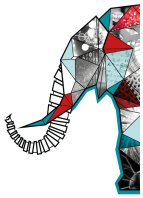
25e Congrès Général de la Société Française de Physique



Contribution ID: **264** Type: **Orale**

Polariton graph simulators

Tuesday, 9 July 2019 08:30 (30 minutes)

Recently several gain-dissipative platforms based on the networks of optical parametric oscillators, coupled lasers and various non-equilibrium Bose-Einstein condensates such as exciton-polariton, atomic and photon condensates have been proposed as analogue Hamiltonian simulators for solving large-scale hard optimisation problems. Such platforms use an approach to finding the global minimum of spin Hamiltonians which is different from quantum annealers or quantum computers. However, in general, the parameters of such spin Hamiltonians when realised by gain-dissipative simulators depend on the node occupancies that are not known a priori, which limits the simulators applicability to the classes of problems easily solvable by classical computations. I show how to overcome this difficulty and formulate algorithms for solving the NP-hard large-scale optimisation problems such as constant modulus continuous quadratic optimisation and quadratic binary optimisation for any general matrix. To solve such problems any gain-dissipative simulator has to implement a feedback mechanism for the dynamical adjustment of the gain and coupling strengths, so that occupancy of each node is the same. I will illustrate the work of such a simulator using the polariton graph platform that we recently realised in experiments.

Choix de session parallèle

2.3 Fluides quantiques et lumière

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Session Classification: Séance Parallèle