

# A quantum simulation menu

Guang Hao Low,<sup>1,\*</sup> David Poulin,<sup>2,†</sup> and Matthias Troyer<sup>1,‡</sup>

<sup>1</sup>*Quantum Architecture and Computation Group, Microsoft Research, Redmond, WA 98052, USA*

<sup>2</sup>*Département de Physique & Institut Quantique, Université de Sherbrooke, Québec, Canada*  
*Canadian Institute for Advanced Research, Toronto, Ontario, Canada M5G 1Z8*

(Dated: November 30, 2018)

In a first step, we review the methods available to perform quantum simulations. In a second step we consider the combinations that are optimal for various applications.

## I. TIME EVOLUTION

[1]

## II. GROUND STATE AND THERMAL STATES

## III. LATTICE MODELS

## IV. MOLECULES

- 
- [1] I. Kassal, J. D. Whitfield, A. Perdomo-Ortiz, M.-H. Yung, and A. Aspuru-Guzik, Annual Review of Physical Chemistry, **62**, 185 (2011).

---

\* guanghao.low@microsoft.com

† David.Poulin@USherbrooke.ca

‡ mtroyer@microsoft.com