

**Research On Asteroid Dynamic Behavior And Deflecting Defense Effect
By Space-Based Laser-Driven**

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Abstract

Asteroid impact events occurred frequently in history, causing numerous environmental disasters and biological extinction, which is a major potential threat to mankind. The defense of the asteroid impact has become a hot issue in the international community and a great challenge to the global space industry. This paper analyzes the identification of the threat of asteroid impact and the need for security deflecting defense. Based on the interaction mechanism between laser and material, a space-based laser array defense system is proposed to deflect the asteroid by laser ablation driven. The feasibility of deflecting asteroid using space-based laser deflection array system, which consisting of 10 sets laser irradiation systems with 1KJ single pulse energy, 1Hz frequency and 0.6m transmitting aperture, through continuous driving for a long time by approach and accompanying fly, is analyzed and calculated. Through a triangulation three-dimensional reconstruction calculation method, the dynamic behavior of the asteroid under the laser irradiation drive is studied, and the influence law of the shape and rotation of it on the laser driving impulse and the influence of laser driving on its attitude and the rotation state are analyzed. Then taking seven of the most threatening asteroids as objects, the deflection defense effect of laser array

defense system is calculated. The results show that the space-based laser drive system can effectively deflect these asteroids with sufficient warning time. This paper provides a useful reference for the research on the technique of space based laser deflecting to prevent asteroids from striking the earth.