

Multi-Phase Combustion Enhanced by Plasma

This research focuses on the experimental investigation of gas-phase and multi-phase reacting flows enhanced by plasma discharges. Researchers at NRL are looking for a more complete understanding of the physics and chemistry behind plasma-assisted combustion, and experimental measurements of the relevant species, temperatures, and flow parameters are needed. Measurements of interest include planar-laser induced fluorescence (PLIF) for species distributions, phase Doppler anemometry (PDA) for droplet diameters and velocities, optical emissions spectroscopy (OES) for temperature and electron number density, Schlieren imaging for identifying density gradients, and filtered chemiluminescence imaging for heat release rates. Laboratories are equipped with multiple lasers, spectrographs, CCD cameras, and supporting optics and instrumentation. Plasma-assisted experimental platforms include a gas-phase flow tube, a nonreacting spray nozzle, and a piloted spray burner. Candidates should have an understanding of combustion, laser diagnostics, and/or nonequilibrium plasmas such as nanosecond pulse repetitive discharges (NRPD). Full information about ongoing research in our section (Code 6185, Combustion & Reacting Transport) can be found at the following web address: <https://www.nrl.navy.mil/chemistry/research/6180/6185>.