NSTD The Nuclear Science and Technology Division

SEMINAR ANNOUNCEMENT

TITLE: **LINEAR BOLTZMANN TRANSPORT EQUATION — DEVELOPMENT AND ANALYSIS OF NEW SPATIAL DISCRETIZATIONS TO BE USED IN THERMAL RADIATIVE TRANSFER PROBLEMS**

PRESENTED BY: **Teresa Bailey**

DATE: **Thursday, December 20, 2007**

TIME: **10:00 AM**

LOCATION: **Bldg. 5700, Room O304**

The linear Boltzmann transport equation is used to model particle transport behavior in many physical systems ranging from neutron populations in nuclear reactors to photon energy densities in inertial confinement fusion systems or in the atmosphere and oceans. For this reason, great effort has been expended in trying to solve the transport equation accurately and efficiently. The focus of this presentation is to discuss the development and analysis of new spatial discretizations for the transport equation to be used in thermal radiative transfer problems. These new methods are used with discrete ordinates angular discretizations and are accurate on arbitrary polyhedral grids. As a result, the new methods have the potential to increase computational efficiency of transport calculations. These new methods are Discontinuous Finite Element Methods that utilize the Piecewise Linear basis functions developed by Stone and Adams. The development and analysis of the Piecewise Linear Discontinuous Finite Element Method and preliminary computational test results that demonstrate the method's accuracy and robustness in multiple physical limits of interest will be presented.