

Mathematics 512
Spectral Theory of Schrödinger Operators

Outline

This course will be an introduction to the spectral theory of Schrödinger operators. The course will be divided into three parts. The first part is a general introduction to the spectral theory of self-adjoint operators on Hilbert spaces. The topics for this part are

- brief review of bounded operators on Hilbert spaces (Reed and Simon, volume 1, Chapter VI)
- the spectral theorem for bounded self-adjoint operators (Reed and Simon, volume 1, Chapter VII)
- unbounded self-adjoint operators (parts of Reed and Simon, volume 1, Chapter VIII)
- introduction to Schrödinger operators

The other two parts consist of two independent applications of the above general theory.

- scattering theory of Schrödinger operators
- spectral theory of periodic Schrödinger operators

Prerequisites

Permission of the instructor. You will need a very rudimentary knowledge of L^2 spaces and bounded operators on Hilbert spaces. See, for example, Chapters I and II and Sections VI.1–VI.3 of Reed and Simon, volume I.

Text

None, though M. Reed and B. Simon, volume 1 could be used as a text for the first third of the course.

References

- M. Reed and B. Simon, **Methods of Modern Mathematical Physics, I: Functional Analysis**, Academic Press, 1972.
- M. Reed and B. Simon, **Methods of Modern Mathematical Physics, IV: Analysis of Operators**, Academic Press, 1978.

Instructors

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