Oberseminar
Analysis und Theoretische Physik

Prof. Dr. Mats Ehrnström
(NTNU Trondheim)

On waves of greatest height in fully dispersive nonlocal wave equations

Starting from the nonlocal Whitham equation with its fully dispersive linear operator, we consider the existence of periodic traveling waves that are not small, albeit connected to the line of vanishing solutions. Of particular interest is the existence of a highest, $C_{1/2}$-cusped, traveling wave solution, which is obtained as a limiting case at the end of the main bifurcation branch of P-periodic traveling wave solutions. We prove that this regularity is optimal. Given that the Euler equations admits a highest wave that is not cusped, but Lipschitz continuous, it is an interesting question whether a bidirectional Whitham equation, which carries the full two-way dispersion relation from the Euler equations, could encompass a Lipschitz wave as well. Due to reasons to be explained in the talk, it however turns out that the highest wave for the bidirectional Whitham equation, which we prove to exist, is not Lipschitz --- nor is its optimal regularity described by Hölder or Zygmund spaces. We characterize its behaviour near the wave crest. At the end we outline the first steps towards a more general theory. Our interest is a somewhat general large-amplitude theory for nonlinear dispersive equations.
The talk is based on joint works with E. Wahlén, Lund, M. A. Johnson and K. M. Claassen, both Kansas.

Dienstag, 17. Januar 2017, 15:00 Uhr, Raum c311
Hauptgebäude der Universität

Über Ihren Besuch würden sich freuen:

Prof. Dr. Wolfram Bauer
Prof. Dr. Joachim Escher
Prof. Dr. Olaf Lechtenfeld
Prof. Dr. Elmar Schrohe
Prof. Dr. Christoph Walker
Prof. Dr. E. Wiedemann