This Spring ('10) the Math Department offers the graduate course...

MATH 648M: Advanced Analytic Methods with Applications

**Instructor:** Doron Levy (dlevy@math.umd.edu)

**TuTh 12:30-1:45pm, Rm Math 1311**

**FOCUS:** Concepts and analytical tools used in various scientific disciplines. Applications from condensed matter physics, fluid and solid mechanics, materials science, quantum mechanics, biology, number and probability theory.

**TOPICS:**

**PART I: ASYMPTOTICS:** Asymptotics and perturbations for Ordinary & Partial Differential Eqs. (ODE's & PDE's) and difference eqs: WKB analysis; boundary layers; homogenization theory; multiscale expansions.


**FIG. 1:** Temperature around a plate (red: hot, to blue: cold). This can be derived by asymptotics to a PDE.

**FIG. 2:** Line defects (steps) on crystal surfaces fluctuate. Their motion is described by stochastic ODE’s.