Fakultät für Mathematik

Mathematisches Kolloquium

EINLADUNG

Prof. Dr. Maurice De Gosson

(Universität Wien)

"Born-Jordan Quantization and Pseudodifferential Operators"

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Abstract: Quantum mechanics is one of the most successful sciences ever. There are several possible mathematical formulations of this theory, one of the most effective being operator theory because it allows the calculation of spectral values corresponding to the energy levels of atoms. This however raises a basic question: given a classical "observable" (energy, angular momentum, etc.) what should the associated quantum operator be? This question has led indirectly to vast developments in operator theory, in particular pseudodifferential theory under the name of "quantization schemes". In this talk we explain the questions at issue, and compare the Weyl quantization with the less well-known Born Jordan quantization. The differences between Weyl and Born Jordan quantization are in fact of a rather subtle nature; for instance, observables (or "symbols" as they are called in mathematics) will not correspond in a one-to-one fashion to operators (quantum physicists would talk about the non-uniqueness of dequantization). Born - Jordan pseudodifferential calculus moreover leads to an alternative version of phase space quantum mechanics, where the usual Wigner distribution has to be replaced with a new generalized quasi-distribution which is being intensively studied in time-frequency analysis. In this talk we begin by giving some physical motivations, we thereafter give a user-friendly definition of pseudodifferential operators accessible to a large audience; we thereafter discuss the issue of invertibility of this quantization scheme following recent yet unpublished results obtained in collaboration with E. Cordero and F. Nicola. We finally briefly discuss the issue of continuity of Born- Jordan operators in Feichtinger's modulation spaces.

Zeit: Mittwoch, 4. November 2015
15.45 Uhr Kaffeejause,
anschließend 16.15 Uhr Vortrag
Vinum cum pane nach dem Vortrag

Ort: Fakultät für Mathematik,
Oskar-Morgenstern-Platz 1,
Sky Lounge

Harald Rindler