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Development of a Computational Tool for Inductively Coupled Plasma Flow Over Test Samples MAXIMILIAN DOUGHERTY, DOUGLAS FLETCHER, University of Vermont — A boundary layer flow code is being developed to complement experimental work at the University of Vermont Plasma Diagnostics Laboratory. The stagnation region boundary layer is important because it controls the heat flux to the material during planetary entry and ground testing. Within the nonequilibrium boundary layer, highly exothermic chemical reactions can significantly augment heat transfer to the material surface. Many boundary layer codes rely on similarity solutions in transformed coordinate systems that are not necessarily intuitive at first glance. The benefit of these transformations is that a simplified grid can be used with a finite difference approach but this is at the expense of obfuscating the basic physical quantities which are of interest from an experimental perspective. As a result, the code being developed will use a finite volume formulation in physical coordinates. Chemical and thermodynamic properties will be computed with a separate gas property library which will allow for calculations of high temperature dissociated multi-species flows.

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