

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：

**Block Preconditioning Method for
the Thermal Radiation Transport
Equations**

邀请人： 龚伟 副研究员

报告时间： 2020 年 12 月 4 日 (周五)

下午 16:00-17:00

报告地点： 科技综合楼

311 教室

Abstract:

Radiation transport equations have important applications in Inertial Confinement Fusion (ICF). In this report, we consider the preconditioned iterative solver for the grey radiation transport equations. When the material temperature equation does not have diffusion term, eliminating the temperature variable in implicit discrete ordinate methods will lead to a pseudo-scattering term which couples the radiation intensity in different directions. A popular solution for that discrete system is sweeping method embedded into source iteration. However source iteration may converge slowly and sweeping can not be successfully implemented in general unstructured grids. To remedy this, we resort to preconditioned Krylov subspace methods and some typical 3D simulations are given. In practical application, the temperature equation generally has the diffusion term. For true implicit scheme, one cannot eliminate temperature variable first and then obtain a single equation for radiation intensity. For this case, we developed a mixed finite element method and obtained the heat flux, electron temperature and radiation intensity simultaneously. And we finally proposed an efficient block preconditioning method for the resulting algebraic systems.

欢迎大家参加！