

数学与系统科学研究院
计算数学所定期学术报告

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报告题目：

**Symplectic numerical methods of
plasma physics**

邀请人： 唐贻发 研究员

报告时间： 2017 年 4 月 26 日 (周四)

下午 16:00-17:00

报告地点： 思源楼一层

报告厅

Abstract:

The well-known symplectic algorithm has been regarded as the de facto method for numerical integration of Hamiltonian systems due to its long-term accuracy and fidelity. Dynamics of a non-relativistic and relativistic charged particle in the canonical coordinates is a Hamiltonian system, we combine the familiar sum-split method and a generating function method to construct explicit symplectic algorithms for dynamics of charged particle. For Vlasov-Maxwell equations and Schrödinger-Maxwell systems, we developed canonical symplectic methods by discretizing the Marsden-Weinstein bracket. A fast local algorithm to solve the symplectic implicit time advance is discovered without root researching or global matrix inversion. These methods inherit all the good numerical features of canonical symplectic algorithms, such as the preserving of symplectic structure and the long-term bound on energy error.

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