

数学与系统科学研究院

计算数学所学术报告

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(航天科技集团中国空气动力技术研究院)

报告题目:

The fundamental principles and challenges of functional materials using as thermal protection system

邀请人: 曹礼群 研究员

报告时间: 2017 年 3 月 14 日 (周二)

上午 10:00-11:30

报告地点: 数学院南楼二层

202 教室

Abstract:

Thermal protection or heat shield technology from extremely aerodynamic heating is one of the biggest challenges and most important key technique for vehicles especially in hypersonic domain. From the theoretical model of chemical reactions in boundary flow, the presentation briefly introduces the principal solution in mass loss or surface recession of different materials from chemical ablation and liquid flow. Some typical thermal protection materials, such as C/C composite, silica based composite and polymer matrix composites with low-density, are chosen as examples to present the detailed instruction of ablation simulation and to validate the basic model. Given the rapid development of new vehicles and novel materials, some complicated phenomena with characteristics of non-uniform ablation, erosion from aerodynamics or thermal stress even coupled reasons become critical and important. The preliminary solutions for above questions are also recommended. Moreover, the *ab initio* methodology of computational materials science used in finding non-ablative candidates for reusable launch vehicles is demonstrated. At last, processes to treat common problems are suggested combining specific examples in thermal protection design for space vehicles.

欢迎大家参加！