

Institute Colloquium



S. N. Bose National Centre for Basic Sciences
(An Autonomous Research Institute established under DST, GOI)



28 NOVEMBER, 2023



4.00 PM



Silver Jubilee Hall



YouTube Link



Webinar Link

Title:

Zig-zag dynamics in a Stern-Gerlach spin measurement

Abstract:

The Stern-Gerlach setup of spin measurement is paradigmatic for a quantum measurement. We review its history and visualize its (particle) trajectories as a zig-zag dynamics of electrons (similar to a run-and-tumble dynamics). In the case of a single particle, the motion is always (approximately) luminal, with a zig-zag motion in the direction of the spin vector. During the passage through a Stern-Gerlach device, the spin vector and hence the direction of zig-zag motion may change. We examine the case of an EPR-pairs well, where we let one of the entangled particles pass through a Stern-Gerlach spin measurement, visualizing action at a distance. The presentations illuminate the notion of effective collapse (as it appears in repeated measurements), and they clarify the different meanings of “spin” as a property of the wave function and as a random variable within position measurement via the 100-year-old Stern-Gerlach setup (collaboration with Simon Krekels, Kasper Meerts, and Ward Struyve).

Speaker: Prof. Christian Maes

Professor, Department of Physics and Astronomy,
KU Leuven, Belgium.

Short Biography of the Speaker:

Prof. Christian Maes is a professor of theoretical physics at KU Leuven, Belgium. His primary areas of research are statistical physics, nonequilibrium thermodynamics and mathematical physics. Prof. Maes has made fundamental contributions towards understanding the role of entropy production and frenesy in characterizing dynamical fluctuations away from equilibrium. His current research interests include study of canonical non-equilibrium structures in dynamical and quantum large deviations, active matter and nonequilibrium calorimetry.

