

Computational Plasma & Reactive Flow Lab — Funding

In this thread, you can find recent research grants obtained by our lab, and some details about them.

Large Eddy Simulation of Boundary Layer Transition by Nanosecond Pulse Plasma Actuators

The objective of this study is to investigate on the effect of nanosecond pulse plasma actuators on boundary layer transition on a wing at Mach 2+. The full coupling between the plasma and the turbulent eddies is here predicted for the first time using a novel computational method which permits the fast integration of the plasma transport equations using aerodynamic-scale time steps.

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| Sponsor: | National Research Foundation of Korea |
| Investigators: | PI: Bernard Parent. |
| Duration: | July 2018 — June 2021. |
| Budget: | \$120,000 |

Preliminary Estimates of Plasma Properties in Hypersonic Boundary Layers Using CFD

The objective of the study will be to gain a better understanding of plasma effects in vehicle boundary layers at hypersonic speeds. The study will compare the results of two CFD codes (CFDWARP and LEMANS) in modeling plasmas including plasma sheath effects. Additional analysis activities will investigate plasmas at lower Mach numbers via sublimation of the ablation layer partly composed of cesium. Resulting data generation will be used to estimate how plasmas interact with various flow and surface properties important to vehicle performance.

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| Sponsor: | Raytheon Missiles and Defense |
| Investigators: | PI: Bernard Parent; Co-PI: Kyle Hanquist |
| Duration: | May 2020 — December 2020. |
| Budget: | \$45,000 |
