Spin systems and phases of matter

Rapport sur les contributions

ID de Contribution: **1**　　　　　　　　　　　　　　　　Type: **Non spécifié**

The two-lane exclusion process

mercredi 4 juin 2025 13:30 (1 heure)

We consider the simple exclusion process on $\mathbb{Z} \times \{0, 1\}$, that is, a "horizontal ladder" composed of 2 lanes, depending on 6 parameters. Particles can jump according to a lane-dependent translation-invariant nearest neighbour jump kernel, i.e. "horizontally" along each lane, and "vertically" along the scales of the ladder. We investigate the extremal invariant measures, then the hydrodynamic behavior and local equilibrium of this model. We highlight new phenomena arising beyond the one-dimensional exclusion dynamics.

Joint works with Gidi Amir, Christophe Bahadoran, Ofer Busani.

Orateur: SAADA, Ellen (MAP5, CNRS-Université Paris Cité)

ID de Contribution: **2**   Type: **Non spécifié**

Symmetry breaking in 3d QED

mercredi 4 juin 2025 15:00 (1 heure)

QED in 2+1 dimensions is among the simplest and yet very rich examples of strongly interacting gauge theories, arising in many physical contexts. When the number of electrons is large, the theory is known to flow to a symmetry-preserving interacting CFT at low energies, but there is evidence that this scenario is excluded below some critical value of the number of electrons. Focusing on the case of two electrons, we argue that the theory must then spontaneously break its U(2) global symmetry to a U(1) subgroup via the condensation of monopole operators. This gives rise to a non-linear sigma model with target space a squashed three-sphere, equipped with a theta term required by anomaly matching. Time permitting, I will also discuss how this scenario is consistent with deformations of supersymmetric QED with eight supercharges.

Orateur: NIRO, Pierluigi (SISSA, Trieste)

ID de Contribution: **3**   Type: **Non spécifié**

Ornstein—Zernike theory for the near-critical planar random cluster model

mercredi 4 juin 2025 16:15 (1 heure)

In this talk, we will discuss the classical Ornstein-Zernike theory for the random-cluster models (also known as FK percolation). In its modern form, it is a very robust theory, which most celebrated output is the computation of the asymptotically polynomial corrections to the pure exponential decay of the two-points correlation function of the random-cluster model in the subcritical regime. We will present an ongoing project that extends this theory to the near-critical regime of the two-dimensional random-cluster model, thus providing a precise understanding of the Ornstein-Zernike asymptotics when p approaches the critical parameter p_c. The output of this work is a formula encompassing both the critical behaviour of the system when looked at a scale negligible with respect to its correlation length, and its subcritical behaviour when looked at a scale way larger than its correlation length. Based on a joint work with Ioan Manolescu.

Orateur: D'ALIMONTE, Lucas (LPSM, Sorbonne Université)