Variational Quantum Eigensolver
- SQUANDER -

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Variational Quantum Eigensolver (VQE)

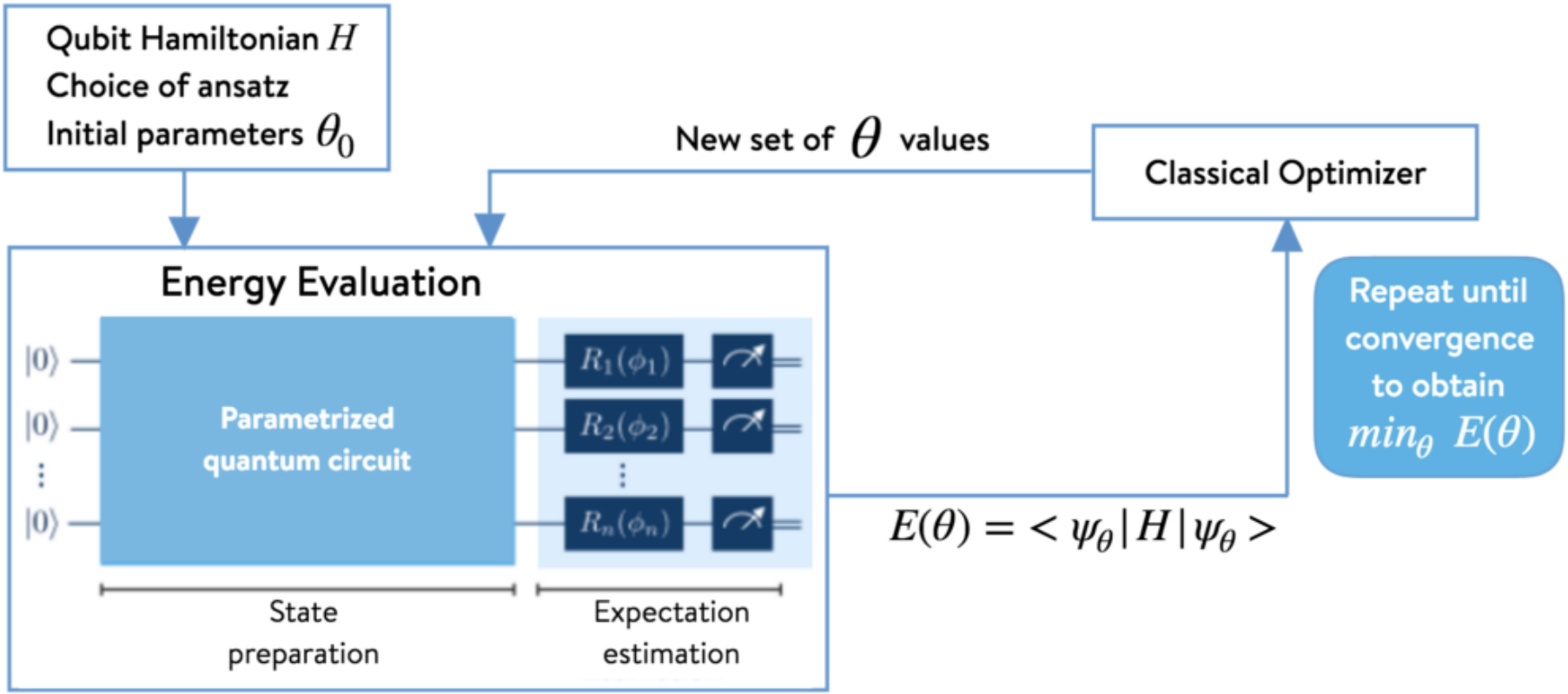


Figure 1: qmunity.thequantuminsider.com

Classical optimization processes

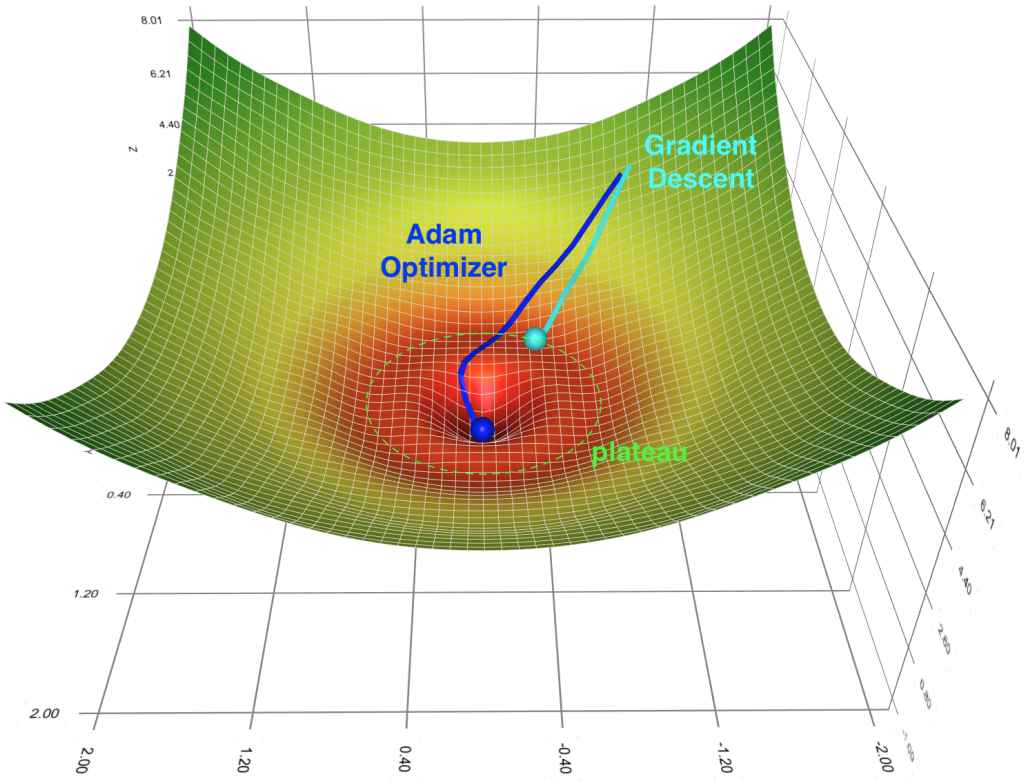
Gradient-based methods

- **Gradient Descent**
- **Parameter Shift Rule** (Quantum GD)
