

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
DEPARTMENT OF MATHEMATICS

# Applied Math Colloquium

Monday, October 28, 2019

4:15pm      Room : 2 - 190



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**“Bloch theory and spectral gaps for linearized water waves”**

## Abstract

We consider the movement of a free surface of a two-dimensional fluid over a variable bottom. We assume that the bottom has a periodic profile and we study the water wave system linearized near a stationary state. The latter reduces to a spectral problem for the Dirichlet–Neumann operator in a fluid domain with a periodic bottom and a flat surface elevation. Bloch spectral decomposition is a classical tool to address problems in periodic geometries or equivalently differential operators with periodic coefficients. We show that the spectral problem admits a Bloch decomposition in terms of spectral band functions and their associated band-parametrized eigenfunctions. We find that, generically, the spectrum consists of a series of bands separated by spectral gaps which are zones of forbidden energies.