数学与系统科学研究院

计算数学所学术报告

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报告题目：

Lorentz Covariant Symplectic Algorithms

邀请人：　唐贻发 研究员

报告时间：2018 年 5 月 28 日（周一）

上午 9:00-10:00

报告地点：　数学院南楼七层

702 教室

Abstract:

Under Lorentz transformation, both the form and performance of a Lorentz covariant algorithm are invariant. To acquire the advantages of symplectic algorithms and Lorentz covariance, a general procedure for constructing Lorentz covariant canonical symplectic algorithms (LCCSA) is provided, based on which an explicit LCCSA for dynamics of relativistic charged particles is built. LCCSA possesses Lorentz invariance as well as long-term numerial accuracy and stability, due to the preservation of discrete symplectic structure and Lorentz symmetry of the system. For situations with time-dependent electromagnetic fields, which is difficult to handle in traditional construction procedures of symplectic algorithms, LCCSA provides a perfect explicit canonical symplectic solution by implementing the discretization in 4-spacetime. We also show that LCCSA has built-in energy-based adaptive time steps, which can optimize the compuation performance when the Lorentz factor varies.

欢迎大家参加！