Electrodeless Generation and Control of High-density and High-speed Plasma Flow

“Keyword: Active Flow Control”

Flow Control Technique Using Dielectric Barrier Discharge

Active Control of Three-dimensional Separation Flow over a Flight Vehicle

Innovative Spacecraft and Launch Vehicle
Electrodeless Generation and Control of High-density and High-speed Plasma Flow

-propellant
- RF Antenna
- Antenna for Acceleration
- Magnetic Coil
- Helicon Plasma Source
- Plasma Exhaust
- Glass Tube

Schematic of Electrodeless Plasma Thruster

- Helicon Plasma Source
- Radio-Frequency Rotating Electric Field
- Magnetic Nozzle

Development of electrodeless plasma acceleration technique

High-density and long-lived advanced plasma thruster
Flow Control Technique Using Dielectric Barrier Discharge

Clarification of the physical mechanism of the jet production by DBD

Improvement of the output power of DBD Plasma Actuator

✓ No moving mechanical part
✓ Quick response to control input
Active Control of Separation Flow over Flight Object

Active control of the separation flow over a flight object

Improvement of the aerodynamic characteristics under various flight conditions

Innovative aircraft and spaceplane

- Slender body
  - Forebody of an airplane or a rocket
- High-Angle-of-Attack flight
  - Complex separation flow structure
  - Large side force and yawing moment