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THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

GEOMETRIC MECHANICS SEMINARS

SPEAKER:

UTE A. MUELLER
Arnold Sommerfeld Institut fuer Theoretische Physik
TU Clausthal, Germany

On the Topic:

"Reproducing Kernel Hilbert Spaces and their Relation to Quantisation Methods"

Let X be a locally compact space, and $\mathcal{H}$ a separaable Hilbert space. A reproducing kernel is a map $K : X \times X \longrightarrow \mathcal{L}(\mathcal{H})$ with the following properties:

- $\forall x \in X, K(,x) \in \mathcal{H}$,
- $\forall x \in X \forall \psi \in \mathcal{H}, \psi(x) = (K(,x)\psi)$, where $(,)$ denotes the inner product in $\mathcal{H}$

$\mathcal{H}$ together with the map K is called a reproducing kernel Hilbert space.

We exhibit two regimes in which reproducing kernel Hilbert spaces emerge as a natural tool while quantising a physical system.

In the first case we give a quantisation rule given by means of a positive operator valued measure of the phase space of a physical system. Under the assumption that the positive operator valued measure possesses a density, we may then realise it as positive operator valued measure on reproducing kernel Hilbert space. As a consequence the observables of the system are relaised in terms of the reproducing kernel.

In the second case the kernel is used to construct a quantisation of both the states as well as the observables of the system in question.

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3:30 pm, room 3018, at The Fields Institute

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