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平流层浮空器的热特性与研究现状

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Thermal Characteristics of Stratospheric Aerostats and Their Research

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摘要 研究平流层浮空器热状况的形成机制与特性是进行热控制设计和研究热控制技术的前提，对平流层浮空器技术的发展具有重要作用。在分析平流层对流与辐射热环境特性的基础上，运用传热学基本原理分析了浮空器热状况的复杂形成机制与影响因素。评述了浮空器热特性及其控制技术的研究现状，介绍了相关研究方法、热模型与主要结果，分析了平流层浮空器热特性研究得出的基本认识与存在的问题，指出了应进一步开展的研究方向。

关键词： 平流层浮空器 热环境 热特性 热控制 传热学

Abstract: Knowledge of the heat transfer mechanism and thermal characteristics of stratospheric aerostats is the precondition of thermal control design, which is crucial to the development of stratospheric aerostat technology. On the basis of analyzing the convective and radiative thermal environment of the stratosphere, the heat transfer principle is employed to analyze the complex mechanism governing the thermal status of stratospheric aerostats and the influencing factors. After that, the latest research advances in the thermal characteristics of stratospheric aerostats are reviewed. The relevant methods, thermal models and typical results are introduced. The primary conclusions obtained from these advances as well as existing problems are discussed. Finally, the further research areas for the thermal characteristics of stratospheric aerostats are proposed.

Keywords: stratospheric aerostat thermal environment thermal characteristics thermal control heat transfer

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