

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:

**Conservative      Explicit      Local  
Timestepping   Schemes   for   the  
Shallow Water Equations**

报告时间: **2019 年 11 月 14 日 (周四)**

**下午 16:00-17:00**

报告地点: **数学院南楼二层**

**204 教室**

## **Abstract:**

In this talk we present high- order explicit local time-stepping (LTS) schemes for the shallow water equations. The system is discretized in space by a C- grid staggering method, namely the TRiSK scheme adopted in MPAS- Ocean, a global ocean model with the capability of resolving multiple resolutions within a single simulation. The time integration is designed based on the strong stability preserving Runge- Kutta (SSP-RK) methods, but different time step sizes can be used in different regions of the domain through the coupling of coarse-fine time discretizations on the interfaces, and are only restricted by respective local CFL con-ditions. The proposed LTS schemes are of predictor- corrector type in which the predictors are constructed based on Taylor series expansions and SSP-RK stepping algorithms. The schemes preserve some important physical quantities in the discrete sense, such as exact conservation of the mass and potential vorticity and conservation of the total energy within time truncation er-rors. Moreover, they inherit the natural parallelism of the original explicit global time-stepping schemes. Extensive numerical tests are also presented to demonstrate the performance of the proposed algorithms.

**欢迎大家参加！**