Louis FRY-BOURIAUX

Title:
Platform for the experimental characterisation of diabatic quantum annealing.

Abstract:
We have developed a 4-spin quantum annealing problem instance and associated schedules on which the dynamics of diabatic quantum annealing (DQA) can be investigated. The experiment is designed to be implemented on existing flux qubit circuits and can be operated within the capabilities of instruments and experimental wiring used for scheduling. Our gadget is designed such that the system passes through two local energy-gap minima during the annealing process. Operating in the diabatic regime allows the system to transition to the first excited state at the first minimum, and back to the ground state at the second. The magnitudes of the minima and the time interval between them can be tuned independently whilst keeping the total annealing time fixed, allowing the dynamics of the DQA process to be investigated as a function of these parameters. The platform could also serve as a tool to characterise the interaction of the whole circuit with its environment.