

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 7 December 2016, 4:00 p.m.

Asymptotic-Preserving Numerical Schemes for Particle Transport, with Applications in Radiation Therapy

by Martin Frank
RWTH Aachen University

Abstract.

One of the biggest challenges for particle transport simulations are multi-scale media with strongly varying material coefficients. It is especially important that a numerical scheme correctly describes the singular limit of strong scattering. This is relevant for many applications, among them radiation transport in clouds and radiation therapy. Schemes that are stable in that singular limit are called asymptotic-preserving (AP). In this talk, we will present a new method and prove its AP property. We demonstrate the practical relevance of such schemes in several application cases. Furthermore, we comment on reproducibility in computational science.