

**Mathematisches Oberseminar** *PDG und Spektraltheorie* (WiSe 2014/15).

**Date:** 06.11.2014.

**Time and place:** 14:15 in B 134.

**Speaker:** Søren Fournais (Aarhus University).

**Titel:** *Optimal magnetic Sobolev constants in the semiclassical limit.*

**Abstract:**

We introduce the following nonlinear eigenvalue, or optimal magnetic Sobolev constant:

$$\lambda(\Omega, \mathbf{A}, p, h) = \inf_{\psi \in H_0^1(\Omega), \psi \neq 0} \frac{\mathcal{Q}_{h, \mathbf{A}}(\psi)}{\left( \int_{\Omega} |\psi|^p dx \right)^{\frac{2}{p}}} = \inf_{\substack{\psi \in H_0^1(\Omega), \\ \|\psi\|_{L^p(\Omega)} = 1}} \mathcal{Q}_{h, \mathbf{A}}(\psi),$$

where the magnetic quadratic form is defined by

$$\forall \psi \in H_0^1(\Omega), \quad \mathcal{Q}_{h, \mathbf{A}}(\psi) = \int_{\Omega} |(-ih\nabla + \mathbf{A})\psi|^2 dx.$$

This object, and the corresponding minimizing functions, are of obvious interest in non-linear evolution problems.

We obtain—under different classes of assumptions on the magnetic field generated by the vector potential  $\mathbf{A}$ —leading order asymptotic estimates on  $\lambda(\Omega, \mathbf{A}, p, h)$  as well as localisation estimates for the minimizers.

This work is based on collaboration with Nicolas Raymond (Rennes).

Thomas Østergaard Sørensen