- **ADAM** (Adaptive Moment Estimation)
- **BFGS** (Broyden–Fletcher–Goldfarb–Shanno)

Gradient-free methods

- **Powell's method**
- **COBYLA** (Constrained Optimization BY Linear Approximation)
- **Nelder–Mead**
- **Batched Line Search Strategy** (SQUANDER built-in)

Barren Plateau (BP) Problem



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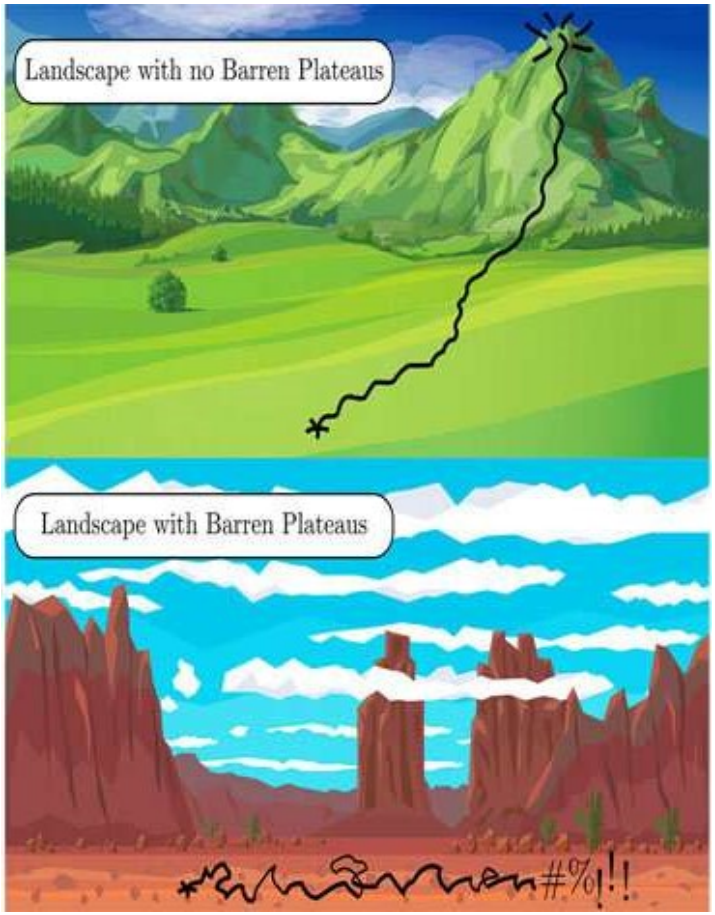

