

## Day 3 (Poster E)

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Title: Pausing and reverse annealing of the p-spin model in a dissipative environment

Abstract:

Different schedules including pausing and reverse annealing may improve the performance of quantum annealing in the presence of a dissipative bath. We focus on the fully-connected ferromagnetic p-spin model, an analytically solvable model with a search-like behavior. We investigate the effect of pausing and observe improvements up to two orders of magnitude with respect to an isolated quantum dynamics of the same duration. In reverse quantum annealing, the initial state is an eigenstate of the final problem Hamiltonian and the transverse field is cycled rather than strictly decreased as in forward quantum annealing. Even in this case we show that the open-system dynamics substantially enhances the performance of reverse annealing. Namely, including dephasing overcomes the failure of purely closed-system reverse annealing to converge to the ground state of the p-spin model.

[1] G Passarelli, V Cataudella, P Lucignano, Improving quantum annealing of the ferromagnetic spin model through pausing *Physical Review B* 100 (2), 024302 (2019)

[2] G Passarelli, KW Yip, DA Lidar, H Nishimori, P Lucignano Reverse quantum annealing of the -spin model with relaxation *Physical Review A* 101 (2), 022331 (2020)