数学与系统科学研究院

计算数学所学术报告

报告人：　**Prof. Weizhu Bao**

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报告题目：

Analysis and Efficient Computation for Nonlinear Eigenvalue Problems in Quantum Physics and Chemistry

邀请人：　明平兵研究员

报告时间：　**2010** 年 **7** 月 **6** 日（周二）

下午 **4：00～5：00**

报告地点：　科技综合楼三层 **301**

计算数学所小报告厅

Abstract:

In this talk, we study asymptotically and numerically the nonlinear eigenvalue problems under constraints arising from Bose-Einstein condensation, nonlinear optics, quantum physics and chemistry. We begin with the time-independent nonlinear Schrodinger equation also known as Gross-Pitaevskii equation and reformulated it into singular perturbed nonlinear eigenvalue problems under constraints. Matched asymptotic approximations for the eigenfunctions and eigenvalues as well as the corresponding energy are presented in strongly interaction regimes. Boundary and/or interior layers and their width are presented. An efficient and accurate numerical method based on the normalized gradient flow is proposed for computing the first and/or other eigenfunctions of the nonlinear eigenvalue problems. Numerical results in one dimension (1D), 2D and 3D are reported. Finally, the analysis results and numerical method are extended to nonlinear eigenvalue problems of system of nonlinear Schrodinger equations.

欢迎大家参加！