

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
FRIDAY, OCTOBER 20, 2017
704 THACKERAY HALL

3:30 P.M.

ZHIWU LIN

SCHOOL OF MATHEMATICS
GEORGIA INSTITUTE OF TECHNOLOGY

INSTABILITY INDEX, EXPONENTIAL TRICHOTOMY
AND INVARIANT MANIFOLDS FOR HAMILTONIAN PDEs

ABSTRACT: Consider a general linear Hamiltonian system in a Hilbert space. Assume that the energy functional has only finitely many negative dimensions (i.e. finite Morse index) and almost no restriction on the symplectic operator is imposed. In a recent work (with Chongchun Zeng), we proved: 1) an instability index theorem to relate the linear instability of the Hamiltonian system and the Morse index; 2) the linear exponential trichotomy of the evolution Hamiltonian group. I will discuss the background, main results and some key ideas in the proof. Then several examples are given to show the application of this theory. They include: invariant manifolds and local dynamics near solitary waves of supercritical KDV equations, the barotropic instability for shear flows in geophysical fluids, and the turning point principle for the stability of gaseous stars.

Refreshments served at 3:00 p.m.
in the Math Dept. COMMON ROOM, Thackeray 705