

Title:

Pulsed Laser Propulsion

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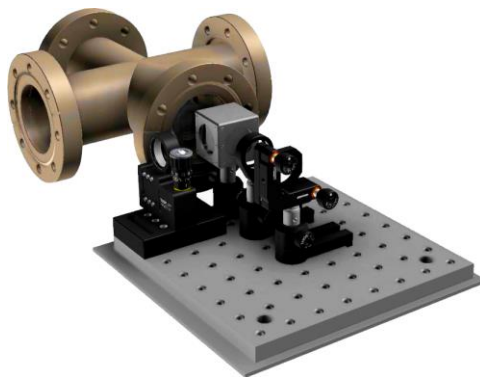
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Grant:

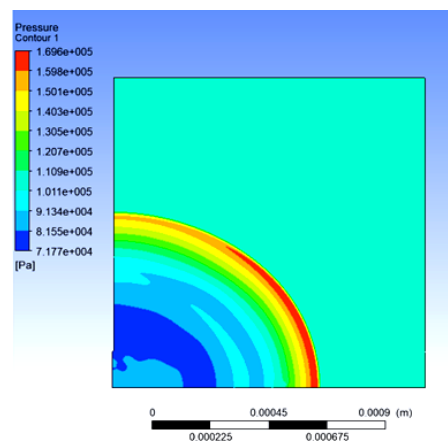
Teaching Assistant Grant

Short Description:

The pulsed laser propulsion is based on hitting a solid target (propellant) by a pulsed laser thus heating up the surface. As a result, the target spot undergoes phase changes from solid to liquid then to gas. This gas is further heated and a plasma plume expands thus producing thrust. The application of this type of propulsion has potentials in space missions with nano-satellites swarm missions in low earth orbit. At this orbit the atmospheric drag will dissipate the orbital energy, and as a result these satellites will burn in the earth atmosphere. For this reason it is suggested the use of pulsed laser thrusters. In this project both experimental and numerical methods are used to study the effect of adding a magnetic field on the propulsion enhancement and to analyze the plasma dynamics for different ablated materials.



(a)



(b)

(a) Experimental setup used to measure the thrust and (b) Chock wave (colored by pressure) produced by the ablated plasma obtained from CFD simulations