

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

“Keyword : Active Flow Control”

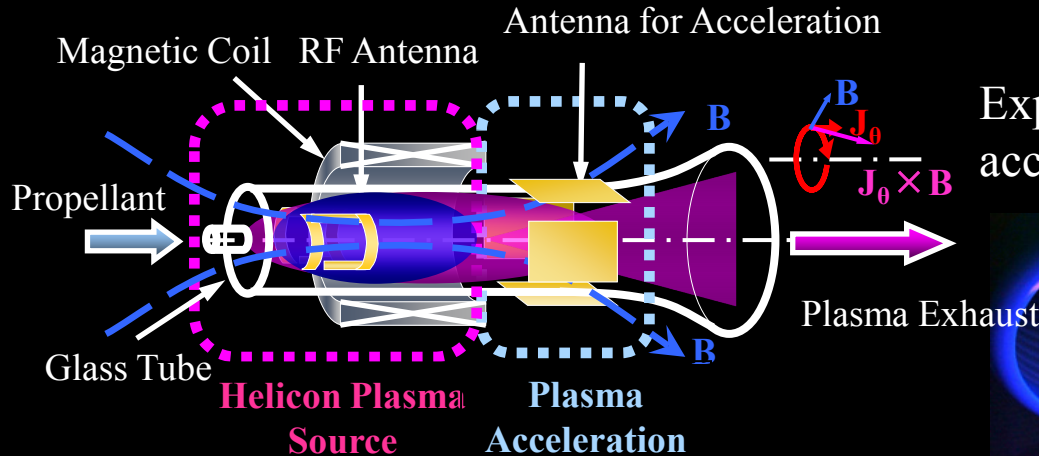
*Flow Control Technique
Using Dielectric Barrier
Discharge*

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

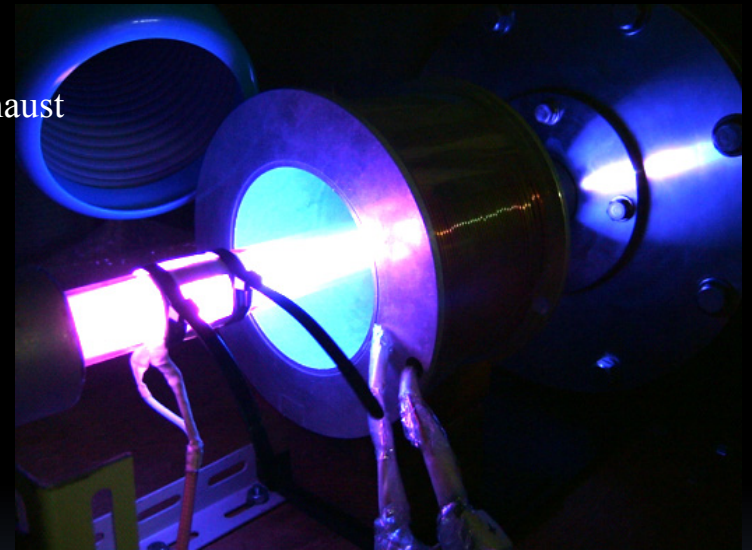


Innovative Spacecraft and Launch Vehicle

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



Experiment of electrodeless plasma acceleration using rotating electric field



Schematic of Electrodeless Plasma Thruster

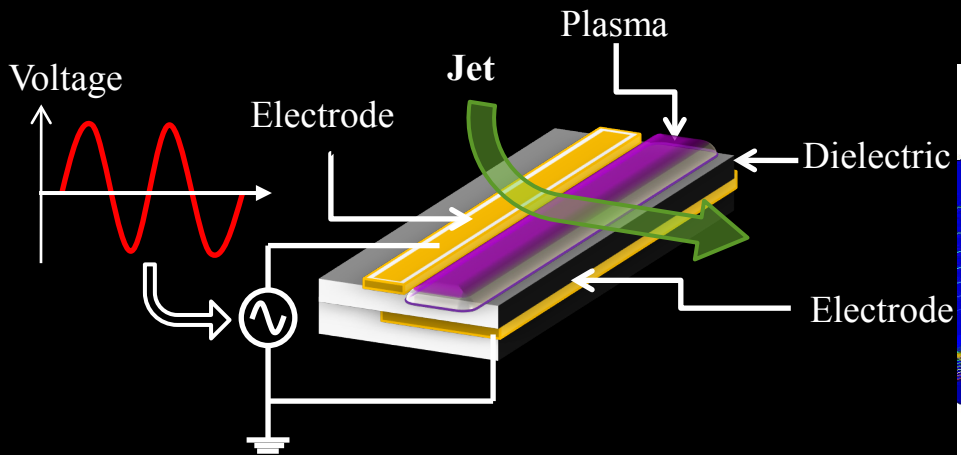
- ✓ *Helicon Plasma Source*
- ✓ *Radio-Frequency Rotating Electric Field*
- ✓ *Magnetic Nozzle*

