

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:

多尺度 Maxwell 方程的均匀化方法

邀请人: 毛士鹏 副研究员

报告时间: 2014 年 6 月 14 日 (周六)

下午 14:00-15:00

报告地点: 科技综合楼三层 301
计算数学所小报告厅

Abstract:

This talk is about the homogenization of quasi-static and nonlinear Maxwell's equations in grain-oriented (GO) silicon steel laminations. GO silicon steel laminations have multiple scales, and the ratio of the largest scale to the smallest scale can be up to 10^6 . Direct solution of three-dimensional nonlinear Maxwell's equations is very challenging and unrealistic for large electromagnetic devices. Based on the magnetic vector potential and the magnetic field, respectively, we propose two macroscale models for the quasi-static Maxwell's equations. We prove that microscale solutions converge to the solutions of the macroscale models weakly in $H(\text{curl}, \Omega)$ and strongly in $L^2(\Omega)$ as the thickness of lamination tends to zero. The well-posedness of the homogenized model is established by using weighted norms. Numerical experiments are carried out for a benchmark problem from the International Compumag Society, TEAM Workshop Problem 21c-M1. The numerical results show good agreements with the experimental data and validate the homogenized model.

欢迎大家参加!