Claudio’s Group with Claudio

Kai-Hsin Wu
Guilherme Delfino
Aleksei Khudorozhkov
Claudio Chamon
Shiyu Zhou
Elliot Yu
• Quantum Circuit Complexity
  ❖ *Clifford Circuits* + 1 *T gate*

• Quantum Simulation
  ❖ *Experimental Realization of Exotic States in Quantum Machines*
Clifford Circuits + T gates

- Clifford Circuits
  - Classically Simulatable
  - Maximal Entanglement

- Universal Circuits
  - Maximal Entanglement
  - Not-Classically Simulatable

1 T-gate
Quantum Simulation

\[ H_{\text{dwave}} = \frac{A(s)}{2} \sum_i \sigma_i^x + \frac{B(s)}{2} \left( \sum_i h_i \sigma_i^z + \sum_{i,j} J_{i,j} \sigma_i^z \sigma_j^z \right) \]

Chimera Graph:

Source: D-Wave
$\mathbb{Z}_2$ Spin Liquids

: Spin up  : Spin down

Diagram showing a lattice with spins represented by lines and arrows.
Thank you

–Shiyu Zhou