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Quantum simulations for heavy ion physics

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Applications of quantum computing to nuclear physics have been studied intensively in recent years. One natural application of quantum computing is the simulation of real-time dynamics of a QCD matter via first principles, which is difficult on a classical computer due to the sign problem. In this talk, I will focus on the viscosity and discuss a general quantum algorithm for computing the viscosity via first principles. Due to the limitation of resources, such calculation on a quantum computer is possible only for small-volume systems in the foreseeable future. I will discuss finite-volume effects on the computation of the viscosity in the context of the quantum algorithm.

Authors: YAMAUCHI, Yukari; Dr LAMM, Henry (Fermi National Accelerator Laboratory); Dr LAWRENCE, Scott (University of Colorado - Boulder)

Presenter: YAMAUCHI, Yukari

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