



Akatsuka Laboratory

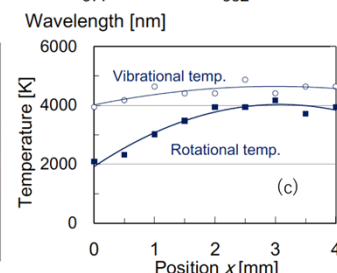
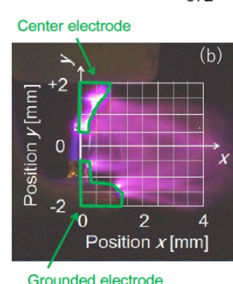
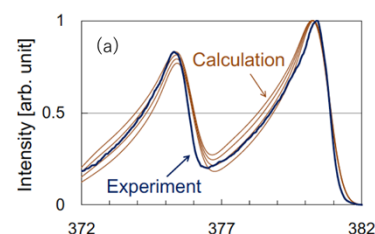
Plasma Science and Technology — Atomic/molecular processes, spectroscopic measurement, and applications

Laboratory for Zero-Carbon Energy, Nuclear Energy Division

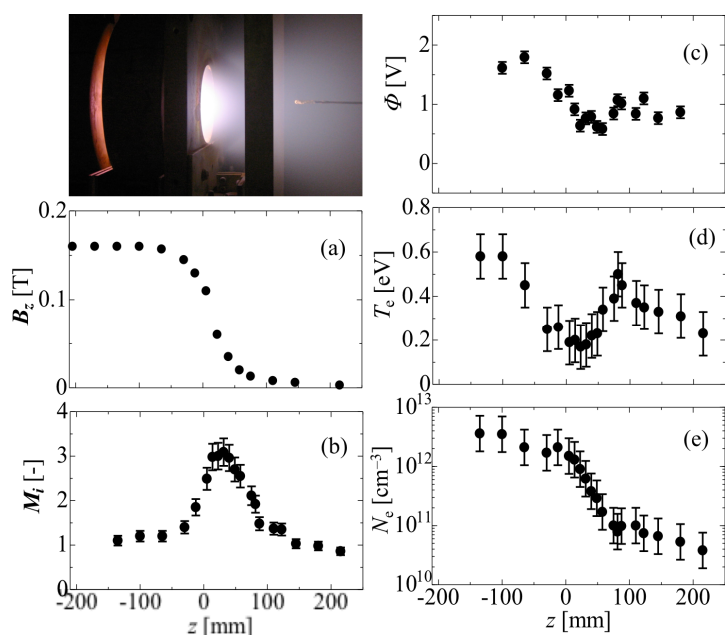
<http://www.zc.iir.titech.ac.jp/~hakatsuk>

- **Plasma Chemistry and Optical Emission Spectroscopy (OES)** — Electron & gas temperatures, electron & radical densities
- **Plasma Physics** — Transonic plasma flow along magnetic field
- **Arc-Jet in Water** — Decommissioning of nuclear facilities

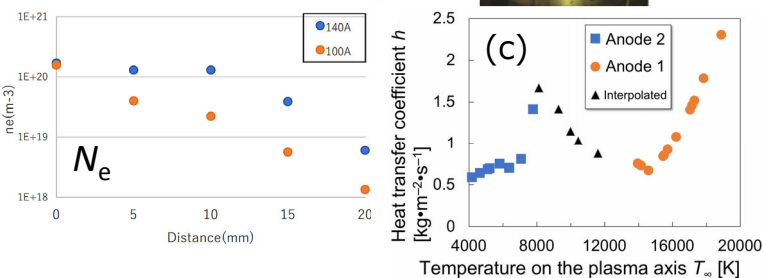
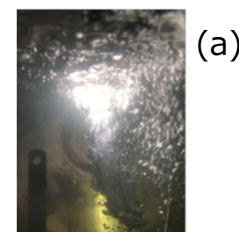
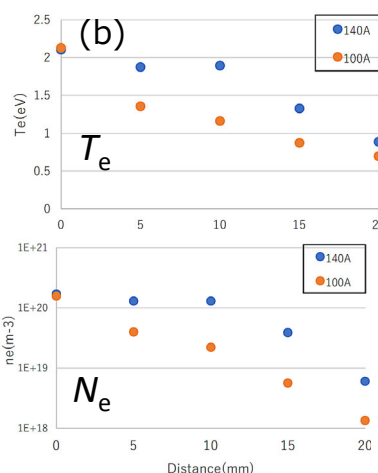
We have been developing original methods of OES measurement of plasmas in a state of non-equilibrium based on atomic/ molecular processes. Our OES methods covers wide range of engineering; not only to nuclear fusion, but also nuclear fission engineering, electric/electronic engineering, material engineering, astronautic engineering, mechanical engineering, environmental engineering, etc.



OES of N_2 excited states of pulse-discharge plasma simulating automotive engines: (a) Theoretical fitting of N_2 2PS spectrum in pulsed nitrogen plasma, (b) photo of the plasma and (c) position dependence of temperatures.



Supersonic acceleration and potential formation of arc-jet plasma along diverging magnetic field: Photo of the arc-jet along open-field line, and (a) longitudinal magnetic field, (b) ion Mach number, (c) space potential, (d) electron temperature and (e) electron density.



Arc-Jet in water for decommissioning of nuclear facilities: (a) Arc-jet ejected into water, (b) its electron temperature & density, and (c) heat transfer coefficient vs electron temperature on the plasma axis.