

S E M I N A R



Prof Stef Roux

University of Pretoria and
University of Toronto, Canada

Date:

Friday, 10 May 2024

Time:

14h00-15h00 SAST

Venue:

- NITheCS Seminar Room
University of KwaZulu-Natal
Westville Campus
3rd Floor, H-Block,
School of Chemistry and Physics
- Online

Refreshments will be served.

Enquiries:

Email Neli Mncube:
neli.mncube@nithecs.ac.za

Quadrature bases for a fermionic Wigner functional theory

ABSTRACT:

A Grassmann functional phase space is formulated in terms of quadrature bases, allowing the representation of fermion states and operators in terms of fermionic Wigner functionals. Suitable fermionic operators are identified that are analogues to boson quadrature operators. These fermionic quadrature operators are defined with relative spin transformations between the ladder operators, in contrast to the Majorana operators. The eigenstates of the fermionic quadrature operators provide complete orthogonal bases, with their dual space defined through the incorporation of a spin transformation. These quadrature bases lead to the definition of a symplectic Grassmann phase space on which Wigner functionals are defined in a way equivalent to the bosonic case.

Filippus Stefanus Roux (Stef) earned a PhD in Electronic Engineering from the University of Pretoria in 1990 and another in Theoretical Particle Physics from the University of Toronto (Canada) in 2000. He was a faculty member of electrical/electronic engineering departments at the University of Potchefstroom, University of Ottawa, and University of Pretoria. He also worked at government laboratories, including the CSIR (Aerotek, which is currently called DPSS, and the National Laser Centre), and National Metrology Institute of South Africa, from which he retired in 2023. While living in Canada, he spent two years in industry at JDS Uniphase Corporation (currently called Lumentum). During most of his career, he worked on fields in optics (diffractive optics, singular optics, periodic structures, fibre optics, etc). He has a strong interest in particle physics and quantum physics. His current focus is quantum optics.

WHO SHOULD ATTEND?

This colloquium talk is intended to be accessible to postgraduate students. All are welcome!

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