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磁层磁场模式的研究进展

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摘要　磁场模式是表述空间磁场的一种有效工具，对于研究磁层大尺度电流系的发展变化和辐射带粒子具有重要意义.本文介绍了三种主要的磁层磁场模式，即经验模式、抛物面模式和事件导向模式，结合模式的原理和特点，对模式的改进情况和性能检验进行了详细论述，并对三种模式进行了对比分析.三种模式都能对暴时磁场进行动态模拟.最近的Tsyganenko模式考虑了太阳风的历史作用,每个磁场源都有自己的松弛时间尺度及驱动函数；抛物面模式A01中增加了场向电流及窄尾流效应；事件导向模式G03增加了非对称环电流和局地窄尾流片效应.

关键词　磁层磁场, 经验模式, 抛物面模式, 事件导向模式

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Advances in studies on magnetospheric magnetic field models

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Abstract Magnetic field model is a very useful tool not only for the representation of the magnetic field, but also for studies of the evolution of the large-scale currens, and for studies of the radiation belt particles. With the principle and characteristic of models, this paper presents three different magnetospheric magnetic field models: the empirical, the paraboloid and the event-oriented models, dwelling on not only estimating the accuracy of models but also comparing models with one another, in addition to improvement of models. All these models can model the dynamic magnetic field during storms. The latest Tsyganenko model takes into account the prehistory of the solar wind，in which each source of the magnetic field has its own relaxation timescale and a driving function.The paraboloid model A01 takes into account effects of field aligned currents and thin tail current. And an additional localized thin current sheet and asymmetric partial ring current are introduced into the event-oriented model G03.

Key words magnetospheric magnetic field　empirical model　paraboloid model　event-oriented model

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