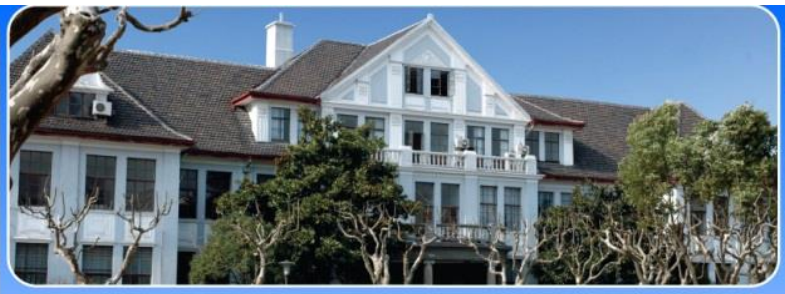


复旦大学数学科学学院
数学综合报告会

报告题目：**Exact Solution of Nonlinear Boundary Value Problems for Surface Diffusion**

报告人：Philip Broadbridge

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报告时间：2016-11-15 星期二 9:30—10：30

报告地点：光华东主楼 1801

摘要：Curvature-driven surface diffusion on crystalline surfaces is modeled by the nonlinear 4th order Mullins equation. There is a class of weakly anisotropic nonlinear models that is fully integrable. Exact solutions are constructed for development of a grain boundary groove and for smoothing of an initial ramp dislocation. For the grooving problem, a piecewise nonlinear but solvable model can be made arbitrarily close to the isotropic nonlinear Mullins equation. The solution shows that unlike in the linear model, the groove depth remains bounded as the dihedral angle approaches vertical.

At a dislocation point of infinite curvature, the quasilinear Mullins model should be extended to a fully nonlinear model to account for Gibbs-Thompson evaporation-condensation. An exactly solvable fully nonlinear degenerate diffusion model shows that unlike in the quasilinear model, deposition rate at the dislocation point is bounded, and the slope remains discontinuous for a finite time.

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