数学与系统科学研究院

计算数学所网络学术报告

报告人： **Ruili Zhang**

（ *Beijing Jiaotong University* ）

报告题目：

Symplectic simulation for the gyrocenter dynamics of charged particles

邀请人： 唐贻发 研究员

报告时间：2020 年 7 月 3 日（周五）

上午 **10:30-11:30**

报告工具：腾讯会议（**ID**：**553 526 408**）

直播地址：

https://meeting.tencent.com/s/ZRrwmXDCKSAW

Abstract：

Gyrocenter dynamics of charged particles plays a fundamental and important role in plasma physics, which requires accuracy and conservation in a long-time simulation. Variational symplectic algorithms and canonicalized symplectic algorithms have been developed for gyrocenter dynamics. However, variational symplectic methods are always unstable, and canonicalized symplectic methods need coordinates transformation case by case, which is usually difficult to find.

In the following, we start from the degenerate Lagrangian of the gyrocenter dynamics of charged particles, and give a Hamiltonian system with constraints. The system can be written as in a port-Hamiltonian differential-algebraic equation (pHDAE). The flow on the manifold generated by the system is symplectic. So for the special form of pHDAE, we can apply the symplectic PRK methods. The implementation of the methods is described, and some numerical tests are reported.

欢迎大家参加！