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Author: Dr. Chen Yue
China, Chenyue2004@sina.com

Mr. ren zhang
Institute of Communication Satellite, China Academy of Space Technology, China, zrcat@163.com

THE RESEARCH ON THE PRINCIPLE OF EMDRIVE PROPULSION TECHNOLOGY

Abstract

EmDrive (Electromagnetic Drive) is a new concept of propulsion technology in recent years. The technology has many advantages, and it is a revolutionary new technology. The performance of spacecraft can be greatly improved by EmDrive. However, the principle of EmDrive remains controversial. The electromagnetic wave distribution in the EmDrive's resonant cavity is studied in the paper emphatically. The EmDrive's resonant cavity has the characteristics as of cutoff waveguide. By reference to the phenomena of electromagnetic wave anomalous propagation in the cutoff waveguide, the fact that the electromagnetic wave can be reflected without metal surface in the cutoff waveguide is presented in the paper. At the same time, another fact that the electromagnetic wave distribution in the EmDrive's resonant cavity showing a characteristic of evanescent wave is presented also. It is a kind of electromagnetic wave anomalous propagation. This anomalous propagation can be described by the photon tunneling effect, consistent with quantum field theory. At last, the opinion that EmDrive revealing some properties of background vacuum is put forward in the paper and the introduction of the virtual photon process may be a new method to analyze the momentum conservation of EmDrive.