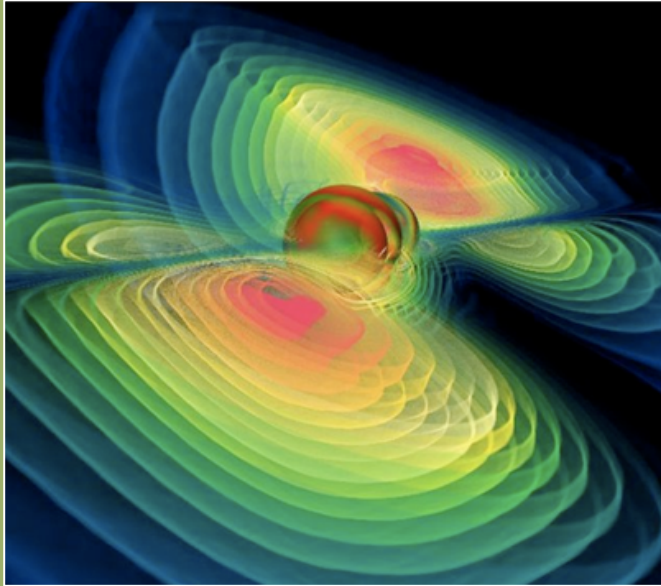


UCCS Department of Mathematics
Math Colloquium Series

IGOR RUMANOV
UNIVERSITY OF COLORADO AT BOULDER



DATE:

MARCH 15, 2018

TIME:

12:30PM-1:30PM

(REFRESHMENTS AT 12:15PM)

LOCATION:

OSBORNE A327

**Whitham modulation theory -
developments and open problems**

Abstract: I discuss the development of Whitham modulation theory as a nonlinear WKB method successfully used to describe the behavior of nonlinear dispersive waves. Recent advances include the appearance of the Whitham theory for (2+1)-dimensional evolution equations of Kadomtsev-Petviashvili (KP) type. The systems of modulation equations are used to analyze the linear stability of traveling wave solutions. These Whitham systems are expected to provide the starting point for studying the formation of dispersive shock waves in two spatial dimensions.

While the complete Whitham systems of modulation equations in (2+1)-dimensions are rather complicated, interesting physical situations are often described by their various (1+1)-dimensional reductions. Recently studied such reductions are Whitham systems for cylindrical KdV (a reduction of KP) and for radial NLS (a reduction of (2+1)-dimensional NLS).

A long-standing problem of computation of phase shifts in Whitham solutions leads to the necessity of taking into account the Whitham expansion to higher order in small dispersion parameter and exposes certain limitations of the standard Whitham approach.

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