Coloquio IMAFI
Instituto de Matemática y Física
Universidad de Talca
Camino Lircay S/N, Campus Norte, Talca-Chile

Geometry of Quantum States and Quantum Correlations

Dominique Spehner*
Institut Fourier and LPMMC, Université Grenoble Alpes, France.

Abstract

Quantum systems exhibit correlations which are stronger than correlations in classical stochastic processes and lead to the violation of the Bell inequalities. These quantum correlations are believed to be at the origin of the better efficiencies of quantum computers and communication protocols, as compared to their classical analogs.

In this talk, I will first introduce a geometrical framework to quantum mechanics. The properties of the manifold of all states of a given quantum system will be analyzed from a Riemannian geometry viewpoint. I will then show how one can use this framework to quantify quantum correlations and will show an unexpected link of the latter problem with the problem of discriminating unknown quantum states.

This is a joint work with F. Mahmoudhi and M. Orszag.

*e-mail: dominique.spehner@univ-grenoble-alpes.fr