# Department of Physics - University of South Alabama

*Presents Colloquium Speaker*


## Dr. James Kniep

( University of California, Los Angeles )


**Thursday, October 25, 2007**

4:00 p.m., ILB Room 250

## Gyrokinetic Particle-in-Cell Simulations of Strong Poloidal Flow Radial Gradient and Parallel Nonlinearity Effects on Toroidal Ion Temperature Gradient Driven Turbulence


ABSTRACT

Nonlinear gyrokinetic numerical calculations have been performed with the three-dimensional, global, toroidal, nonlinear, particle-in-cell, delta-f, massively parallel UCla-CANada (UCAN) code. Their purpose is to study the effects of the parallel nonlinearity and of strong (externally imposed) sheared flow radial gradient corrections on ion temperature gradient driven turbulence (ITGDT) in tokamaks. These calculations show that the strong flow corrections reinforce the powerful stabilizing effects of sheared poloidal flows on the saturation level of the fluctuations and on the heat flux they produce. The re-activated parallel nonlinearity, in combination with zonal flows generated through Reynolds stress by the fluctuations themselves, leads to an apparent quantitative reduction in saturation level and heat flux. This reduction does however decrease with increasing system size at fixed ion Larmor radius, i.e. with diminishing rho.


All interested persons are invited to attend.

Refreshments are served at 3:45 p.m.

Host: Dr. R. Godang