数学与系统科学研究院

计算数学所定期学术报告

报告人：　　张鉴 研究员

（ 中科院网络中心 ）

报告题目：

Scalable compact localized exponential time differencing and its application on extreme-scale phase field simulations

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报告时间：**2016** 年 **12** 月 **8** 日（周四）

下午 **16:00-17:00**

报告地点：　　数学院思源楼

一层报告厅

Abstract:

A Scalable compact Localized Exponential Time Difference method is proposed for the solution of the phase field equations. The method combines decompositions of compact spatial difference operators on a regular mesh with stable and accurate exponential time integrators and efficient algorithms. It can deal with stiff nonlinearity and both homogeneous and inhomogeneous boundary conditions of different types. We also present techniques for implementation on various modern heterogeneous hardware platforms, including clusters equipped with Intel Xeon and Xeon Phi processors and the Sunway TaihuLight supercomputer. In the application end, the highly nonlinear and severely stiff Cahn-Hilliard equations with degenerate mobility for microstructure evolution are solved at extreme scale, demonstrating that the latest advent of high performance computing platform and the new advances in algorithm design are now offering us the possibility to simulate the coarsening dynamics accurately at unprecedented spatial and time scales.

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