Temple University Mathematics Colloquium

Daniel R. Reynolds

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will speak on

Scalable Implicit Methods for Magnetic Fusion Modeling

ABSTRACT:

Fusion energy holds the promise of a clean, sustainable and safe energy source. While research in this field has been ongoing for over the last half century, much work remains before it may prove a viable source of energy for the future. In this talk, I discuss some of the scientific and engineering challenges remaining in fusion energy, and the role of applied mathematics and scientific computation in helping overcome these obstacles. I then introduce some of the mathematical models used in studying fusion stability and refueling, and how solutions to those models may be approximated. Of particular interest in such approximation techniques is the ability of the relevant numerical methods to scale up to resolutions necessary for accurately modeling the underlying physics. To that end, I discuss some of my recent work in the development of fully implicit solution approaches for models of magnetic fusion devices, presenting both numerical results and theoretical analysis demonstrating the benefit of these approaches over traditional methods.

Monday, 11 February 2008
Lecture at 4:00 pm
Coffee, tea, and refreshments from 3-5 pm
Room 617, Wachman Building
Department of Mathematics