

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
APRIL 27, 2007
704 THACKERAY HALL
4:00 P.M.

SPEAKER: **PROFESSOR ERIK VAN VLECK**

UNIVERSITY OF KANSAS

TITLE: **ORTHOGONAL INTEGRATION AND THE ERROR IN
APPROXIMATING LYAPUNOV EXPONENTS**

ABSTRACT: Lyapunov exponents are often employed as an indicator of chaos in nonlinear dynamical systems. In many instances they are approximated numerically by transforming the linear variational equation about a time dependent solution to upper triangular form via a time dependent orthogonal change of variables. After presenting background on stability spectra for time dependent linear systems (e.g. Lyapunov exponents and Sacker-Sell spectrum), we consider the error in approximating the orthogonal change of variables and outline the development of a global error analysis. As consequences of the error analysis we obtain rigorous error bounds on the approximation of Lyapunov exponents and on the approximation of point spectrum for a class of linear Schrodinger operators.