

# Research for Application of the Plasma Energy



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<b>Keywords</b>	plasma particle simulation, electric propulsion, space plasma, magnetic nozzle		
<b>Technical Support Skills</b>	<ul style="list-style-type: none"> <li>• 3D Hybrid particle-in-cell Simulation</li> <li>• Full PIC code</li> <li>• Space Propulsion</li> </ul>		

## Research Contents    Ion thruster , Plasma sail, Magnetic nozzle thruster, Laser Fusion

1. Ion thruster lifetime evaluation requires a time-consuming and costly test. To drastically reduce the cost and the time required for an ion thruster life test, a numerical tool called JIEDI (JAXA's Ion Engine Development Initiative) is being developed.

<http://gd.isas.jaxa.jp/JIEDI-WEB/>

2. Magneto Plasma Sail (MPS) generates a propulsive force by the interaction between the solar wind plasma flow and an artificially generated magnetic field inflated by the plasma injection from the spacecraft. The thrust performance of the MPS under the optimized parameters associated with the injected plasma has ever been evaluated by using numerical simulation.

<http://www.akashi.ac.jp/contents/Electric/kajimura/research.html>

3. A possible method for protecting beam ports and laser sources from alpha particles which are produced by a nuclear fusion in the Fast Ignition Laser Fusion Power Plant (KOTO-Fast) is proposed. Two simple dipolar magnetic fields generated by two coils installed at the tip of the beam port and at the side of the beam port are used for protecting the alpha particles coming into the inside of the beam port and colliding to the tip surface of the beam port. To calculate the behavior of alpha particles in the magnetic field, we use a 3D hybrid numerical simulation code.

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### Available Facilities and Equipment

JIEDI Code	
3D Hybrid PIC Code	
TRISTAN Code	