

论文

卫星介质深层充电的计算机模拟研究

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摘要 卫星介质深层充电效应是诱发地球同步轨道卫星运行故障和异常的重要因素之一, 文中介绍了介质深层充电的物理机制, 给出了初步的物理模型和计算机模拟方法, 该模型的模拟计算结果与欧空局的深层充电分析软件 DICTAT 的计算结果吻合得很好. 深层充电导致的最大电场总是出现在介质的接地侧, 因此, 介质的接地侧是发生放电的危险区域; 对于典型的外辐射带高能电子能谱情况, 介质的充电时间为小时量级.

关键词 [卫星](#) [介质深层充电](#) [计算机模拟](#) [空间环境](#)

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A study of deep dielectric charging on satellites by computer simulation.

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Abstract Deep dielectric charging is one of the important factors that induce malfunctions and failures on geosynchronous satellites. In this paper, we present the physical mechanism for charging is introduced, the preliminary physical model and computer simulation method. The results by the model agree well with those of DICTAT, a deep dielectric charging analysis software developed by European Space Agency. The maximum electric field induced by deep dielectric charging always appears on the grounding side of the dielectric, where it's most likely for discharge to take place accordingly. For the typical high energy electron spectrum in outer radiation belt, the charging time for dielectrics is of the order of an hour.

Key words [Satellite](#); [Deep dielectric charging](#); [Computer simulation](#); [Space environment](#).

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