

# COLLOQUIUM

## A non-linear eigenvalue problem

Peter Lindqvist

Norwegian University of Science and Technology

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The spectrum (eigenvalues) for the Laplace operator is among the most studied objects in mathematics. The simplest version appears in the analysis of the frequencies of a vibrating string, which is familiar to most students. The eigenvalues can be obtained by minimization of the Rayleigh quotient, where the important Dirichlet integral is involved. A seemingly small change of the problem is to replace the square in the Dirichlet integral (and in the denominator) by a power  $p$ . The  $p$ -Laplace operator appears in this non-linear eigenvalue problem, first introduced by E. Lieb or by F. du Thelin.

A lot is known about this problem and the results are similar to the linear case, except that the principle of superposition is naturally lost. The first two eigenvalues are clear, but the rest of the spectrum is "terra incognita". I shall give an overview of this fascinating topic, and, if time permits, a recent non-local variant is included. Also  $p = \infty$  is considered!

The lecture will take place in Thackeray 704 at 3:30pm.  
Refreshments will start at 3:00pm.