数学与系统科学研究院

计算数学所学术报告

报告人：**Prof. Qin Sheng**

（ Department of Mathematics, Center for Astrophysics, Space Physics and Engineering Research, Baylor University, USA ）

报告题目：

Stabilities of a Modified Peaceman-Rachford Splitting Method for the Paraxial Helmholtz Equation on Adaptive Grids

邀请人：　唐贻发 研究员

报告时间：2016 年 7 月 27 日（周三）
下午 **16:00-17:00**

报告地点：　数学院南楼七层
702 会议室

Abstract：

This talk concerns the asymptotic stability of an eikonal, or ray, transformation based Peaceman-Rachford splitting method for solving the paraxial Helmholtz equation with high wave numbers. Arbitrary nonuniform grids are anticipated in transverse and beam propagation directions. The differential equation targeted has been used for modeling propagations of high intensity laser pulses over a long distance without diffractions. Self-focusing of high intensity beams may be balanced with the de-focusing effect of created ionized plasma channel in the situation, and applications of grid adaptations are frequently essential. It is shown that the oscillation-free decomposition method on arbitrary adaptive grids is asymptotically stable with a stability index one. The result can be extended to multidimensional cases for multiphysical high-oscillatory applications. A number of simulation experiments will be given to illustrate our concern and conclusions.

Bio：

Dr. Sheng received his BS and MS in Mathematics from Nanjing University in 1982, 1985, respectively. Then he acquired his Ph.D. from University of Cambridge under the supervision of Professor Arieh Iserles. After his postdoctoral research with Professor Frank Smith, FRS, in University College London, he joined National University of Singapore in 1990. Since then, Dr. Sheng was on faculty of several major universities till his joining Baylor University, which is one of known research institutions and the second largest private university in the United States. Dr. Sheng has been interested in splitting and adaptive numerical methods for solving linear and nonlinear partial differential equations. He is also known for the Sheng-Suzuki theorem in numerical analysis. He has published over 105 refereed journal articles as well as 6 joint research monographs. He has been an Editor-in-Chief of the SCI journal, International Journal of Computer Mathematics, published by Taylor and Francis since 2010. He gives invited presentations, including keynote lectures, in international conferences every year. Dr. Sheng's projects have been supported by several U.S. research agencies. He currently advises 3 doctoral students and 1 postdoctoral research fellow.

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