the world will likely accelerate the impact of computational studies on advances in low-temperature plasma physics and chemistry. In this regard, we present a finite volume computational toolbox to perform high-fidelity simulations of LTP systems. This framework, primarily based on the OpenFOAM solver suite, allows us to enhance our understanding of multiscale plasma phenomenon by performing massively parallel, three-dimensional simulations on unstructured meshes using well-established high performance computing tools that are widely used in the computational fluid dynamics community. In this talk, we will present preliminary results obtained using the OpenFOAM-based solver suite with benchmark three-dimensional simulations of microplasma devices including both dielectric and plasma regions. We will also discuss the future outlook for the solver suite.

Ayyaswamy Venkattraman
University of California Merced

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