

IGNACIO CIRAC LABORATORY

course

GROUP THEORY, QUANTUM CORRELATION SETS AND TSIRELSON'S PROBLEM

PLACE: Aula Naranja, ICMAT (Campus de Cantoblanco, Madrid)

DATE: March 6-10, 2017. 15:30 - 17:00 h

SPEAKER: William Slofstra (Institute for Quantum Computing, IQC, Waterloo University)

ORGANIZER: ICMAT

ABSTRACT: In quantum probability, composite systems are typically modeled using either tensor-product models, or commuting-operator models. These two choices correspond to the minimal and maximal tensor product of C^* -algebras. Tsirelson's problem asks whether the observable consequences of these two choices, as captured by simple objects called quantum correlation sets (or behaviours), are the same. Tsirelson's problem comes in several variants; the most important variant is known to be equivalent to Connes' embedding problem by work of Junge, Navascués, Palazuelos, Pérez-García, Scholz, and Werner, of Fritz, and of Ozawa.

In this course, I will describe how to solve an easier variant of Tsirelson's problem using a connection to combinatorial group theory. The first two lectures will be at a survey level, covering some of the background from operator algebras and combinatorial group theory respectively. The remaining lectures will cover the construction in detail.