Development of electrodeless plasma acceleration technique

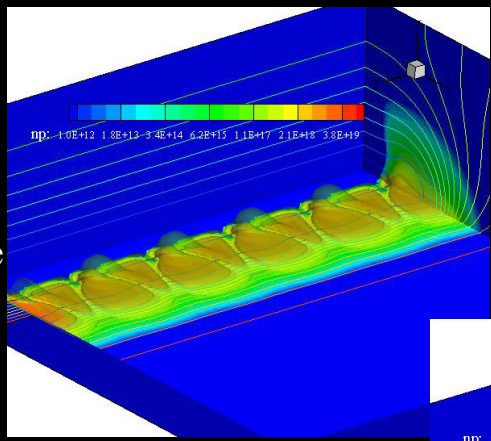


High-density and long-lived advanced plasma thruster

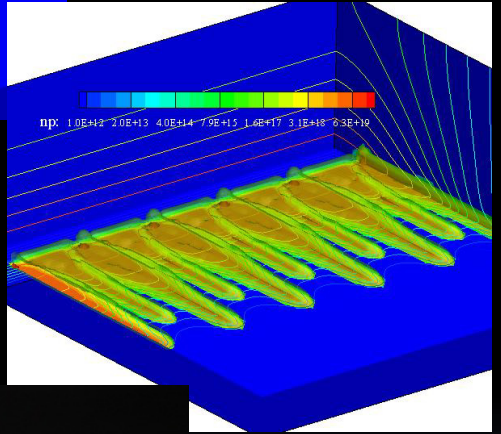
Flow Control Technique Using Dielectric Barrier Discharge



Schematic of DBD Plasma Actuator



Numerical simulation of discharge plasma.

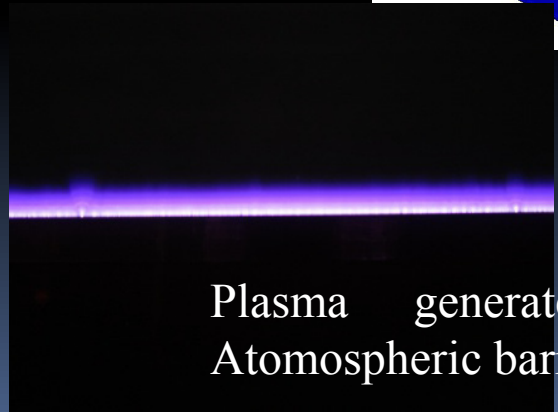


- ✓ *No moving mechanical part*
- ✓ *Quick response to control input*

Clarification of the physical mechanism of the jet production by DBD

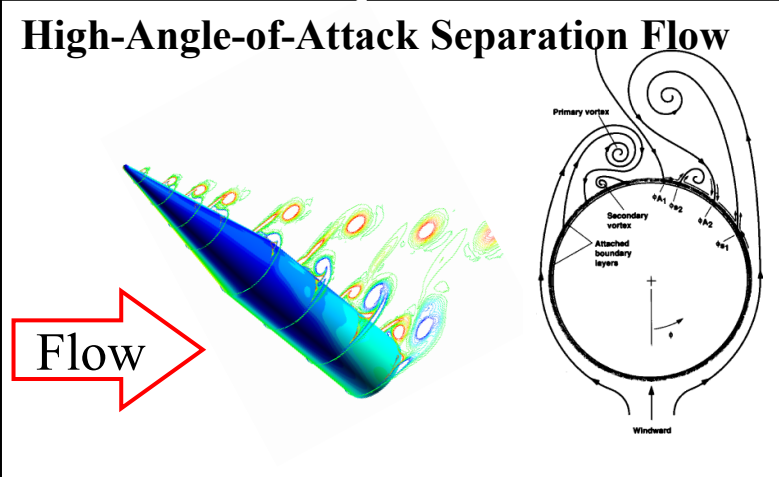


Improvement of the output power of DBD Plasma Actuator



Plasma generated by the Atmospheric barrier discharge

Active Control of Separation Flow over Flight Object



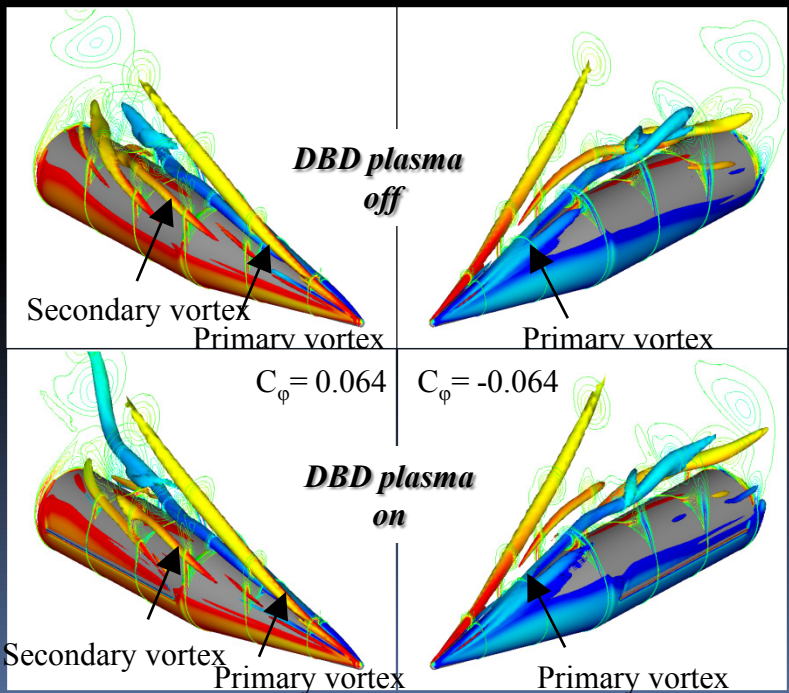
Active control of the separation flow over a flight object



Improvement of the aerodynamic characteristics under various flight conditions



Innovative aircraft and spaceplane



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