Quantum Annealing is a metaheuristic to solve optimization problems. The solution of a given problem corresponds to the ground state of a quantum system, then a time-evolution of the system is set in order to reach the ground state with high probability. The typical hardware architecture of a quantum annealer is given by a network of qubits arranged on the vertices of a graph whose edges represent the interactions between neighbors. Since the graphs of the existing physical machines present low connectivity, the embedding of an optimization problem into the annealer architecture may be computationally hard with deleterious effects on performances.

Hybrid quantum-classical algorithms represent an alternative to the direct reduction of a given problem into the sparse annealer graph. In this talk we give an overview on the hybrid paradigm and present a novel strategy based on repeated calls of a quantum annealer within a classical algorithm where the representation of an objective function into the annealer architecture is not a priori fixed and already visited solutions are penalized by a tabu search. Moreover we show the convergence of our algorithm to a global optimum in the case of quadratic unconstrained binary problems.