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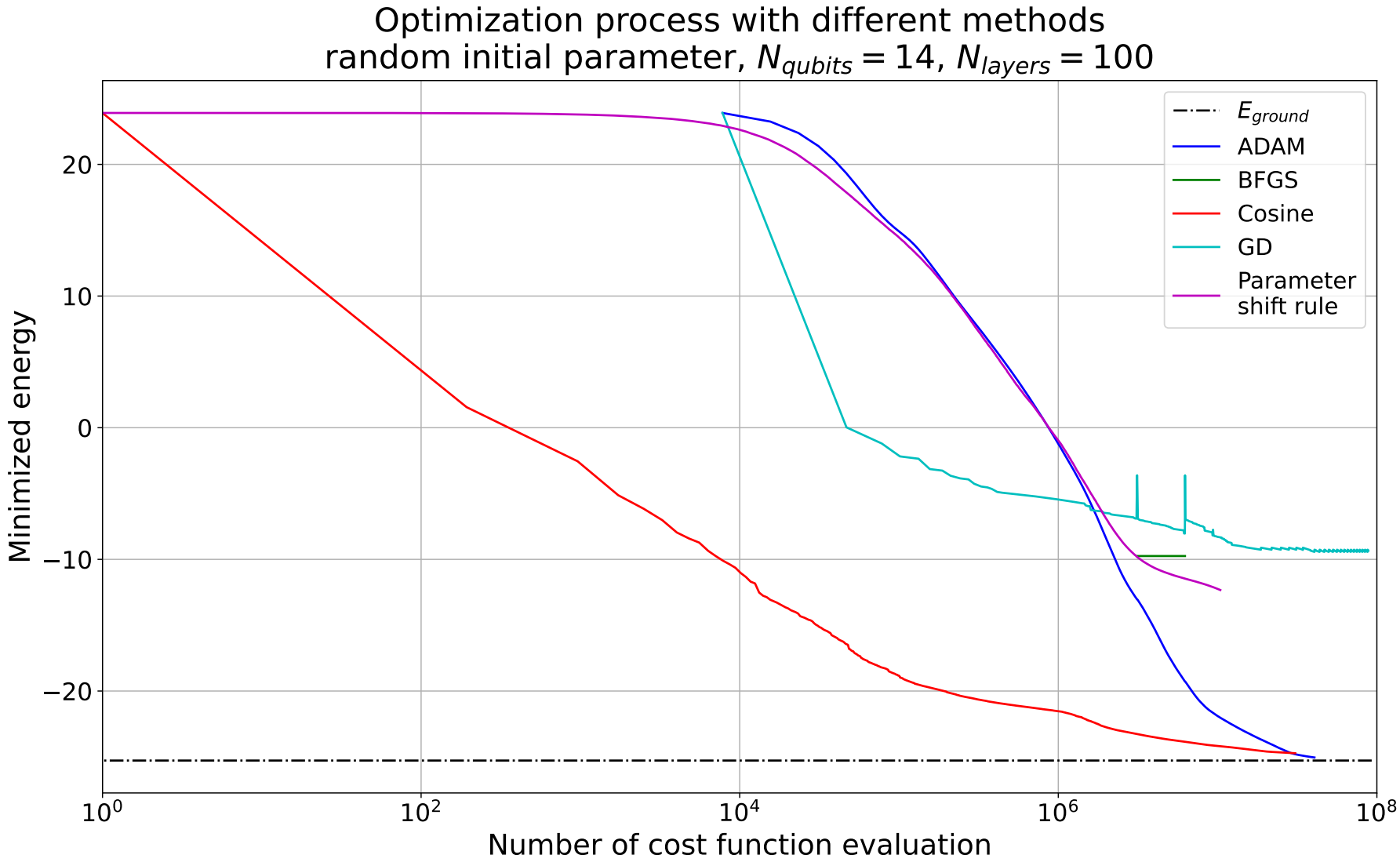
Example for BP



Future plans

- Changing the degree of network in the Hamiltonian generation process.
- Run simulation with *ADAM*, *Powell* and *Batched Line Search* methods.
- Compare the different results.