

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (Part 2) (4B)

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EXPERIMENTAL STUDY ON MECHANISM OF ASTEROID DEFENSE BY PULSED LASER

Abstract

There have been many asteroid impact events in the history of the earth, among which the most famous impact event led to the extinction of dinosaurs. Therefore, the asteroid impact event in the future will be a grave threat to the future sustainable development of human beings. In order to avoid the catastrophic consequences, it is critical to carry out the research of asteroid defense technology. The existing results show that the defending technology using laser ablation deflection has obvious advantages in dealing with small-scale asteroids with medium and long-term warning time. But at present, there are few experimental studies on laser ablation deflection defense technology. Most of the proposed concepts and experimental studies are based on continuous wave laser ablation. The research on the interaction law and deflection mechanism between pulsed laser and asteroid material is insufficient. Based on this, the experiment on the mass removal rate and ablation plume law of asteroid like materials under the action of pulsed laser were carried out, and the mass removal rate and ablation plume expansion and variation law of asteroid like materials under different laser energy and action time were studied. The results provide an experimental basis for further understanding the mechanism of laser ablation deflection of asteroids.