**Variational Quantum Annealing Simulations of Non-stoquastic Hamiltonians**

**Abstract:**It was recently shown that the quantum annealing paradigm could be emulated in a variational Monte Carlo (VMC) framework using autoregressive neural networks [1]. In [1], only stoquastic driver Hamiltonians were considered. In this talk, we leverage the fact that the VMC algorithm is inherently sign-problem-free to simulate quantum annealing with non-stoquastic drivers. We show that the variational quantum annealing method can capture the dynamics of various non-stoquastic Hamiltonians and is able to provide an advantage for annealing paths hampered by exponentially closing gaps [2].

[1] M. Hibat-Allah, E. M. Inack, R. Wiersema, R. G. Melko, J. Carrasquilla, *Nature Machine Intelligence, volume 3, pages 952–961 (2021)*

[2] Nishimori and Takada, Frontiers in ICT 4, 2 (2017)